



CENSUS OF INDIA 1951

VOLUME VI

WEST BENGAL, SIKKIM & CHANDERNAGORE

PART IC—REPORT

A. MITRA
*of the Indian Civil Service,
Superintendent of Census Operations
and
Joint Development Commissioner, West Bengal*

PUBLISHED BY THE MANAGER OF PUBLICATIONS, DELHI
PRINTED BY THE GOVERNMENT OF INDIA PRESS, CALCUTTA, INDIA
1953

THE CENSUS PUBLICATIONS

THE CENSUS PUBLICATIONS for West Bengal, Sikkim and Chandernagore will consist of the following volumes. All volumes will be of uniform size, demy quarto 8½"×11½":

Part IA—General Report by A. Mitra containing the first five chapters of the Report in addition to a Preface, an Introduction, and a bibliography. 587 Pages.

Part IB—Vital Statistics, West Bengal, 1941-50 by A. Mitra and P. G. Choudhury, containing a Preface, 60 tables, and several appendices. 75 Pages.

Part IC—General Report by A. Mitra (the present volume).

Part II—Union and State Census Tables of West Bengal, Sikkim and Chandernagore by A. Mitra. 535 Pages.

Part III—Report on Calcutta City by A. Mitra. About 550 Pages.

Part IV—Tables of the Calcutta Industrial Region by A. Mitra. About 450 Pages.

Part V—Administrative Report of the Census Operations of West Bengal, Sikkim, Chandernagore and Calcutta City: Enumeration: by A. Mitra. 96 Pages.

The Tribes and Castes of West Bengal—edited by A. Mitra, containing 1951 tables of Scheduled Castes and Scheduled Tribes in West Bengal. A monograph on the Origin of Caste by Sailendranath Sengupta, a monograph on several artisan castes and tribes by Sudhansu Kumar Ray, an article by Professor Kshitishprasad Chattopadhyay, an article on Dharmapuja by Sri Asutosh Bhattacharyya. Appendices of selections from old authorities like Sherring, Dalton, Risley, Gait and O'Malley. An Introduction. 414 Pages and eighteen plates.

An Account of Land Management in West Bengal, 1872-1952, by A. Mitra, containing extracts, accounts and statistics over the 80-year period and agricultural statistics compiled at the Census of 1951, with an Introduction. About 312 Pages.

Fairs and Festivals in West Bengal by A. Mitra, containing an account of fairs and festivals classified by villages, unions, thanas and districts. With a foreword and extracts from the laws on the regulation of fairs and festivals. 45 Pages.

District Handbooks for each West Bengal District by A. Mitra. Each volume contains an Introductory essay, bringing the old Gazetteer up to date, several important appendices, and about 82 tables, together with a list of ancient monuments in each district. Contains also a village directory where the J. L. No. of every village, its name, area, total population, number of houses, number of literates and population classified into eight livelihood classes are tabulated. The whole series is expected to be complete by 1954. Each volume will contain about 300 pages (14 volumes).

A catalogue of the better known ancient monuments of West Bengal by A. Mitra. Will contain brief descriptions of extant ancient monuments in each district of the State, dating up to 1800, with exact location and present state. Translations of all inscriptions found in West Bengal and an account of all invasions or conquests of Bengal mentioned in inscriptions. With many plates. About 600 Pages.

Any statement made or conclusion drawn in this Report is wholly the responsibility of the author alone in his personal capacity and does not necessarily represent the views of Government

CONTENTS

CHAPTER VI	PAGE
SECTION 1—Preliminary Remarks	1
SECTION 2—Religion	2
SECTION 3—Territorial Distribution of House and Households: size and composition of family households	12
SECTION 4—Sex Ratios	12
SECTION 5—Marital Status Ratios	15
SECTION 6—Age Groups	16
SECTION 7—Literacy and Educational Qualifications	22
SECTION 8—Mother Tongue and Bilingualism	28
A Note on the Recording of Mother Tongues of Certain Scheduled Castes and Scheduled Tribes	36
A Note on the Maternity Data of Married Women in Rural Areas of West Bengal .	41
A Note on Vital Index for West Bengal	71
SUBSIDIARY TABLES	91
[See page xi for details]	
REPRINTS AND SPECIAL NOTES	
I Extract from Ain-i-Akbari of Abul Fazl—I—Allami—Bengal Subah	169
IA Extract from Ain-i-Akbari of Abul Fazl—I—Allami—A'IN V & VI	173
II Extract from Travels in the Mogul Empire—Francis Bernier	177
III Remarks on the Husbandry and Internal Commerce of Bengal—H. T. Colebrooke	180
IV Extract from An Account of the District or Zila of Dinajpur—By Francis Buchanan Hamilton on the population of the district and the causes which operate on its increase or diminution	232
V Extract from An Account of the District or Zila of Dinajpur—By Francis Buchanan Hamilton on the Land Tenures of Dinajpur	237
VI On recent changes in the Delta of the Ganges—James Fergusson	251
VII Progress of Electricity Supply in West Bengal—Manoranjan Datta	272
VIII Land Utilisation in West Bengal During the Last Thirty Years—Bimal Chandra Sinha	297
BRIEF ACCOUNTS OF SOME OF THE NATURAL RESOURCES AND INDUSTRIES OF THE STATE (With Two Bibliographies)—Chanchalkumar Chatterjee and Kamal Majumdar	305

ILLUSTRATIONS AND MAPS

		PAGE
1	Sample male and female populations by quinquennial age groups (Ungraduated)	13
2	Sample male and female populations by quinquennial age groups (graduated by Tertiary Septenary method with mortality correction)	14
3	Diagrams in respect of districts Burdwan, Hooghly, Calcutta and 24-Parganas, showing the proportion of unmarried, married and widowed or divorced persons	17
4	Sex ratio of first child born	50
5	Number of children born at different ages of mothers (quinquennial periods)	51
6	Changes in Vital Index by quinquennial periods, 1901-50	90
7	Diagram section across the bed of a River (Fergusson)	255
8	Diagram illustrating the Secular Elevation of Delta (Fergusson)	255
9	Diagram illustrating the junction of tributary streams with main rivers (Fergusson)	255
10	Fergusson—Delta of the Ganges (3 diagrams)	facing page 256
11	Map of the Rivers of Bengal (Fergusson)	257
12	Electricity generations and sales in West Bengal (1941-51)	293
13	Electricity generation and sales, 1950	294
14	Production of electricity in K.W.H. per head of population, 1938 and 1947	294
15	Map of West Bengal showing existing and projected power stations	295
16	The South Calcutta Electrification Scheme	296
17	The Raniganj Coal Field Electrification Scheme	296
18	Map Showing State Electrification Schemes in parts of West Bengal	facing page 296
19	The Mayurakhi Hydro-Electric Scheme: Route Diagram of H. T. Lines	" 296
20	The Mayurakhi Hydro-Electric Scheme: Diagrammatic Layout of Lines and Sub-station Equipment	" 296

SUBSIDIARY TABLES
CONTENTS

TABLES	PAGE
<i>Series I—General Population</i>	
I.1 } Area and Population, actual and Percentage by thana Density	92
I.1a }	97
I.2 } Variation and Density of General Population	98
I.3 } Mean Decennial Growth rates during three decades—General Population	101
I.4 } Immigration	102
I.5 } Emigration	103
I.6 } Migration between the State and other parts of India	103
I.7 } Variation in natural Population	103
I.8 } Livelihood pattern of general population	103
<i>Series II—Rural Population</i>	
II.1 } Distribution of Population between villages	104
II.2 } Variation and density of rural population	104
II.3 } Mean Decennial Growth rates during three decades—Rural population	105
II.4 } Livelihood pattern of rural population	106
<i>Series III—Urban Population</i>	
III.1 } Distribution of population between towns	107
III.1a }	108
III.2 } Variation and density of urban population	108
III.3 } Mean decennial Growth rates during three decades—Urban population	110
III.4 } Towns classified by population	110
III.5 } Cities—Chief figures	110
III.6 } Number per 1,000 of the General population and of each livelihood class who live in towns	110
III.7 } Livelihood pattern of Urban population	111
<i>Series IV—Agricultural Classes</i>	
IV.1 } Agricultural Classes per 1,000 persons of general population; number in each Class and Sub-class of 10,000 persons of All Agricultural Classes; and comparison with agricultural holdings by size	112
IV.1a }	114
IV.2 } Livelihood Class I (Cultivators of land wholly or mainly owned and their dependents)—Number per 10,000 persons of Livelihood Class I in each sub-class; secondary means of Livelihood of 10,000 persons of Livelihood Class I	114
IV.3 } Livelihood Class II (Cultivators of land wholly or mainly unowned and their dependents)—Number per 10,000 persons of Livelihood Class II in each sub-class; Secondary Means of Livelihood of 10,000 persons of Livelihood Class II	115
IV.4 } Livelihood Class III (Cultivating labourers and their dependents)—Number per 10,000 persons of Livelihood Class III in each sub-class; Secondary Means of Livelihood of 10,000 persons of Livelihood Class III	116
IV.5 } Livelihood Class IV (Non-cultivating owners of land; agricultural rent receivers and their dependents)—Number per 10,000 persons of Livelihood Class IV in each sub-class; Secondary Means of Livelihood of 10,000 persons of Livelihood Class IV	117
IV.6 } Active and Semi-active workers in cultivation	118
IV.7 } Progress of cultivation during three decades	119
IV.8 } Components of cultivated area <i>per capita</i> during three decades	120
IV.9 } Land area <i>per capita</i> (1951); and trend of cultivation <i>per capita</i> during three decades	122
<i>Series V—Non-agricultural Classes</i>	
V.1 } Non-agricultural Classes per 1,000 persons of general population; number in each class and sub-class per 10,000 persons of All Non-Agricultural Classes; and number of employers, employees and independent workers per 10,000 Self-supporting persons of all Non-Agricultural Classes	123
V.1a } Non-Agricultural Classes per 1,000 persons of Rural Population; number in each class and sub-class per 10,000 persons of all Non-Agricultural Classes; and number of employers, employees and independent workers per 10,000 Self-supporting persons of all Non-Agricultural Classes	124
V.1b } Non-Agricultural Classes per 1,000 persons of Urban Population; number in each class and sub-class per 10,000 persons of all Non-Agricultural Classes; and number of employers, employees and independent workers per 10,000 Self-supporting persons of all Non-Agricultural Classes	124
V.2 } Livelihood Class V (Production other than cultivation)—Number per 10,000 persons of Livelihood Class V in each sub-class; Number per 10,000 Self-supporting persons of Livelihood Class V who are employers, employees and independent workers; Secondary means of Livelihood of 10,000 persons of Livelihood Class V	125

CONTENTS

TABLES	<i>Series V—Non-agricultural Classes—concl'd.</i>	PAGE
V.3	Livelihood Class VI (Commerce)—Number per 10,000 persons of Livelihood Class VI in each sub-class; Number per 10,000 Self-supporting persons of Livelihood Class VI who are employers, employees and independent workers; Secondary means of Livelihood of 10,000 persons of Livelihood Class VI	128
V.4	Livelihood Class VII (Transport)—Number per 10,000 persons of Livelihood Class VII in each sub-class; Number per 10,000 self-supporting persons of Livelihood Class VII who are employers, employees and independent workers; Secondary means of Livelihood of 10,000 persons of Livelihood Class VII	131
V.5	Livelihood Class VIII (Other services and miscellaneous sources)—Number per 10,000 persons of Livelihood Class VIII in each sub-class; Number per 10,000 self-supporting persons of Livelihood Class VIII who are employers, employees and independent workers; Secondary means of Livelihood of 10,000 persons of Livelihood Class VIII	134
V.6	Comparison of the Classification of the Population by Livelihood Classes at the 1951 and 1931 Censuses	137
V.7	Territorial Distribution of 10,000 Self-supporting persons of all Industries and Services in the State (by Divisions)	139
V.8	Territorial Distribution of 10,000 Self-supporting persons in the State, engaged in Primary Industries not elsewhere specified (By Sub-divisions)	140
V.9	Territorial Distribution of 10,000 Self-supporting persons in the State, engaged in Mining and Quarrying (By Sub-divisions)	141
V.10	Territorial Distribution of 10,000 Self-supporting persons in the State, engaged in Processing and Manufacture—Foodstuffs, Textiles, Leather and Products thereof (By Sub-divisions)	142
V.11	Territorial Distribution of 10,000 Self-supporting persons in the State, engaged in Processing and Manufacture—Metals, Chemicals and Products thereof (By Sub-divisions)	143
V.12	Territorial Distribution of 10,000 Self-supporting persons in the State, engaged in Processing and Manufacture—not elsewhere specified (By Sub-divisions)	144
V.13	Territorial Distribution of 10,000 Self-supporting persons in the State, engaged in Construction and Utilities (By Sub-divisions)	145
V.14	Territorial Distribution of 10,000 Self-supporting persons in the State, engaged in Commerce (By Sub-divisions)	146
V.15	Territorial Distribution of 10,000 Self-supporting persons in the State, engaged in Transport, Storage and Communications (By Sub-divisions)	147
V.16	Territorial Distribution of 10,000 Self-supporting persons in the State, engaged in Health, Education and Public Administration (By Sub-divisions)	148
V.17	Territorial Distribution of 10,000 Self-supporting persons in the State, engaged in Services not elsewhere specified (By Sub-divisions)	149
<i>Series VI—Families, Sexes and Principal Age Groups</i>		
VI.1	Persons per 1,000 Houses and Houses per 100 square miles and comparison with past Censuses	150
VI.2	Number of Households per 1,000 Houses and Distribution by size of 1,000 Sample Households of Rural and Urban Population	151
VI.3	Family Composition of 1,000 Households of the General Population	152
VI.4	Females per 1,000 males (General, Rural and Urban Population); and comparison with Previous Censuses	152
VI.5	Females per 1,000 males in Agricultural Classes and Sub-classes	153
VI.6	Females per 1,000 males in Non-Agricultural Classes and Sub-classes	154
VI.7	Marital Status of 1,000 persons of each Sex of General Population and comparison with Previous Censuses	155
VI.8	Age distribution of 1,000 married persons of each sex (and comparison with 1941 Census)	156
VI.9	Infants per 10,000 Persons	157
VI.10	Young Children (aged 1-4) per 10,000 persons	157
VI.11	Boys and Girls (aged 5-14) per 10,000 persons	158
VI.12	Young Men and Women (aged 15-34) per 10,000 persons	158
VI.13	Middle Aged Persons (aged 35-54) per 10,000 persons	159
VI.14	Elderly Persons (aged 55 and over) per 10,000 persons	159
<i>Series VII—Literacy and Education</i>		
VII.1	Progress of Literacy	160
VII.2	Literacy Standard of Livelihood Classes	161
VII.3	Educational Services and research	165

CHAPTER VI

SECTION 1

PRELIMINARY REMARKS

THE STATISTICS discussed in this chapter are contained in Union Tables A.I, C.I, C.II, C.III, C.IV, C.V and D series. In addition Subsidiary Tables of the VI and VII series printed at the end of this chapter show:—

- VI (1)—Persons per 1,000 houses and houses per 100 square miles and comparison with past censuses.
- VI (2)—Number of households per 1,000 houses and distribution by size of 1,000 Sample Households of Rural and Urban Population.
- VI (3)—Family Composition of 1,000 households of the General Population.
- VI (4)—Females per 1,000 males (General, Rural and Urban Population); and comparison with previous censuses.
- VI (5)—Females per 1,000 males in Agricultural Classes and Subclasses.
- VI (6)—Females per 1,000 males in Non-Agricultural Classes and Subclasses.
- VI (7)—Marital Status of 1,000 of each sex of general population and comparison with previous censuses.
- VI (8)—Age distribution of 1,000 married persons of each sex (and comparison with 1941 Census).
- VI (9)—Infants per 10,000 persons.
- VI(10)—Young children (aged 1-4) per 10,000 persons.
- VI(11)—Boys and girls (aged 5-14) per 10,000 persons.
- V (12)—Young men and women (aged 15-34) per 10,000 persons.
- V (13)—Middle aged persons (aged 35-54) per 10,000 persons.
- V (14)—Elderly persons (aged 55 and over) per 10,000 persons.
- VII (1)—Progress of Literacy.
- VII (2)—Literacy Standard of Livelihood Classes.
- VII (3)—Educational Services and Research.

The union tables and the subsidiary tables are so elaborate that it will serve no useful purpose to tax the reader's patience by merely paraphrasing their contents.

SECTION 2

RELIGION

Pages 68-9 in the Introductory chapter of Part IA of this Report give an account of the distribution of the religious communities in the State. Only the major communities have been discussed in that place. The West Bengal Government has published on behalf of the Census Department a volume called 'The Tribes and Castes of West Bengal' compiled by me in which will be found a comparative statement of the strength at each census beginning from 1872 of each caste and tribe brought under the schedule for the State of West Bengal by the President of India. That volume also contains tables to show the distribution of the 58 Scheduled Castes and 7 Scheduled Tribes for each census tract of West Bengal in urban and rural areas, the tract being, in a great many cases conterminous with the thana, and in the remaining cases with groups of contiguous thanas. That volume also contains tables showing the 58 Scheduled Castes and 7 Scheduled Tribes arranged by eight principal livelihoods on which the Scheduled Castes and Scheduled Tribes population is dependent. The following Statement VI.1, showing the distribution of the strength of each major religious community per 10,000 of the total population, arranged for rural and urban areas, shows how the Hindu, the Muslim, the Christian, the Sikh, the Buddhist, the Jain and the remaining communities stand in relation to one another in strength in the State as a whole, in the villages and in the towns. It shows how Christians, Sikhs, Buddhists and Jains are overwhelmingly town dwellers. Also how Muslims live more in villages than in towns in the State as a whole and in every district, except Darjeeling where the Muslim population is concentrated in the 4 towns. An

occupational distribution of each religious community was not attempted in the last census except for the Scheduled Castes and Scheduled Tribes for which figures will be available in the volume mentioned above. Nevertheless, as agriculture forms the mainstay of the population in the villages, Statement VI.1 suggests that the bulk of the Muslim population must be engaged in agriculture, which in fact it is. Statement VI.2 below gives a distribution of the strength of each major religious community in the rural and urban areas per 10,000 of its total population which will further elucidate the above remarks.

The growth of Anglo-Indians in this State has been reasonable and normal. I had been feared that there might be a decline from 1941, imagining that in 1941 there might have been a tendency to inflate the figures as the two major communities had done, and a further tendency among Indian Christians to call themselves Anglo-Indians. But neither motive was active. The increase has been 2,538 over a population of 29,076 in 1941 or .873 per cent per annum in the ten-year period. There were 978 females to 1,000 males in 1941 and 1,192 females to 1,000 males in 1951. This is explained by the presence of 13,675 female Anglo-Indians in Calcutta in 1951 out of a total of 22,186 Anglo-Indians, males being 8,511. The corresponding figures for Calcutta in 1941 were a total of 20,141 of whom 9,630 were males and 10,511 females. The increase among females in Calcutta has been 3,164 or 3 per cent per annum, and the decrease among males is 1,119.

Calcutta and to a slight extent 24-Parganas are mainly responsible for this striking change in the male-female ratio. For this there is a ready and

RELIGION

perfectly satisfactory answer: a large number of Anglo-Indian males now work in Eastern Pakistan who have left behind their womenfolk in Calcutta and 24-Parganas, and visit them at week

ends or holidays. Also the female members of a number of Anglo-Indian families who lived in Pakistan before partition now live in Calcutta while their male members still work in Pakistan.

RATIO OF MAJOR

STATEMENT

Distribution of the strength of each major religious community per 10,000 of total

State and District		Hindu					
		1951	1941	1931	1921	1911	1901
West Bengal	Total	7,845	6,972	6,652	6,558	6,632	6,763
	Rural	7,611	6,109	6,545	6,441	6,568	6,726
	Urban	8,554	7,483	7,294	7,322	7,088	7,056
Burdwan Division	Total	8,633	7,898	8,286	8,207	8,233	8,319
	Rural	8,596	7,861	8,313	8,218	8,251	8,331
	Urban	8,847	8,162	8,022	8,079	8,010	8,158
Burdwan	Total	8,373	7,372	7,862	7,799	7,934	7,968
	Rural	8,382	7,336	7,897	7,817	7,960	7,987
	Urban	8,322	7,641	7,486	7,547	7,544	7,652
Birbhum	Total	7,200	6,548	6,717	6,805	7,024	7,289
	Rural	7,161	6,463	6,699	6,777	7,021	7,290
	Urban	8,080	7,943	7,484	7,798	7,303	7,227
Bankura	Total	9,116	8,363	9,100	8,632	8,696	8,740
	Rural	9,075	8,276	9,074	8,575	8,647	8,696
	Urban	9,644	9,497	9,501	9,541	9,623	9,616
Midnapur	Total	9,178	8,406	8,907	8,820	8,781	8,845
	Rural	9,196	8,426	8,943	8,841	8,797	8,844
	Urban	8,951	8,084	8,212	8,258	8,364	8,392
Hooghly	Total	8,652	7,981	8,293	8,192	8,108	8,207
	Rural	8,569	7,890	8,308	8,179	8,091	8,186
	Urban	8,942	8,331	8,224	8,253	8,210	8,352
Howrah	Total	8,345	7,950	7,830	7,928	7,867	7,908
	Rural	8,060	7,889	7,874	7,989	7,975	8,016
	Urban	8,938	8,102	7,686	7,712	7,471	7,492
Presidency Division	Total	7,206	5,275	5,426	5,328	5,372	5,480
	Rural	6,589	4,659	5,080	4,977	5,106	5,268
	Urban	8,456	7,230	7,007	7,044	6,761	6,665
24-Parganas	Total	7,390	6,532	6,420	6,421	6,269	6,304
	Rural	6,917	6,267	6,184	6,219	6,088	6,143
	Urban	8,513	7,354	7,375	7,063	6,890	6,971
Calcutta	Urban	8,341	7,262	6,871	7,083	6,750	6,505
*Nadia	Total	7,703	3,739	3,753	3,911	3,972	4,056
	Rural	7,329	3,367	3,465	3,661	3,763	3,862
	Urban	9,385	7,931	7,669	7,495	7,301	7,259
Murshidabad	Total	4,460	4,175	4,301	4,505	4,688	4,827
	Rural	4,182	3,941	4,127	4,327	4,542	4,690
	Urban	7,711	7,138	6,726	6,891	6,944	7,089
*Malda	Total	6,292	3,773	4,217	4,063	4,636	4,982
	Rural	6,223	3,737	4,198	4,025	4,653	4,997
	Urban	8,048	4,747	4,756	5,282	4,242	4,616
*West Dinajpur	Total	6,930	4,021	4,522	4,409	4,499	4,636
	Rural	6,764	3,958	4,497	4,384	4,481	4,624
	Urban	9,013	6,827	6,791	6,771	6,402	6,013
*Jalpaiguri	Total	8,418	5,063	6,753	5,502	6,063	6,790
	Rural	8,318	5,005	6,742	5,482	6,063	6,798
	Urban	9,701	7,306	7,277	6,744	6,101	6,199
Darjeeling	Total	8,171	4,743	7,413	7,129	7,141	7,541
	Rural	8,270	4,721	7,542	7,241	7,273	7,666
	Urban	7,803	4,859	6,584	6,049	5,842	6,214
Cooch Behar	Total	7,000	6,163	6,432	6,716	6,906	7,019
	Rural	6,916	6,113	6,382	6,685	6,888	7,019
	Urban	9,231	8,104	8,007	7,757	7,569	7,004

* Proportions for 1901-41 for the districts Nadia, Malda, West Dinajpur and Jalpaiguri

RELIGIOUS COMMUNITIES, 1901-51

VI.1

rural and urban population respectively, 1901-1951

Muslim						Christian					
1951	1941	1931	1921	1911	1901	1951	1941	1931	1921	1911	1901
1,985	2,948	3,008	2,946	2,860	2,939	70	41	63	56	49	43
2,258	3,127	3,118	3,043	3,015	2,980	38	22	33	28	23	17
1,169	2,190	2,445	2,313	2,504	2,618	169	124	244	234	244	248
1,256	1,390	1,414	1,344	1,344	1,317	20	19	21	20	16	11
1,302	1,360	1,376	1,308	1,309	1,286	6	7	8	9	7	6
990	1,398	1,782	1,736	1,790	1,747	99	107	152	135	138	85
1,500	1,781	1,856	1,851	1,888	1,875	28	36	34	29	25	19
1,582	1,757	1,830	1,826	1,867	1,854	9	14	12	15	11	13
1,435	1,953	2,148	2,198	2,206	2,229	137	197	284	223	237	117
2,686	2,741	2,609	2,507	2,382	2,235	6	3	7	5	9	9
2,786	2,798	2,675	2,524	2,381	2,231	5	2	5	4	8	8
1,233	1,800	2,395	1,895	2,483	2,648	21	22	96	77	76	90
440	481	459	457	454	453	10	10	15	14	9	3
453	435	402	401	402	404	6	5	11	10	6	2
273	378	410	387	314	346	68	73	70	71	60	32
717	773	759	678	686	664	28	20	22	22	15	7
727	738	728	656	666	650	6	5	6	10	5	6
595	1,321	1,363	1,256	1,217	1,044	292	264	317	325	265	47
1,327	1,593	1,617	1,608	1,688	1,760	8	8	9	8	8	7
1,415	1,489	1,593	1,593	1,694	1,784	2	4	3	4	3	1
1,017	1,557	1,727	1,680	1,674	1,584	30	23	33	36	39	48
1,622	1,988	2,126	2,030	2,073	2,050	20	27	34	32	33	30
1,928	2,067	2,112	1,996	1,995	1,973	7	10	9	8	8	4
985	1,794	2,176	2,152	2,300	2,370	48	67	116	118	126	133
2,576	4,068	4,206	4,141	4,229	4,279	112	57	95	83	75	67
3,249	4,390	4,565	4,472	4,496	4,519	71	34	54	44	35	26
1,218	2,410	2,567	2,526	2,639	2,935	194	151	231	270	282	298
2,535	3,247	3,365	3,462	3,613	3,624	62	68	74	70	66	67
3,014	3,483	3,590	3,670	3,796	3,802	67	76	68	64	61	49
1,398	2,515	2,458	2,800	2,985	2,886	50	45	97	92	83	138
1,200	2,359	2,600	2,303	2,696	2,948	208	174	397	430	441	447
2,236	6,126	6,177	6,018	5,953	5,895	51	63	66	57	57	49
2,610	6,499	6,471	6,272	6,169	6,093	48	57	60	53	53	45
526	1,920	2,188	2,305	2,530	2,635	77	123	140	136	109	105
5,524	5,655	5,559	5,357	5,197	5,077	5	3	3	4	3	3
5,812	5,889	5,728	5,539	5,346	5,218	1	1	1	2	1	1
2,181	2,701	3,167	2,916	2,887	2,748	45	26	24	39	43	42
3,697	5,678	5,428	5,151	5,033	4,807	9	4	11	6	4	2
3,766	5,697	5,434	5,185	5,062	4,784	9	4	12	6	4	2
1,931	5,240	5,236	4,703	5,747	5,374	5	2	5	5	2	4
2,094	5,020	5,051	4,907	4,884	4,957	45	8	40	29	19	5
3,160	5,098	5,075	4,927	4,897	4,967	47	7	38	29	11	4
312	2,858	2,947	3,064	3,475	3,800	7	43	180	38	43	63
974	2,368	2,399	2,475	2,631	2,902	279	28	150	93	61	32
1,031	2,300	2,396	2,467	2,617	2,892	298	28	152	93	61	31
247	2,693	2,590	2,970	3,683	3,637	27	15	69	96	92	84
144	242	203	301	356	370	277	125	259	237	200	180
86	168	206	289	340	349	270	83	188	208	187	130
359	651	623	413	508	594	301	352	712	984	1,295	703
2,894	3,787	3,533	3,258	3,079	2,967	4	3	3	2	1	3
3,074	3,839	3,589	3,297	3,192	2,973	4	3	2	1	1	1
666	1,743	1,760	1,982	2,232	2,757	12	21	31	63	40	86

are based on the repartition (1947) figures of these districts.

**RATIO OF MAJOR
STATEMENT**

State and District	Sikh						Buddhist					
	1951	1941	1931	1921	1911	1901	1951	1941	1931	1921	1911	1901
	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban
West Bengal	12	3	9	6	1	5	23	..	23	23	20	29
	3	..	3	1	..	1	29	..	29	31	30	29
	49	49	29	23	8	6	43	..	43	44	34	41
Burdwan Division	10	4	6	5	2	3	1	..	1	..	..	..
	4	..	4	1	..	1	..	..	..	..	..	..
	44	44	29	19	3	1	9	..	2	7	7	7
Burdwan	25	13	12	8	4	4	1	..	1	..	..	..
	13	..	13	4	..	4	1	..	1	..	..	..
	90	90	39	11	..	..	5	..	4	..	..	..
Birbhum	3	2	1	1	..	..	..	..	..	..	..	..
	2	..	2	1	..	..	..	..	..	..	..	..
	25	25	3	..	..	1	1	..	..	..	..	1
Bankura	1	..	1	..	..	..	..	..	..	..	..	..

	12	12	1	..	..	..	..	..	..	..	..	1
Midnapur	9	2	7	6	4	2	3	..	..	..	..	..
	2	..	2	..	..	..	..	..	..	..	..	..
	96	96	100	84	17	2	42	..	..	..	..	3
Hooghly	2	1	1	2	..	..	1	..	1	..	..	..
	1	..	1	..	..	..	..	..	..	..	..	..
	8	8	12	1	..	1	2	..	2	2	2	..
Howrah	10	3	7	6	4	2	2	..	1	1	1	1
	3	..	3	2	2	1	1	..	1	1	..	..
	22	22	14	8	..	1	3	..	3	3	3	1
Presidency Division	14	2	12	8	4	2	58	..	61	57	54	53
	2	..	2	1	..	..	60	..	61	57	56	53
	39	39	29	24	9	3	35	..	60	60	45	55
24-Parganas	7	..	7	5	1	2	3	..	2	1	1	1
	..	..	..	1	..	..	1	..	1	..	..	..
	23	23	15	6	5	7	9	..	6	2	4	2
Calcutta	..	..	..	..	..	..	..	..	..	..	..	..

	Urban	56	40	39	15	11	37	..	25	28	26	34
*Nadia	3	2	1	..	..	..	2	..	..	..	..	..
	2	..	2	..	..	..	2	..	..	..	..	..
	6	6	1	..	..	..	1	..	..	..	..	..
Murshidabad	..	..	..	..	..	..	..	..	..	..	..	..

	Urban	2	..	1	..	..	1	..	..	1	1	1
*Maldah	1	1	..	..	..	..	..	..	..	..	..	..

	Urban	2	1	..	..	..	..	..	..	..	..	..
*West Dinajpur	..	..	..	..	..	..	1	..	..	..	..	..

	Urban	4	4	..	..	..	4	..	1	..	..	..
*Jalpaiguri	12	12	2	1	..	..	71	..	76	65	59	80
	..	..	..	..	..	..	77	..	77	65	90	80
	Urban	8	8	5	9	..	4	..	32	76	28	56
Darjeeling	7	1	..	1	..	..	1,396	..	1,244	1,833	1,804	1,768
	1	..	..	1	..	..	1,369	..	1,810	1,760	1,751	1,702
	Urban	29	8	..	4	1	1,496	..	2,060	2,527	2,324	2,472
Cooch Behar	1	1	..	..	..	..	..	..	..	..	..	..

	Urban	1	..	..	1	..	3	..	1	..	5	1

*Proportions for 1901-41 for the districts Nadia, Maldah, West Dinajpur and Jalpaiguri

RELIGIOUS COMMUNITIES, 1901-51

VII—concl'd.

Jain						Others					
1951	1941	1931	1921	1911	1901	1951	1941	1931	1921	1911	1901
8	4	4	5	2	2	47	629	234	401	328	224
2	1	1	1	1	..	59	740	268	456	364	249
24	18	18	31	14	12	12	156	33	48	48	25
4	1	1	1	1	..	76	687	276	428	405	353
3	1	1	1	..	..	89	770	302	464	432	377
7	3	4	2	2	..	4	101	19	44	58	9
5	3	2	2	1	..	8	800	243	319	152	138
4	3	1	2	1	..	9	896	200	340	161	146
8	3	11	6	9	..	3	167	56	26	4	2
1	..	5	3	2	1	44	707	602	680	583	466
1	..	5	2	2	1	45	736	616	693	588	470
11	..	10	17	..	6	29	232	15	213	137	28
13	..	..	..	..	..	430	1,196	426	897	841	799
13	..	..	..	..	..	453	1,284	459	954	885	838
10	1	4	..	..	..	3	50	9	1	3	5
3	..	..	..	..	..	62	795	308	479	516	484
2	..	..	..	..	..	67	831	323	493	530	500
18	5	2	..	..	..	6	226	22	144	154	14
1	1	..	..	..	..	9	505	80	192	196	26
1	..	..	..	..	..	12	617	95	225	216	29
1	2	1	1	3	..	1	75	12	28	72	16
1	1	1	..	..	..	..	28	4	8	25	2
3	3	3	1	1	..	1	32	2	6	21	2
..	..	..	..	..	..	1	20	9	14	38	4
11	6	5	8	4	3	23	586	203	381	265	118
1	1	1	1	1	1	28	715	239	449	306	133
30	24	23	41	18	16	14	176	38	50	44	31
1	..	1	1	..	..	2	148	137	43	49	4
..	..	..	..	..	..	1	173	137	47	55	6
3	..	5	5	1	..	4	71	33	33	30	3
46	32	27	61	20	15	22	133	41	70	56	51
1	..	1	1	..	..	4	72	3	13	18	..
1	..	1	1	..	..	4	77	3	13	15	..
1	..	3	1	1	..	4	25	..	13	59	1
8	8	8	10	7	7	3	159	132	124	105	86
2	2	2	1	1	1	3	167	142	131	110	91
78	82	81	124	105	117	2	53	1	29	20	8
..	..	1	2	..	..	1	540	343	778	327	299
..	..	1	2	..	..	1	562	353	802	341	217
9	7	3	3	3	3	5	3	..	7	6	3
3	2	3	3	1	1	27	949	384	652	604	401
..	1	2	1	1	1	29	966	388	659	610	404
52	27	74	112	75	68	8	241	7	15	5	45
4	1	3	5	3	3	242	2,598	618	1,860	1,153	193
3	1	2	5	3	3	261	2,664	630	1,888	1,166	196
13	..	16	18	6	13	..	71	7	96	90	11
3	1	1	2	1	1	2	4,888	220	451	408	140
2	1	1	2	1	1	2	5,027	253	499	448	152
6	2	11	7	8	6	6	4,128	10	16	22	11
9	9	9	8	10	7	2	38	23	16	4	4
3	6	3	3	6	4	2	39	24	15	3	4
87	129	198	178	127	119	..	3	3	19	25	33

are based on the repartition (1947) figures of these districts.

DISTRIBUTION OF MAJOR

STATEMENT

Distribution of each major religious community among

1951

State and District	Hindu	Muslim	Christian	Sikh	Buddhist	Jain	Others
West Bengal	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Burdwan Division							
{ Total	4,925	2,832	1,250	3,564	206	2,129	7,267
{ Rural	5,748	2,934	630	7,116	45	7,403	7,675
{ Urban	2,702	2,233	1,537	2,842	544	710	846
Burdwan							
{ Total	943	694	350	1,800	33	525	163
{ Rural	1,102	701	237	4,875	21	1,854	164
{ Urban	512	652	428	1,175	60	167	152
Birbhum							
{ Total	398	582	39	110	3	72	401
{ Rural	503	660	76	303	4	148	408
{ Urban	114	119	14	70	2	51	280
Bankura							
{ Total	618	118	71	40	1	882	4,757
{ Rural	783	132	99	6	1	3,925	5,057
{ Urban	173	36	53	47	..	64	44
Midnapur							
{ Total	1,584	489	530	979	131	491	1,808
{ Rural	2,012	536	264	982	1	1,205	1,909
{ Urban	430	211	710	978	402	299	210
Hooghly							
{ Total	691	418	73	121	11	55	128
{ Rural	730	406	41	196	5	200	131
{ Urban	586	493	95	106	24	16	82
Howrah							
{ Total	691	531	187	514	27	104	10
{ Rural	618	499	113	754	13	71	6
{ Urban	887	722	237	466	56	113	78
Presidency Division							
{ Total	5,875	7,168	8,750	6,436	9,794	7,871	2,733
{ Rural	4,252	7,066	9,170	2,884	9,955	2,397	2,325
{ Urban	7,298	7,767	8,463	7,158	9,456	9,290	9,154
24 Parganas							
{ Total	1,750	2,373	1,630	1,059	180	201	72
{ Rural	1,580	2,320	3,052	149	40	52	31
{ Urban	2,209	2,681	661	1,244	473	241	713
Calcutta							
{ Total	1,092	621	4,333	4,744	1,156	6,142	456
{ Rural	..	..	..	..	..	..	..
{ Urban	4,039	4,292	7,288	5,707	3,580	7,794	8,137
*Nadia							
{ Total	453	520	336	110	27	40	38
{ Rural	484	582	602	387	36	153	33
{ Urban	871	154	155	54	7	10	115
Murshidabad							
{ Total	393	1,924	43	17	2	737	43
{ Rural	466	2,180	20	40	1	893	43
{ Urban	198	409	58	13	6	693	40
*Malda							
{ Total	303	704	48	19	1	26	8
{ Rural	396	807	114	99	1	44	7
{ Urban	54	95	2	2	..	21	23
*West Dinajpur							
{ Total	257	438	185	6	5	130	168
{ Rural	323	509	452	2	5	72	176
{ Urban	77	18	3	7	6	146	47
*Jalpaiguri							
{ Total	396	181	1,456	359	802	197	1,896
{ Rural	497	208	3,566	2,031	1,179	721	2,016
{ Urban	122	23	17	20	11	56	..
Darjeeling							
{ Total	187	13	703	108	7,619	64	11
{ Rural	204	7	1,333	103	8,692	156	7
{ Urban	140	48	274	109	5,367	40	76
Cooch Behar							
{ Total	244	394	16	14	2	334	11
{ Rural	302	453	31	73	1	501	12
{ Urban	88	47	5	2	6	289	3

*Proportions for 1901-41 for the districts Nadia, Malda, West Dinajpur and Jalpaiguri are based

RELIGIOUS COMMUNITIES, 1901-51

VI.2

the districts of West Bengal, 1901-51

1941							1951						
Hindu	Muslim	Christian	Sikh	Buddhist	Jain	Others	Hindu	Muslim	Christian	Sikh	Buddhist	Jain	Others
10,000	10,000	10,000	10,000	..	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
5,184	1,971	1,937	3,083	..	950	4,576	6,312	2,016	1,451	2,650	44	1,458	5,051
5,828	1,970	1,396	6,000	..	3,661	4,717	5,757	1,999	1,076	6,986	25	3,670	5,120
2,958	1,978	2,339	2,742	..	434	1,752	3,111	2,150	1,756	2,325	131	641	1,682
889	464	659	951	..	612	980	924	482	426	340	15	431	811
1,006	471	534	3,653	..	3,350	1,004	1,010	491	305	2,057	10	814	812
484	423	752	634	..	91	508	463	413	524	212	30	289	774
438	306	37	51	..	13	480	474	417	49	17	3	705	1,210
525	444	57	372	..	68	494	549	460	75	245	3	2,501	1,234
136	105	22	13	..	2	191	74	74	28	..	..	41	32
688	76	122	10	..	6	998	754	84	129	7	..	37	1,005
816	84	132	19	..	..	1,045	898	89	205	..	..	5	1,024
248	34	115	9	..	7	62	304	41	66	..	..	49	65
1,711	340	624	1,293	..	100	1,641	1,859	350	476	1,098	2	117	1,829
2,082	356	323	543	..	..	1,694	2,104	359	296	774	2	265	1,860
432	241	848	1,381	..	119	580	541	280	624	1,707	2	62	322
702	286	106	226	..	90	450	689	297	79	20	10	40	188
711	262	100	50	..	243	458	669	269	58	..	3	..	186
669	427	110	247	..	61	292	796	520	96	21	43	55	258
756	409	389	552	..	129	27	642	386	292	575	14	128	8
688	353	250	1,963	..	..	22	587	331	137	3,910	7	85	4
989	748	492	458	..	154	119	933	822	418	325	50	145	231
4,816	8,029	8,063	6,917	..	9,050	5,424	4,658	7,984	8,549	7,350	9,956	8,542	4,949
4,172	8,030	8,604	4,000	..	6,339	5,283	4,243	8,001	8,924	3,014	9,975	6,330	4,880
7,042	8,022	7,661	7,258	..	9,656	8,248	6,889	7,850	8,244	7,675	9,869	9,359	8,318
1,473	1,583	2,365	1,093	..	30	339	1,299	1,505	1,582	485	69	411	788
1,378	1,497	4,657	2,385	..	19	314	1,189	1,449	2,566	774	30	206	742
1,892	2,106	664	942	..	32	839	1,889	1,059	744	464	252	486	3,042
977	686	3,587	5,590	..	6,662	182	613	513	3,715	6,675	430	4,545	104
4,340	4,827	6,249	6,244	..	7,931	8,833	3,911	4,604	6,742	7,174	2,413	6,224	5,182
420	1,487	1,091	32	..	32	82	428	1,558	786	..	..	170	11
448	1,689	2,154	214	..	109	84	437	1,711	1,494	..	..	487	11
323	267	301	10	..	..	50	382	339	208	..	2	53	..
437	1,279	42	2	..	1,212	169	440	1,256	31	13	2	1,453	384
493	1,439	29	19	..	1,426	173	467	1,359	30	61	2	1,465	392
244	316	52	..	..	1,172	87	294	430	32	9	..	1,448	13
297	965	46	12	..	45	430	331	943	93	..	1	88	767
364	1,083	106	82	..	69	451	378	1,027	204	..	1	275	782
68	256	2	4	..	40	2	80	275	3	..	..	20	..
494	1,334	154	32	..	374	1,184	592	1,462	546	10	2	664	1,429
614	1,536	320	208	..	1,619	1,236	690	1,635	1,156	142	2	1,713	1,458
81	116	30	11	..	136	137	62	84	49	..	1	276	16
852	347	299	120	..	62	1,832	495	389	1,155	160	1,067	381	1,288
437	392	693	1,054	..	386	1,922	575	429	2,551	1,935	1,288	1,233	1,314
58	70	7	11	..	..	27	66	72	18	28	48	58	15
114	13	460	36	..	54	1,190	177	14	648	7	8,385	114	149
124	8	609	38	..	280	1,086	184	10	903	102	8,652	164	151
80	37	350	36	..	11	3,272	136	40	440	..	7,152	96	46
252	335	19	..	..	579	16	283	344	13	..	..	716	20
314	386	36	..	..	2,341	17	323	381	20	..	..	767	30
37	27	6	..	..	244	1	69	47	8	..	1	698	5

on the repartition (1947) figures of these districts.

DISTRIBUTION OF MAJOR STATEMENT

State and District		1921						
		Hindu	Muslim	Christian	Sikh	Buddhist	Jain	Others
West Bengal	{ Total Rural Urban }	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Burdwan Division	{ Total Rural Urban }	5,348 5,762 2,970	1,950 1,941 2,020	1,520 1,476 1,554	1,725 7,073 911	26 14 83	681 2,746 182	4,559 4,593 2,453
Burdwan	{ Total Rural Urban }	908 998 394	480 493 363	398 440 365	147 1,115 ..	4 4 ..	346 1,465 76	607 613 204
Birbhum	{ Total Rural Urban }	467 531 99	383 418 76	45 62 30	14 105 ..	.. .. ..	254 1,087 52	763 769 412
Bankura	{ Total Rural Urban }	713 782 316	84 89 40	135 213 74	.. .. ..	.. .. ..	.. .. ..	1,210 1,230 7
Midnapur	{ Total Rural Urban }	1,904 2,100 436	326 339 210	555 579 536	1,201 3,484 853	5 7 ..	.. .. ..	1,693 1,702 1,158
Hooghly	{ Total Rural Urban }	716 700 807	312 289 520	83 50 108	23 .. 26	7 1 35	43 151 17	275 272 413
Howrah	{ Total Rural Urban }	640 591 918	365 313 811	304 132 441	340 2,369 32	10 2 48	38 43 37	11 7 259
Presidency Division	{ Total Rural Urban }	4,652 4,238 7,030	8,050 8,059 7,960	8,480 8,524 8,446	8,275 2,927 9,089	9,974 9,986 9,917	9,319 7,254 9,818	5,441 5,407 7,547
24-Parganas	{ Total Rural Urban }	1,366 1,181 2,425	1,639 1,476 3,043	1,765 2,748 986	1,799 2,125 1,749	19 1 102	378 157 431	150 125 1,703
Calcutta	{ Total Rural Urban }	520 3,505	377 3,608	3,713 6,655	6,311 7,271	558 3,126	5,810 7,214	84 5,305
*Nadia	{ Total Rural Urban }	471 484 396	1,613 1,735 305	812 1,574 208	.. .. ..	2 1 4	92 416 14	26 25 103
Murshidabad	{ Total Rural Urban }	460 483 330	1,218 1,309 442	50 38 59	.. .. ..	2 .. 9	1,312 870 1,418	208 207 213
*Malda	{ Total Rural Urban }	324 366 86	915 993 242	52 115 2	.. .. ..	.. .. ..	180 870 13	1,015 1,032 18
*West Dinajpur	{ Total Rural Urban }	609 703 66	1,508 1,672 95	476 1,063 12	4 35 ..	.. .. ..	473 1,341 264	1,472 1,495 23
*Jalpaiguri	{ Total Rural Urban }	417 480 54	417 457 76	830 1,847 24	28 209 ..	986 1,170 102	484 2,346 34	2,305 2,340 118
Darjeeling	{ Total Rural Urban }	163 175 95	15 15 20	770 1,135 481	129 558 64	8,406 8,803 6,574	67 232 28	169 171 37
Cooch Behar	{ Total Rural Urban }	322 306 73	348 382 59	12 4 19	4 .. 5	1 2 ..	523 1,022 402	12 12 27

* Proportions for 1901-41 for the districts Nadia, Malda, West Dinajpur and

RELIGIOUS COMMUNITIES, 1901-51

VI.2—concl'd.

1911							1901							
Hindu	Muslim	Christian	Sikh	Buddhist	Jain	Others	Hindu	Muslim	Christian	Sikh	Buddhist	Jain	Others	
10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	..	10,000	10,000	10,000
5,464	1,998	1,457	3,320	20	1,072	5,469	5,563	2,020	1,217	..	16	359	7,126	
5,839	2,019	1,429	9,195	6	2,697	5,570	5,896	2,054	1,813	..	7	1,329	7,203	
2,960	1,328	1,476	303	104	436	3,202	3,074	1,773	910	..	69	45	930	
956	510	404	20	1	400	373	991	537	381	..	2	28	517	
1,036	529	427	..	1	1,042	379	1,062	557	736	..	2	76	523	
427	345	389	30	..	274	27	456	358	198	..	..	12	27
515	391	86	20	..	398	871	534	377	105	..	..	232	1,032
586	433	200	43	..	1,410	885	599	414	280	..	..	886	1,044
40	37	12	7	..	..	112	43	42	15	..	1	21	47
776	91	107	..	..	27	1,527	792	95	47	..	1	..	2,188
843	98	179	..	..	88	1,555	851	102	73	..	..	..	2,215
330	30	60	..	..	3	15	352	34	33	..	5	..	69
1,942	340	440	2,805	..	54	2,921	2,002	345	254	..	4	12	3,314	
2,156	356	396	8,508	..	151	2,338	2,197	365	687	..	..	51	3,353
512	206	470	15	..	16	1,389	549	174	87	..	28	..	257	
693	323	90	112	5	78	340	698	345	97	..	1	78	69	
685	312	88	86	..	..	328	690	339	46	..	1	316	64
747	421	104	126	37	109	963	768	392	124	..	4	..	414	
582	343	330	273	14	25	97	546	327	333	..	8	9	5	
533	291	159	560	5	..	25	497	277	91	..	4	..	4	
904	789	441	125	67	34	696	906	773	458	..	31	12	126	
4,536	8,002	8,543	6,680	9,980	8,928	4,531	4,437	7,974	8,783	..	9,984	9,641	2,375	
4,161	7,981	8,571	805	9,994	7,303	4,490	4,104	7,946	8,187	..	9,993	8,671	2,797	
7,040	8,172	8,524	9,697	9,896	9,564	6,798	6,926	8,227	9,090	..	9,931	9,955	9,070	
1,196	1,545	1,694	1,906	36	217	190	1,063	1,406	1,778	..	17	12	25	
1,035	1,405	3,089	173	..	525	166	947	1,323	3,121	..	1	12	23	
2,270	2,719	791	2,797	250	97	1,509	1,028	2,150	1,085	..	105	12	200	
474	424	4,182	4,544	399	4,023	79	448	467	4,879	..	543	3,844	106	
3,633	4,011	6,890	6,878	2,789	5,598	4,439	3,786	4,624	7,305	..	3,455	5,090	8,485	
503	1,691	965	73	1	67	46	549	1,835	1,041	..	..	..	1
516	1,843	2,175	216	1	167	38	559	1,989	2,681	..	..	..	..
421	403	182	..	..	28	498	475	465	104	..	..	..	29
504	1,252	44	5	1	2,183	230	522	1,264	50	..	1	3,092	280	
528	1,353	14	14	..	804	232	542	1,362	28	..	..	1,380	283
348	400	63	..	6	2,723	149	370	386	62	..	7	3,047	55	
365	887	45	..	..	47	523	357	794	22	..	..	37	453
404	946	113	..	..	94	532	391	844	60	..	..	25	459
106	395	1	..	..	40	20	109	342	3	..	..	41	18
595	1,448	208	5	..	459	1,027	589	1,450	100	..	..	688	1,543
675	1,608	510	14	..	676	1,656	661	1,603	262	..	..	1,658	1,561
61	92	12	..	..	374	6	55	95	17	..	..	374	120
429	417	582	93	1,373	566	1,650	434	427	320	..	1,178	997	375	
487	458	1,451	273	1,596	1,957	1,688	486	467	907	..	1,384	2,084	370	
43	72	19	..	39	22	94	44	69	17	..	69	53	24	
149	17	813	54	8,167	81	173	152	17	575	..	8,244	115	85	
158	16	1,212	115	8,398	135	175	161	17	1,120	..	8,607	304	86	
86	21	555	22	6,799	50	48	91	24	293	..	6,294	53	47	
321	321	10	..	3	1,285	4	323	314	18	..	1	1,156	7	
358	352	7	..	1	2,975	3	357	341	8	..	1	2,608	6	
72	59	11	..	13	623	35	68	72	24	..	1	685	92	

Jalpaiguri are based on the repartition (1947) figures of these districts.

SECTION 3

TERRITORIAL DISTRIBUTION OF HOUSE AND HOUSEHOLDS; SIZE AND COMPOSITION OF FAMILY HOUSEHOLDS

Union Table C.I and Subsidiary Tables VI(1)—(3) yield a very detailed picture of the distribution of houses and households and the size and composition of family households. This is an entirely new information in the history of the Indian Census and as a result no comparison is possible with previous censuses. Subsidiary Table VI(2) shows the distribution of households by

size of household in villages and towns and shows that the medium sized family of 4 to 6 members seems to predominate both in villages and town. The large and very large families seem to be yielding place to the small and medium families. This matter has been discussed in some detail in the Introduction and Chapter I of Part IA of this Report.

SECTION 4

SEX RATIOS

Subsidiary Tables VI(4)—(6) give a detailed account of the female population per 1,000 males and the distribution of females in the agricultural and non-agricultural classes. The steadily diminishing ratio of females per 1,000 males has been discussed rather elaborately in the Introduction and Chapter I of Part IA of this Report, where it has been observed how in almost every age group females fall short of males, contrary to what obtains in Western countries. Some more material will be found in the Note on the Maternity data of women collected at the last census, published elsewhere in this volume. This note will also indicate how the survival of girls cannot catch up with the survival of boys not only in the 1st year after birth but also in the subsequent years. The following diagram shows the difference between the strength of males and females at each census age group in the last census.

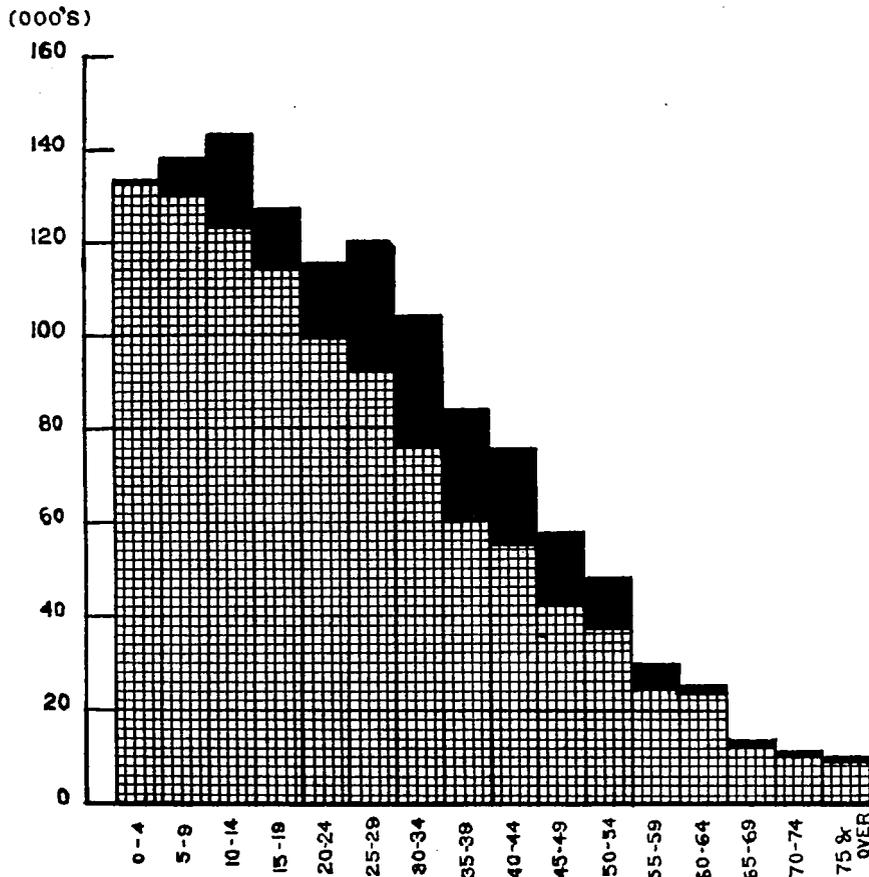
The declining ratio of females and the probable causes of this decline

have been discussed not only by every Census Commissioner for India but almost by every Census Superintendent in the country. This declining ratio seems to be almost a universal phenomenon throughout the Union except for small territories. The question has been treated from every aspect, sociological, anthropological, biological, medical, etc., but no definite progress seems to have been made towards stopping the pace of this phenomenon. Interesting and learned discourses will be found in the All India Reports of Plowden, Baines, Gait, Marten, and Hutton and also in the Bengal Reports of O'Donnell, Gait, O'Malley, Thompson and Porter. In recent years several important contributions have appeared in the journal 'Sankhya' and at least one important contribution has been made by D. Ghosh. The note on the Maternity data published elsewhere in this volume also makes an important statistical contribution. The following broad conclusions seem to be warranted

SAMPLE MALE & FEMALE POPULATIONS BY QUINQUENNIAL AGE GROUPS

(UNGRADUATED)

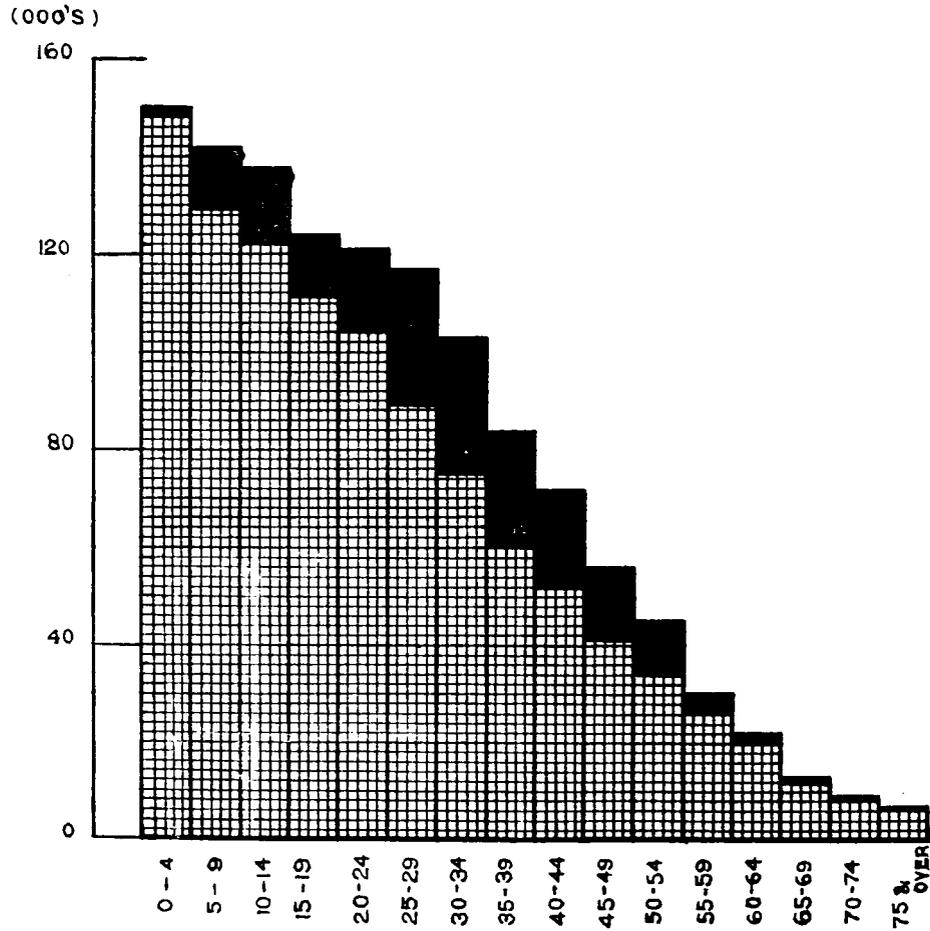
N.B. THE TOTAL LENGTH OF THE BAR REPRESENTS THE MALE POPULATION AND
THE BLACK PORTION THE EXCESS OR MALES OVER FEMALES IN A PARTICULAR
AGE GROUP



SAMPLE MALE & FEMALE POPULATIONS BY QUINQUENNIAL AGE GROUPS

(GRADUATED BY TERTIARY SEPTENARY METHOD WITH MORTALITY
CORRECTION)

N.B.—THE TOTAL LENGTH OF THE BAR REPRESENTS THE MALE POPULATION AND
THE BLACK PORTION THE EXCESS OF MALES OVER FEMALES IN A PARTICULAR
AGE GROUP



SEX AND MARITAL STATUS

from what has been discussed in Part IA of this Report and the observations of my predecessors:

(a) That a larger proportion of boys than girls seems to be born in this country than in Western countries;

(b) That girls, in the first few years of their life, still seem to suffer from comparative neglect than boys, as a result of which Nature's balancing action of taking away more boys than girls in the first years of life does not properly come into play, and the survival of girls never seems to draw even with the survival of boys;

(c) That a very heavy toll of female lives is taken in the earlier period of the reproductory age, that is, between

the ages of 15 and 34. The toll is so heavy that the difference between the male population and the female population grows remarkably rapid and wide and this gap is never made up in middle or old age.*

(d) That proportionately greater deaths occur among females even between the ages 35 and 54 than is usually imagined.

* A small but welcome feature is the decline of suicides among women all over the State. The proportion of suicides among females compared to that among males has been reversed in the course of the last 30 years. Whereas the proportion of suicides among females in 1920 was greater than that among males, the opposite holds good in 1951,

SECTION 5

MARITAL STATUS RATIOS

Subsidiary Tables VI(7) and VI(8) give the marital status of 1,000 persons of each sex of the general population in 1951 and compare the statistics with those of previous censuses and also give the age distribution of 1,000 married persons of each sex and compare the statistics with those of 1941. In the last census infants and children aged 0—4 were supposed to have been not married, and the tabulation was made on that assumption. While this assumption was generally correct the census returns reveal that marriage among infants and very young children (age 1—4) is by no means extinct and the general law, called the Sardá Act, limiting the age of marriage to a minimum of 14, does not seem to be universally respected. The age of unmarried girls aged 15—25, both in the town and village, seems to be still universally understated in the country, and it is difficult to say for certain how the age of marriage has advanced in this age group in the last 30 years. The

note on Maternity data published elsewhere in this volume still seems to point towards an early age of marriage. But it should be remembered that the statistics considered in that note are almost entirely for the rural areas of West Bengal and do not represent the picture of marital status in the Calcutta Industrial Area and the large towns. It is in these latter places that there is a great concentration of the educated middle class and a close survey of marital status among girls and women of this class is likely to reveal much interesting data. It is always hazardous to advance an opinion based entirely on common experience without subjecting that experience to observation over a wide field and representative samples. One's opinion is too often biased by the experience of families within one's social orbit, but, if one were to judge by the opinion expressed in sociological articles in contemporary journals, one would be persuaded to believe that the

MARITAL STATUS

usual age of marriage of girls receiving school and college education is higher in the State than that even in many western countries. The age of marriage of this class of girls is seldom below 23, and the age of marriage of males who seek marriages with this category of girls is seldom below 28. As has been said above, this opinion is by no means intended to be hard and fast. While on the one hand, therefore, age of

marriage in the villages is still low, and often less than the minimum stipulated by law, the age of marriage in the town and city, especially among the middle classes, is high, even higher than the average age of marriage in many western countries. The adjoining diagrams show graphically the proportion of unmarried, married and widowed or divorced males and females in the population of several districts in West Bengal.

SECTION 6

AGE GROUPS

Subsidiary Tables VI(9) to (14) give in considerable detail the proportion of age groups of males and females in the general, rural and urban population, and the agricultural and non-agricultural classes. It is unnecessary to paraphrase these statistics, and at the same time the reader's attention is invited to Chapter I of Part IA of this Report where the age groups are discussed district by district and also generally; particularly to diagrams facing page 360 of that volume. In this connexion statements I.38 and I.148 published in Part IA will be of some interest. The diagrams and other

statements will show that the figures for age groups in the last 50 years do not display any indisputable trend.

This leads naturally to the question of misstatement of age in the census, digital preference, and the smoothing of the single year age curve which, ungraduated, presents such a hedgehog appearance. But as the census Actuary will be dealing with their entire problem, the matter is not being discussed in this report. A small separate brochure on the subject will be published by the West Bengal Government.

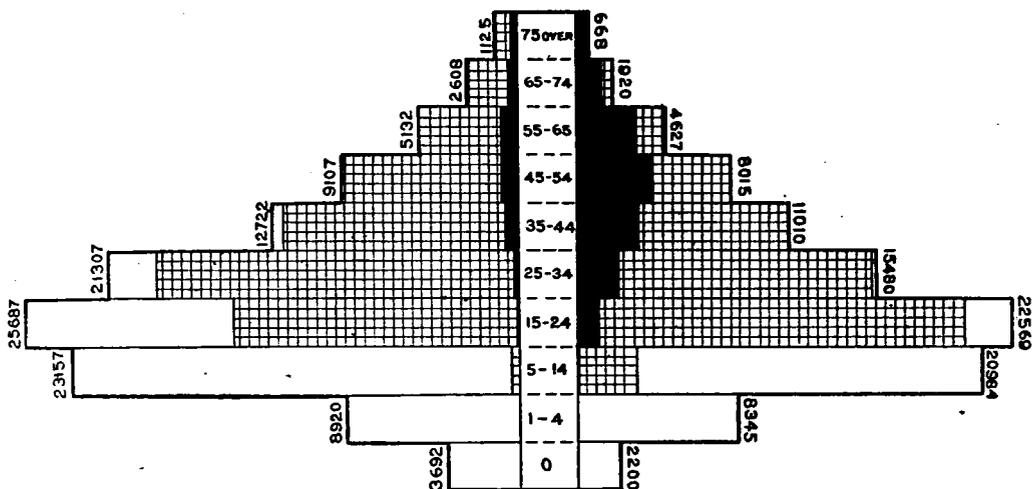
EXPLANATION

Comparative Age Pyramids of Unmarried, Married and Divorced Males and Females in 1901, 1931 and 1951 of districts (1) Burdwan, (2) Hooghly, (3) 24-Parganas and (4) Calcutta.

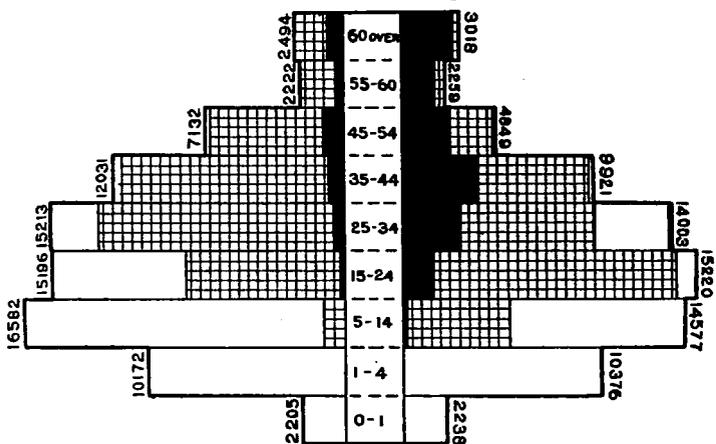
The left horizontal bars stand for the male population and the right horizontal bars stand for the female population. White portions signify the extent of unmarried males and females, checks signify that of married males and females, and blacks signify widowed or divorced males and females. The number inserted sideways to each horizontal bar signifies the total male or female population in that particular age group. The vertical legends in the middle between the two sets of horizontal bars indicate the age groups to which the bars relate.

BURDWAN

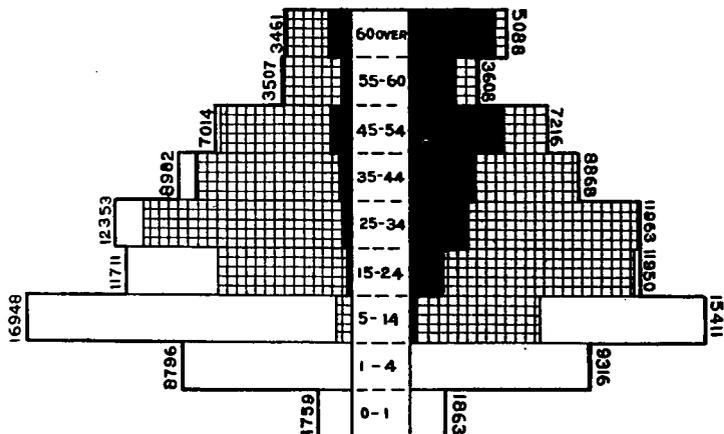
1951



1931



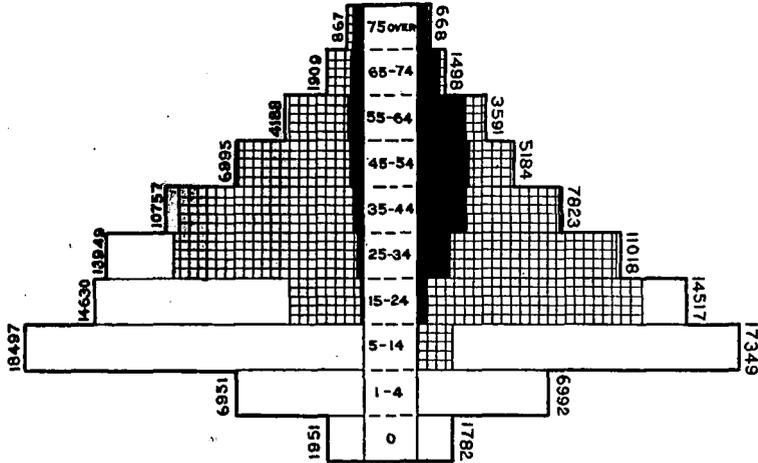
1901



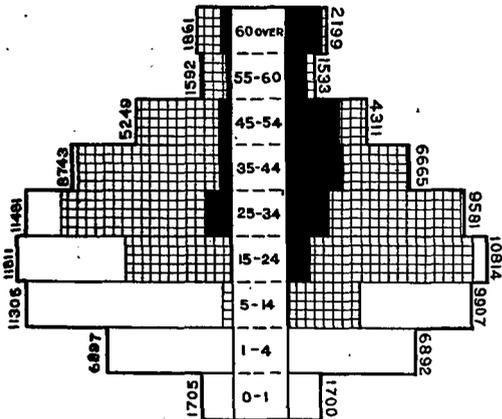
White=Unmarried ; Check=Married ; Black=Widowed or Divorced

HOOGLY

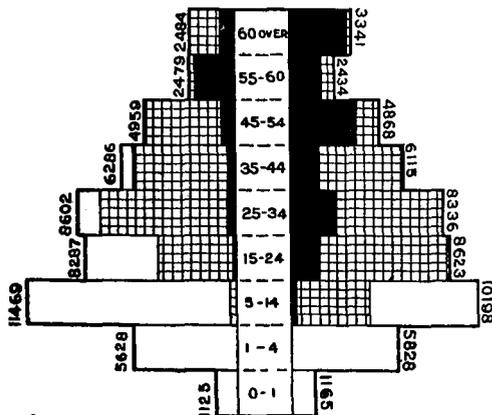
1951



1931

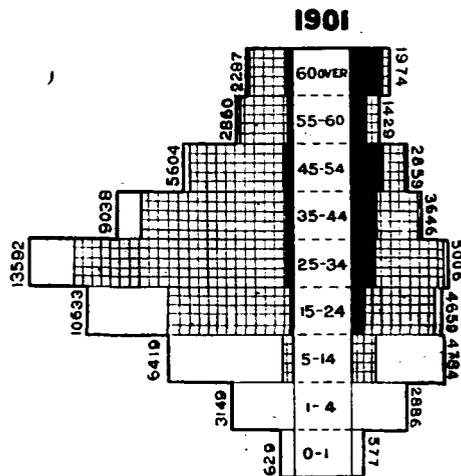
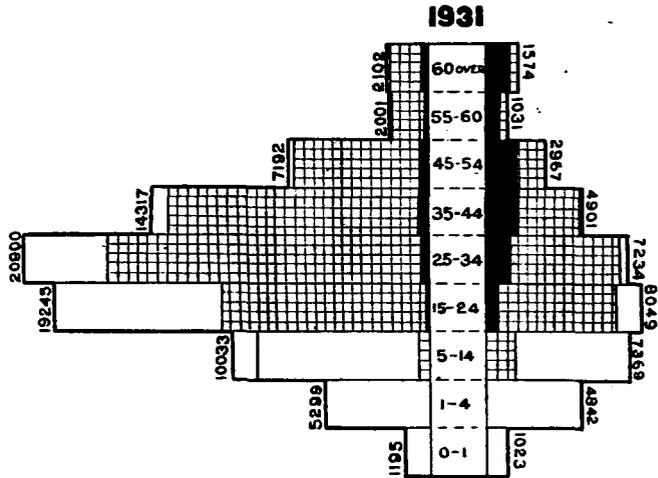
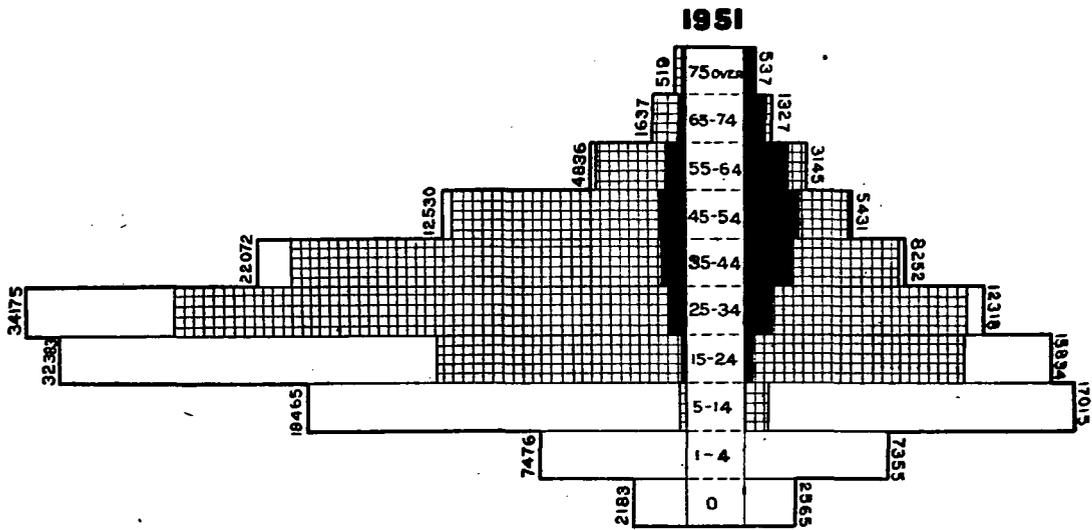


1901



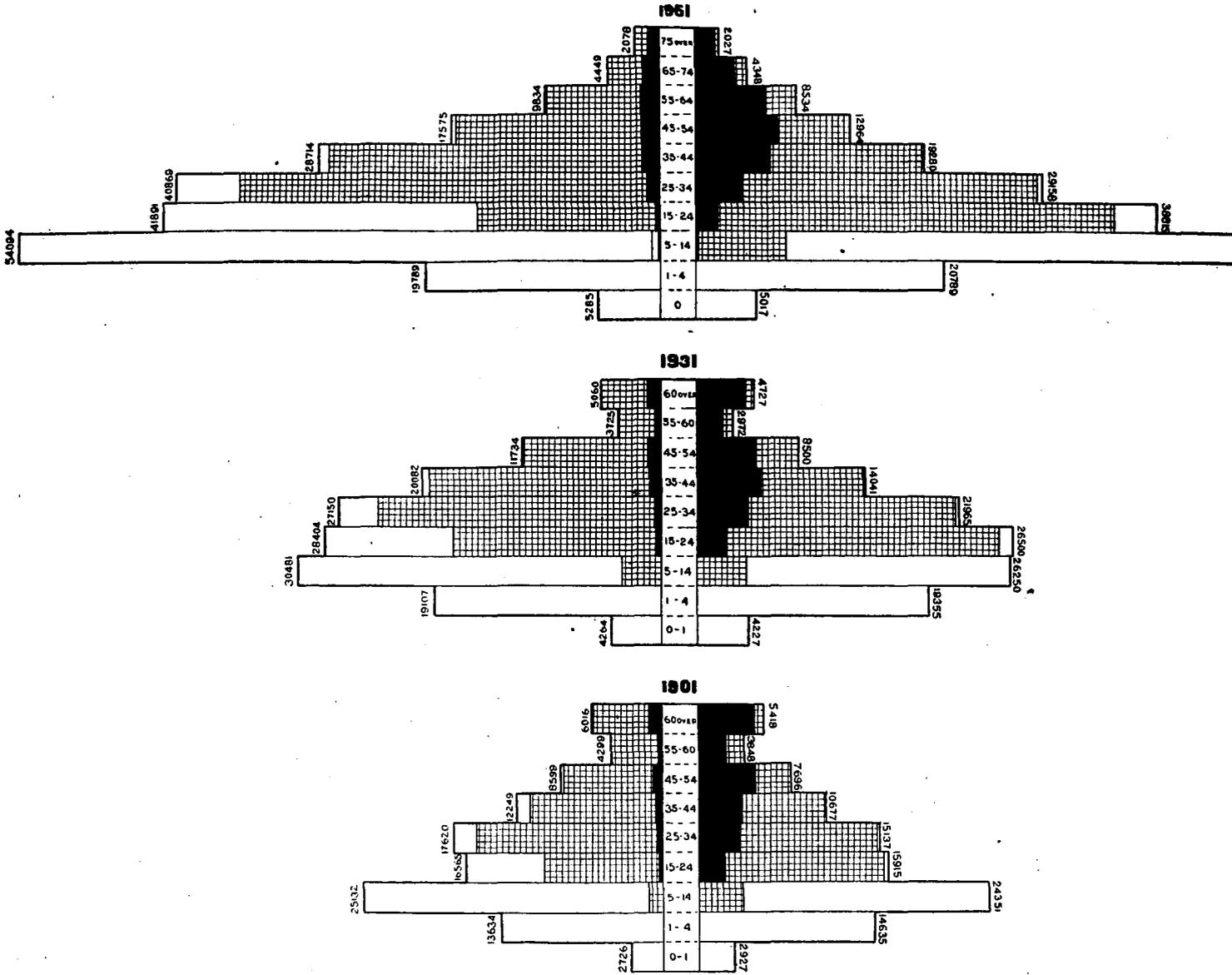
White=Unmarried ; Check=Married ; Black=Widowed or Divorced

CALCUTTA



White=Unmarried ; Check=Married ; Black=Widowed or Divorced

24-PARGANAS



White=Unmarried ; Check=Married ; Black=Widowed or Divorced

SECTION 7

LITERACY AND EDUCATIONAL QUALIFICATIONS

The statistics of literacy are contained in Union Table CIV, DVII, details of foreign educational qualifications by livelihood classes and the following subsidiary tables printed elsewhere in this volume. The third subsidiary table is not strictly a literacy table but explains the number of persons employed in institutions imparting secondary and higher education.

The returns of Union Table DVII were obtained from answers to Question 12 of the census questionnaire. The definition of literacy is the same as what has obtained since 1911, which is the ability to write a letter to a friend and read the answer to it. Those persons who are merely able to read but are not able to write have been shown separately in Union Table CIV. The progress of literacy between 1901 and

1951 has been shown in two statements below: Statement VI.3 showing the number of total, male and female literates per 10,000 of total, male and female population in West Bengal, 1901-1951 and Statement VI.4 showing distribution of total, male and female literates among every 10,000 of total, male and female literates of the State in the districts of West Bengal, 1901-1951. The percentages are shown in the Title pages of Union Table CII and DVII and do not require to be repeated here but Statement VI.5 below shows the distribution of literacy in rural and urban areas of West Bengal in 1951. Statement VI.6 restates the above statements of rural and urban literacy in districts by arranging the administrative divisions of districts in decreasing order.

RATIO OF LITERATES, 1901-51

STATEMENT VI.3

Number of Total, male and female literates per 10,000 of total, male and female population in West Bengal, 1901-51

State and District	1951			1941			1931		
	Persons	Males	Females	Persons	Males	Females	Persons	Males	Females
West Bengal . . .	2,454	2,468	1,273	1,882	2,777	834	1,142	1,854	340
<i>Burdwan Division</i> . . .	2,240	3,331	1,047	1,922	2,972	772	1,280	2,196	308
Burdwan . . .	2,065	2,980	1,034	1,730	2,646	704	1,071	1,832	255
Birbhum . . .	1,766	2,757	750	1,338	2,173	502	692	1,280	105
Bankura . . .	1,721	2,723	694	1,463	2,504	399	851	1,593	106
Midnapur . . .	2,317	3,664	906	1,819	3,047	534	1,517	2,710	294
Hooghly . . .	2,466	3,524	1,271	2,321	3,346	1,136	1,398	2,278	400
Howrah . . .	2,337	3,764	1,692	2,327	3,752	1,652	1,800	2,675	750
<i>Presidency Division</i> . . .	2,627	3,574	1,467	1,854	2,644	881	1,033	1,610	366
24-Parganas . . .	2,730	3,916	1,325	1,963	2,971	733	1,093	1,799	266
Calcutta . . .	5,312	5,869	4,335	5,386	5,812	4,444	3,957	4,449	2,907
*Nadia . . .	2,109	2,871	1,295	1,025	1,502	515	589	931	225
Murshidabad . . .	1,306	1,960	633	962	1,537	380	525	901	151
*Malda . . .	957	1,529	365	689	1,144	229	316	571	60
*West Dinajpur . . .	1,473	2,183	663	974	1,529	352	623	1,101	92
*Jalpaiguri . . .	1,446	2,136	611	981	1,443	432	479	792	108
Darjeeling . . .	2,112	3,139	921	1,406	2,208	497	1,074	1,816	230
Cooch Behar . . .	1,509	2,391	478	826	1,400	176	655	1,131	118

State and District	1921			1911			1901		
	Persons	Males	Females	Persons	Males	Females	Persons	Males	Female
West Bengal . . .	1,136	1,955	230	961	1,745	154	887	1,621	110
<i>Burdwan Division</i> . . .	1,138	2,072	168	1,019	1,913	113	981	1,832	82
Burdwan . . .	1,027	1,845	178	998	1,864	130	850	1,620	84
Birbhum . . .	1,029	1,955	106	880	1,711	63	776	1,532	42
Bankura . . .	1,113	2,130	99	943	1,836	71	929	1,830	55
Midnapur . . .	1,042	1,962	113	936	1,806	67	1,053	2,049	73
Hooghly . . .	1,303	2,240	290	1,115	1,989	205	1,064	1,975	140
Howrah . . .	1,494	2,519	306	1,421	2,483	231	1,152	2,118	119
<i>Presidency Division</i> . . .	1,135	1,872	279	951	1,620	187	810	1,417	134
24-Parganas . . .	1,331	2,266	213	1,236	2,156	171	1,119	2,015	126
Calcutta . . .	4,188	5,015	2,430	3,213	3,957	1,645	2,482	3,158	1,149
*Nadia . . .	648	1,069	206	562	983	137	560	1,041	87
Murshidabad . . .	702	1,240	159	579	1,083	87	551	1,065	58
*Malda . . .	472	884	60	457	887	33	374	735	21
*West Dinajpur . . .	777	1,404	88	587	1,080	37	534	991	26
*Jalpaiguri . . .	567	992	72	557	989	44	392	698	36
Darjeeling . . .	1,094	1,876	222	995	1,693	191	700	1,186	143
Cooch Behar . . .	784	1,393	91	741	1,335	60	587	1,065	44

* Proportions for 1901-41 for the districts Nadia, Malda, West Dinajpur, and Jalpaiguri are based on the repartition (1947) figures of these districts.

DISTRIBUTION OF LITERATES

STATEMENT VI.A

Distribution of 10,000 total, male and female literates among the districts of West Bengal, 1901-51

State and District	1951			1941			1931		
	Persons	Males	Females	Persons	Males	Females	Persons	Males	Females
West Bengal	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
<i>Burdwan Division</i>	4,085	4,173	3,803	4,270	4,335	4,014	4,809	4,940	4,005
Burdwan	743	747	731	706	717	665	733	755	601
Birbhum	310	322	270	303	309	279	285	306	155
Bankura	378	393	311	407	443	270	411	448	183
Midnapur	1,278	1,360	1,019	1,253	1,348	881	1,845	1,940	1,260
Hooghly	630	627	636	691	670	769	676	681	646
Howrah	751	724	836	910	848	1,150	859	810	1,160
<i>Presidency Division</i>	5,915	5,827	6,197	5,730	5,665	5,986	5,191	5,060	5,995
24-Parganas	2,067	2,115	1,915	1,499	1,566	1,237	1,289	1,331	1,028
Calcutta	2,224	2,058	2,750	2,453	2,390	3,091	2,057	1,832	3,436
*Nadia	397	367	492	339	370	465	391	371	516
Murshidabad	368	368	367	341	344	328	313	311	321
*Malda	147	158	116	133	192	149	144	152	98
*West Dinajpur	174	181	153	405	422	339	475	514	237
*Jalpaiguri	217	231	173	231	231	228	205	214	151
Darjeeling	155	162	130	114	120	93	149	156	106
Cooch Behar	166	187	101	115	130	56	168	179	102

State and District	1921			1911			1901		
	Persons	Males	Females	Persons	Males	Females	Persons	Males	Females
West Bengal	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
<i>Burdwan Division</i>	4,279	4,392	3,223	4,572	4,670	3,356	5,002	5,099	3,481
Burdwan	690	699	612	813	822	702	806	815	660
Birbhum	407	427	219	436	455	209	433	448	196
Bankura	530	561	245	569	592	289	641	662	319
Midnapur	1,298	1,358	723	1,400	1,459	665	1,825	1,875	1,050
Hooghly	658	650	731	644	633	771	691	686	753
Howrah	696	697	688	710	709	723	606	613	503
<i>Presidency Division</i>	5,721	5,608	6,777	5,428	5,330	6,641	4,998	4,901	6,519
24-Parganas	1,634	1,676	1,241	1,593	1,613	1,359	1,439	1,449	1,276
Calcutta	1,776	1,601	3,429	1,525	1,377	3,340	1,301	1,169	3,370
*Nadia	450	420	729	482	458	777	577	567	748
Murshidabad	414	406	490	421	421	427	454	458	404
*Malda	218	225	144	243	253	117	205	212	95
*West Dinajpur	619	650	326	525	550	210	517	537	201
*Jalpaiguri	248	258	152	266	278	128	191	194	134
Darjeeling	145	145	144	140	138	166	108	104	171
Cooch Behar	217	227	122	233	242	117	206	211	120

* Proportions for 1901-41 for the districts Nadia, Malda, West Dinajpur, and Jalpaiguri are based on the repartition (1947) figures of these districts.

RURAL AND URBAN LITERACY.

STATEMENT VI.5

Distribution of literacy in rural and urban areas of West Bengal, 1951

State and District	Population			Literates			Percentages	
	Total	Rural	Urban	Total	Rural	Urban	Percentage of literacy to population	Percentage of rural literacy to total Literacy
1	2	3	4	5	6	7	8	9
West Bengal	24,810,308	18,657,045	6,153,263	6,087,797	3,307,715	2,780,082	24.54	54.33
<i>Burdwan Division</i>	<i>11,102,530</i>	<i>9,494,848</i>	<i>1,607,682</i>	<i>2,486,647</i>	<i>1,388,900</i>	<i>600,747</i>	<i>22.40</i>	<i>75.84</i>
Burdwan	2,191,667	1,867,726	323,941	452,586	326,263	126,323	20.65	72.10
Birbhum	1,066,889	997,896	68,993	188,433	163,132	25,301	17.66	86.57
Bankura	1,319,259	1,224,641	94,618	227,045	190,666	36,379	17.21	83.98
Midnapur	3,359,022	3,106,142	252,880	778,268	671,910	106,358	23.17	86.33
Hooghly	1,554,320	1,209,390	344,930	383,219	255,829	127,390	24.66	66.76
Howrah	1,611,373	1,089,053	522,320	457,146	278,100	179,046	28.37	60.83
<i>Presidency Division</i>	<i>13,707,778</i>	<i>9,162,197</i>	<i>4,545,581</i>	<i>3,601,150</i>	<i>1,421,816</i>	<i>2,179,335</i>	<i>26.27</i>	<i>39.48</i>
24-Parganas	4,609,309	3,243,340	1,365,969	1,258,814	698,115	560,199	27.30	55.48
Calcutta	2,548,677	..	2,548,677	1,353,909	..	1,353,909	53.12	..
Nadia	1,144,924	936,823	208,101	241,414	155,320	86,094	21.09	64.34
Murshidabad	1,715,759	1,580,832	134,927	224,025	169,831	54,194	13.06	75.81
Malda	937,580	902,419	35,161	89,758	74,672	15,086	9.57	83.19
West Dinajpur	730,578	678,688	41,940	106,127	87,232	18,895	14.73	82.20
Jalpaiguri	914,538	848,393	66,145	132,236	104,114	28,122	14.46	78.70
Darjeeling	445,260	350,779	94,481	94,021	52,660	41,361	21.12	56.01
Cooch Behar	671,158	620,978	50,180	101,296	79,871	21,425	15.09	78.85

State and District	Percentages					Distribution of total literacy in percentage	Distribution of rural literacy in percentage	Distribution of urban literacy in percentage
	Percentage of urban literacy to total Literacy	Percentage of rural literacy to total population	percentage of urban literacy to total population	Percentage of rural literacy to rural population	Percentage of urban literacy to urban population			
	10	11	12	13	14	15	16	17
West Bengal	45.67	13.33	11.21	17.73	45.18	100.00	100.00	100.00
<i>Burdwan Division</i>	<i>24.16</i>	<i>16.99</i>	<i>5.41</i>	<i>19.46</i>	<i>37.37</i>	<i>40.85</i>	<i>57.02</i>	<i>21.61</i>
Burdwan	27.90	14.89	5.76	17.47	38.98	7.43	9.86	4.54
Birbhum	13.43	15.29	2.37	16.85	36.67	8.10	4.93	0.91
Bankura	16.02	14.45	2.76	15.57	38.45	3.73	5.77	1.31
Midnapur	13.67	20.00	3.17	21.63	42.06	12.78	20.31	3.83
Hooghly	33.24	16.41	8.20	21.15	36.93	6.30	7.74	4.58
Howrah	39.17	17.26	11.11	25.54	34.28	7.51	8.41	6.44
<i>Presidency Division</i>	<i>60.52</i>	<i>10.37</i>	<i>16.90</i>	<i>16.52</i>	<i>47.94</i>	<i>59.15</i>	<i>42.98</i>	<i>78.39</i>
24-Parganas	44.52	15.15	12.15	21.52	41.01	20.67	21.10	20.15
Calcutta	100.00	..	53.12	..	53.12	22.24	..	48.70
Nadia	35.06	13.57	7.52	16.58	41.37	3.97	4.70	3.10
Murshidabad	24.19	9.90	3.16	10.74	40.17	3.68	5.13	1.95
Malda	16.81	7.96	1.69	8.27	42.91	1.47	2.26	0.54
West Dinajpur	17.80	12.11	2.62	12.85	45.05	1.74	2.64	0.68
Jalpaiguri	21.30	11.36	3.03	12.27	42.59	2.17	3.15	1.01
Darjeeling	43.99	11.83	9.29	15.01	43.78	1.55	1.59	1.49
Cooch Behar	21.15	11.90	3.19	12.86	42.70	1.66	2.41	0.77

STATEMENT VI.6

Rural and Urban literacy in districts arranged in decreasing order, 1951

Total literacy in decreasing order		Rural literacy in decreasing order		Urban literacy in decreasing order	
1	2	3	4	5	6
West Bengal	24.54	West Bengal	17.73	West Bengal	45.18
<i>Presidency Division</i>	<i>26.27</i>	<i>Burdwan Division</i>	<i>19.36</i>	<i>Presidency Division</i>	<i>47.94</i>
<i>Burdwan Division</i>	<i>22.40</i>	<i>Presidency Division</i>	<i>15.52</i>	<i>Burdwan Division</i>	<i>37.37</i>
1 Calcutta	53.12	1 Howrah	25.54	1 Calcutta	53.12
2 Howrah	28.37	2 Midnapur	21.63	2 West Dinajpur	45.05
3 24-Parganas	27.30	3 Hooghly	21.52	3 Darjeeling	43.78
4 Hooghly	24.66	4 Burdwan	21.15	4 Malda	42.91
5 Midnapur	23.17	5 Nadia	17.47	5 Cooch Behar	42.70
6 Darjeeling	21.12	6 Birbhum	16.58	6 Jalpaiguri	42.59
7 Nadia	21.09	7 Bankura	16.35	7 Midnapur	42.06
8 Burdwan	20.65	8 Darjeeling	15.57	8 Nadia	41.37
9 Birbhum	17.86	9 Cooch Behar	15.01	9 24-Parganas	41.01
10 Bankura	17.21	10 West Dinajpur	12.86	10 Murshidabad	40.17
11 Cooch Behar	15.09	11 Jalpaiguri	12.85	11 Burdwan	38.98
12 West Dinajpur	14.73	12 Murshidabad	12.27	12 Bankura	38.45
13 Jalpaiguri	14.46	13 Howrah	10.74	13 Hooghly	36.93
14 Murshidabad	13.06	14 Birbhum	8.27	14 Birbhum	36.67
15 Malda	9.57			15 Howrah	34.28

LITERACY
STATEMENT VI.6—concl'd.

Distribution of total literacy in decreasing order		Distribution of Rural literacy in decreasing order		Distribution of Urban literacy in decreasing order	
4		5		6	
West Bengal	100'00	West Bengal	100'00	West Bengal	100'00
Presidency Division	59.15	Burdwan Division	57.02	Presidency Division	78.39
Burdwan Division	40.85	Presidency Division	42.98	Burdwan Division	21.61
1 Calcutta	22.24	1 24-Parganas	21.10	1 Calcutta	48.70
2 24-Parganas	20.67	2 Midnapur.	20.31	2 24-Parganas	20.15
3 Midnapur.	12.78	3 Burdwan	9.86	3 Howrah	6.44
4 Howrah	7.51	4 Howrah	8.41	4 Hooghly	4.58
5 Burdwan	7.43	5 Hooghly	7.74	5 Burdwan	4.54
6 Hooghly	6.30	6 Bankura	5.77	6 Midnapur.	3.83
7 Nadia	3.97	7 Murshidabad	5.13	7 Nadia	3.10
8 Bankura	3.73	8 Birbhum	4.93	8 Murshidabad	1.95
9 Murshidabad	3.68	9 Nadia	4.70	9 Darjeeling	1.49
10 Birbhum	3.10	10 Jalpaiguri	3.15	10 Bankura	1.31
11 Jalpaiguri	2.17	11 West Dinajpur	2.04	11 Jalpaiguri	1.01
12 West Dinajpur	1.74	12 Cooch Behar	2.41	12 Birbhum	0.91
13 Cooch Behar	1.66	18 Malda	2.26	13 Cooch Behar	0.77
14 Darjeeling	1.55	14 Darjeeling	1.59	14 West Dinajpur	0.68
15 Malda	1.47			15 Malda	0.54

Subsidiary Table VII.1 shows the progress of literacy for each sex in four arbitrary age groups. In the first two groups 5—9 and 5—14 the increase in literacy for each sex is slightly over 50 per cent. over the 1941 figures for the corresponding ages. The spread of Free Primary education during the last decade accounts largely for this increase.

It must be noted that age group 0 to 4 has been considered outright as illiterate, although it is possible that many children of age 3 to 4, that is, those who have not completed the age of 5, have acquired literacy.

Literacy among girls of ages 5 to 14 has nearly doubled since 1941. Another interesting feature is that the disparity of literacy between the sexes has diminished considerably in age groups 5—14 and 5 and upwards. The disparity, however, has remained unchanged in age group 5—9. The disparity of literacy between the sexes increases with the increase in age groups. This is possibly due to the comparative neglect to which the campaign of literacy among adult females has been relegated. Up to 1947 there were no schools for adult women in rural areas. The number of male literates for every female literate is as shown below:

Age group	1941	1951
5—9	1.86	1.88
5—14	2.15	1.89
5 and upwards	3.40	2.42
15 and upwards	...	2.67

Literacy among girls is perhaps increasing at a faster rate than among boys.

Subsidiary Table VII.2 classify the literates according to educational qualifications under the various livelihood classes. Of literate persons of the first three agricultural classes more than 75 per cent. come under the lowest definition of the literates. In these three agricultural classes the proportion of women who are merely literate and have had no other education is higher than among men, more of the latter having gone on to more than mere literacy. In Agricultural Class IV, although many more people have gone up for higher education, yet a goodly portion remains merely literate. It is interesting to note that for every matriculate in the first three Livelihood Classes I to III there are about 5 matriculates in Agricultural Class IV—rent receivers.

Among the non-agricultural classes, Livelihood Class VIII is dominated by those who are usually called the Middle Class. It is not therefore surprising that Livelihood Class VIII enjoys the

CONCENTRATION OF LITERACY IN CALCUTTA.

highest proportion of persons who have gone on for higher education, and degrees, and has the lowest proportion of those who are merely literate with no other educational qualifications.

One happy conclusion emerges from the comparative statements given above; which is, that there has been no decrease in literacy ratio in age groups in West Bengal. On the other hand, in the age group 5—9 there has been an increase of 64.4 per cent. over the 1941 figures for West Bengal. All the same the picture of education that emerges from the Union Tables, the above statements, and the subsidiary tables, is not a particularly happy one. The vast majority of literates never rise above *mere* 'literacy'. The ability to read and write does not carry one very far. It is sad to reflect that of the literates among the cultivating classes who form the bulk of the State's population only as few as 1.6 per cent. ever reach the Matriculation stage. There are not many schools in West Bengal which disseminate Technical education and Matriculation is quite often counted, not without plausible reason, as the badge of literacy. This cannot but lead to the conclusion that diffusion of knowledge lags far behind the progress of literacy.

Subsidiary Table VII.3 is a record of persons employed in educational services and research. This table might have been more useful and interesting if different grades of teachers could be shown separately. As the table stands, employees are grouped under three heads. The first group includes managers, clerks and servants of educational and research institutions and of libraries and museums. If librarians could have been separated, an index however imperfect, might have been received of the position and extent of libraries in the State.

Those who are actually engaged in teaching and research have been classed into two groups—University and non-

University teachers. Among the non-University teachers are included professors, lecturers and teachers of vocational schools and colleges and teachers of primary, and special schools. Mixing them all together prevents comparison with the statistical data issued by the Education Department from time to time. Two explanations are, however, needed to understand the table. Secondary schools were under the Calcutta University at the time of the Census. So secondary school teachers were placed under ICEC group 8.21 along with other University teachers and research students. It is for this reason that the figures in this group loom large. Secondary schools went under the Secondary Board of Education after the Census Enumeration.

Secondly, in answer to question 10 only the Principal Means of Livelihood was recorded. Teaching does not form the principal means of livelihood of many ill-paid teachers, including primary school teachers. Thus the number of all teachers cannot be had from Group 8.22 in columns 4 and 5 of the table.

It would be wrong to leave the section at this stage unless a statement were inserted to show the concentration of persons, who have attained some educational standards, in the city of Calcutta. Such a statement would help to confirm some of the statements made above to the effect that Education is not at all uniformly diffused over the State but has concentrated largely in Calcutta and the surrounding areas. The following Statement VI.7 shows the concentration of educational standards in the city of Calcutta in 1951. This together with Statement VI.5 printed above will help to confirm the conclusion drawn earlier that West Bengal has still a long way to go to spread some kind of an educational standard over her domain, especially in rural areas.

**MOTHER TONGUE
STATEMENT VI.7**

Concentration of persons of possessing educational standards in the City of Calcutta, 1951

Educational Standards	West Bengal			Calcutta			Percentage Ratios of Calcutta to West Bengal		
	Persons	Males	Females	Persons	Males	Females	Persons	Males	Females
1	2	3	4	5	6	7	8	9	10
All Standards	6,087,797	4,628,581	1,459,216	1,853,909	952,705	401,204	22.2	20.6	27.5
Able to read and write only	4,143,262	3,038,249	1,105,013	775,321	492,082	283,239	18.7	16.2	25.6
Middle school	1,347,111	1,059,810	287,301	327,137	240,277	86,860	24.3	22.7	30.2
Matriculate or S. L. C. or Higher secondary	352,268	308,319	43,949	182,282	114,533	17,749	37.6	37.1	40.4
Intermediate in Arts or Science	103,641	91,381	12,260	49,079	41,908	7,171	47.4	45.9	58.5
Graduates in Arts or Science	59,359	53,494	5,865	31,135	27,453	3,682	52.5	51.3	62.8
Post Graduates in Arts or Science	13,096	11,944	1,152	7,827	7,043	779	59.8	59.0	67.6
Teaching	16,221	14,313	1,903	2,129	1,476	653	13.1	10.3	34.3
Engineering	6,010	5,860	150	3,622	3,535	87	60.3	60.3	58.9
Agriculture	1,164	1,106	58	210	202	8	18.0	18.3	13.8
Veterinary	510	505	5	182	179	3	35.7	35.4	60.0
Commerce	10,553	10,404	149	7,606	7,484	122	72.1	71.9	81.9
Legal	10,380	10,280	100	6,095	6,020	75	58.7	58.6	75.0
Medical	16,155	15,430	725	6,588	6,234	354	40.8	40.4	48.8
Others	6,100	5,638	462	3,144	2,815	329	51.5	49.9	71.2
British Degrees or Diplomas	1,454	1,372	82	1,156	1,096	60	79.5	79.9	73.2
American Degrees or Diplomas	191	167	24	146	130	16	76.4	77.8	66.7
Continental Degrees or Diplomas	162	153	9	109	101	8	67.3	66.0	88.9
Other foreign Degrees or Diplomas	160	151	9	141	132	9	88.1	87.4	100.0

NOTE.—Percentage Ratios of total population of Calcutta to that of West Bengal :—Persons 10.3, Males 12.2, Females 8.1.

SECTION 8

MOTHER TONGUE AND BILINGUALISM

Details of mother tongue and bilingualism will be available in Union Table DI Languages Part I Mother Tongue, Part II Bilingualism. While the investigation in respect of mother tongue refer to the actual language spoken, that of bilingualism was directed as to whether, say a Frenchman speaking French as his mother tongue could speak any Indian language as a second language.

The languages in the part relating to mother tongue are given in the order of spoken language of speakers speaking them under three major heads:

- (1) languages of the Indian sub-continent,
- (2) languages of other Asian countries,
- (3) languages of countries other than Asia.

The term 'tribal' denotes a group of languages where the enumerator could

not make out what the language exactly was but was certain that the speaker belonged to a tribe.

During compilation of the figures a number of dialects have been combined under the main language name. In the case of Darjeeling and Sikkim, however, all mother tongues returned whether dialect or the second language, have been shown. A departure was made in the case of Darjeeling and Sikkim on the ground that a detailed classification might help the Backward Commission to take certain decision, in as much as the list of Scheduled Tribes and Scheduled Castes applicable to the State of West Bengal might not be generally clearly understood by the enumerators in Darjeeling district and Sikkim. The following Statement VI.8 gives an alphabetical list of languages returned in 1951.

LANGUAGES

STATEMENT VI.8

Alphabetical List of Language names returned in 1951

Africaans	Garó	Kora	Portuguese
Arabic	German	Kumai	Punjabi
Arakanese	Ghasi	Kurku	Rabha
Armenian	Goanese	Lepcha	Rai
Assamese	Greek	Limbu	Rajasthani
Asuri	Gujarati	Maithili	Rajbanshi
Baite	Gurumukhi	Mal	Russian
Balochi	Gurung	Malabari	Sadana
Bara	Hebrew	Malayalam	Sadri
Belgian	Hindi	Maldwipi	Santali
Bengali	Ho	Mal Paharia	Savara
Bhotia	Indonesian	Mangar	Scotch
Brijia	Irish	Manipuri	Sharpa
Burmese	Italian	Marathi	Siamese
Caucasian	Japanese	Marwari	Sindhi
Chattisgarhi	Javanese	Mech	Sinhalese
Chilean	Kachchhi	Mongolian	Spanish
Chinese	Kachin	Mundari	Sunwar
Coorgi	Kagatey	Naga	Swedish
Czech	Kanarese	Nagpuri	Tamang
Danish	Karnatic	Nepali	Tamil
Dhimal	Kashmiri	Newari	Telugu
Dogra	Khambu	Norwegian	Thami
Dukpa	Kharia	Oraon	Tibetan
Dutch	Khasi	Oriya	Toto
English	Khond	Pakhtoon	Tribal
Finnish	Koda	Pashto	Turi
French	Kol	Persian	Urdu
Garhwali	Konkani	Polish	Vietnamese

Statement VI.9 gives an alphabetical list of languages and dialects generally spoken by the local population of Darjeeling district and Sikkim.

On the eve of the tabulation of mother tongues in the census of 1951 a list of languages and dialects under the families, sub-families, groups and sub-groups was circulated among the Deputy Superintendents in charge of Tabulation Offices for their guidance. This list was prepared from J. C. Grier-son's. Tabulation was done upon this list as no list of languages for the last

census was received from the Registrar General.

STATEMENT VI.9

Languages and dialects of Darjeeling district and Sikkim

Bhotia	Mangar or Magari
Dhimal	Nepali
Dukpa	Newari
Gurung	Rai
Kagatey	Sharpa
Khambu	Sunwar
Kumai	Tamang
Lepcha	Thami
Limbu	

STATEMENT VI.10

List of languages and dialects under their families, sub-families, branches, groups and sub-groups

I—AUSTRIC FAMILY

Austro-Asiatic Sub-family
MON-KHMER BRANCH

Khasi Group

- 1 Khasi
- Munda Branch
- 2 Kherwari
 - (a) Santali
 - (b) Mundari
 - (c) Bhumij
 - (d) Koda
 - (e) Ho
 - (f) Turi
 - (g) Asuri
 - (h) Korwa

- 3 Kurku
- 4 Kharia
- 5 Savara
- 6 Gadaha

II—TIBETO-CHINESE FAMILY

Tibeto-Burmese Sub-family

TIBETO-HIMALAYAN BRANCH

Tibetan Group

- 7 Bhotia
 - (a) Bhotia of Tibet or Tibetan

Pronominalised Himalayan Group Eastern Sub-group

- 8 Dhimal
- 9 Thami
- 10 Limbu
- 11 Yakha
- 12 Khambu
- 13 Rai or Jimdar

Non-Pronominalised Himalayan Group

- 14 Gurung
- 15 Murmi
- 16 Sunwar
- 17 Magari
- 18 Newari
- 19 Lepcha or Rong
- 20 Kami
- 21, Toto

STATEMENT VI.10—contd.

ASSAM-BURMESE BRANCH

Bara or Bodo Group

- 22 Bara, Bodo or Plains Kachari
 - (a) Bodo proper
 - (b) Mech

- 23 Garo

- 24 Koch

- 25 Rabha

- 26 Tipura or Mrung

Burma Group

- 27 Mru

- 28 Burmese

- 29 Arakanese or Maghi

III—DRAVIDIAN FAMILY

Dravida Group

- 30 Tamil

- 31 Malayalam

- 32 Kanarese

- 33 Coorgi or Kodagu

- 34 Orao or Kurukh

- 35 Khond

- 36 Kolami

- 37 Gondi

- 38 Telugu

- 39 Brahui

IV—INDO-EUROPEAN FAMILY

Aryan Sub-family

IRANIAN BRANCH

Persian Group

- 40 Persian

Eastern Group

Afghanistan-Baluchistan Sub-group

- 41 Pashto

- 42 Balochi

Dard Group

- 43 Kashmiri

Indo-Aryan Branch outer Sub-branch

North Western Group

- 44 Lahnda or Western Punjabi

- 45 Sindhi

- 46 Kachchhi

- 47 Bhatia

Southern Group

- 48 Marathi

- 49 Berari

- 50 Nagpuri

GRIERSON'S CLASSIFICATION

STATEMENT VI.10—contd.

- Eastern Group*
 51 Oriya
 52 Behari
 (a) Maithili
 (b) Magahi
 (c) Bhojpuri
 53 Bengali
 (a) Central or standard
 (b) Western
 (c) South Western
 (d) Northern
 (e) Rajbanshi
 (f) Eastern
 (g) South Eastern
 54 Assamese
 Mediate Sub-Branch

STATEMENT VI.10—concl'd.

- Mediate Group*
 55 Eastern Hindi
 Central Group
 56 Western Hindi
 (a) Hindusthani
 57 Panjabi
 (a) Standard Panjabi
 (b) Dogra
 58 Gujarati
 59 Rajasthani
 Pahari Group
 60 Nepali, Khaskura or Eastern
 Pahari
 (a) Standard
 (b) Kumaoni
 (c) Garhwali

The following Statement VI.11 shows the number per 10,000 of total population speaking each recorded language as mother tongue in West Bengal in 1951.

STATEMENT VI.11

Number per 10,000 of total population speaking each recorded language as mother tongue in West Bengal, 1951

Serial number	Languages	Number per 10,000 of total population	Serial number	Languages	Number per 10,000 of total population
	All Languages	10,000	33	Dukpa	0.5
	A. Languages of the Indian Sub-continent	9,862	34	Mech	0.5
1	Bengali	8,462	35	Kora	0.3
2	Hindi	635	36	Kachchhi	0.2
3	Santali	267	37	Thami	0.2
4	Urdu	184	38	Garó	0.2
5	Nepali	70	39	Kagatey	0.1
6	Oriya	73	40	Mal Paharia	0.2
7	Rai	26	41	Pashto	0.1
8	Tamang	20	42	Toto	0.1
9	Telugu	20	43	Konkani	0.1
10	Limbu	8	44	Kol	0.1
11	Gurumukhi	13	45	Kanarese	0.1
12	Oraon	12	46	Khond	0.1
13	Lepcha	5	47	Sadri	0.1
14	Gurung	7	48	Goanese	0.1
15	Mangar	8	49	Rabha	0.1
16	Bhotia	3	50	Savara	0.05
17	Newari	6	51	Dhimal	0.05
18	Gujarati	6	52	Nagpuri	0.04
19	Tamil	6	53	Kashmiri	0.04
20	Sharpa	4	54	Koda	0.03
21	Assamese	4	55	Maithili	0.03
22	Rajasthani	3	56	Brijia	0.02
23	Marathi	3	57	Ghasi	0.02
24	Mundari	2	58	Turi	0.02
25	Punjabi	2	59	Ho	0.02
26	Sunwar	2	60	Manipuri	0.02
27	Marwari	2	61	Garhwali	0.02
28	Málayalam	1	62	Karnatic	0.02
29	Tibetan	1	63	Malabari	0.01
30	Sadana	1	64	Kumai	0.01
31	Sindhi	1	65	Bara	0.01
32	Khará	1	66	Maldwipi	0.01
			67	Kurku	0.01

RATIO OF LANGUAGES
STATEMENT VI.11—concl'd.

Serial number.	Languages	Number per 10,000 of total population	Serial number,	Languages	Number per 10,000 of total population
68	Coorgi	0.004	92	Javanese	0.001
69	Dogra	0.004	93	Vietnamese	0.001
70	Khasi	0.004	94	Arakanese	0.0004
71	Naga	0.003	95	Indonesian	0.0004
72	Asuri	0.003			
73	Chattisgarhi	0.002		D. Languages of Continents Other than Asia	
74	Baite	0.002			16
75	Khambu	0.002	96	Africaans	0.002
76	Mal	0.002	97	English	15
77	Rajbanshi	0.001	98	German	0.1
	B. Tribal not specified	118	99	French	0.1
	C. Languages of other Asian Countries	4	100	Dutch	0.1
78	Chinese	2.3	101	Italian	0.1
79	Burmese	0.3	102	Czech	0.1
80	Persian	0.2	103	Norwegian	0.03
81	Armenian	0.2	104	Greek	0.03
82	Hebrew	0.2	105	Russian	0.03
83	Arabic	0.1	106	Danish	0.02
84	Kachin	0.08	107	Swedish	0.02
85	Japanese	0.03	108	Scotch	0.01
86	Sinhalese	0.02	109	Spanish	0.01
87	Balochi	0.02	110	Irish	0.002
88	Pakhtoon	0.004	111	Polish	0.002
89	Caucasian	0.004	112	Finnish	0.001
90	Mongolian	0.002	113	Belgian	0.0004
91	Siamese	0.001	114	Portuguese	0.0004
			115	Chilean	0.0004

The following Statement VI.12 shows the distribution of major mother tongues, per 10,000 of West Bengal's population among the districts in 1951.

STATEMENT VI.12

Distribution of the major mother tongues per 10,000 of total population among the districts of West Bengal, 1951

State and District	NUMBER OF PERSONS SPEAKING										
	Bengali	Hindi	Urdu	Oriya	Guru- mukhi	Gujarati	Rajas- thani	Marathi	Punjabi	Marwari	Sindhi
West Bengal	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Burdwan Division	4,650	3,019	4,061	4,172	2,272	656	62	2,141	1,311	64	340
Burdwan	848	1,269	1,813	544	1,372	505	..	377	..	..	58
Birbhum	456	217	160	226	81	15	62	..	7	20	77
Bankura	552	72	237	125	18	36	..	..	..	35	..
Midnapur	1,436	275	1,149	1,547	262	56	..	1,054	1,304	..	..
Hooghly	653	655	408	690	107	26	..	132	..	..	6
Howrah	705	531	294	1,040	482	18	..	578	..	..	199
Presidency Division	5,350	6,981	5,939	5,828	7,728	9,344	9,938	7,859	8,689	9,936	9,660
24-Parganas	1,986	1,824	1,736	1,860	860	188	..	261	813	116	743
Calcutta	796	3,233	3,744	3,173	6,258	9,040	9,007	6,240	7,320	8,721	8,840
Nadia	530	136	44	143	48	..	..	5	..	..	..
Murshidabad	786	232	154	15	16	61	..	47	..	167	..
Malda	394	161	118	9	1	..	..	20	..	..	..
West Dinajpur	267	257	14	30	9	5	..	..	..	..	..
Jalpaiguri	249	810	55	506	385	19	81	679	156	245	..
Darjeeling	31	192	65	77	124	31	850	394	367	528	77
Cooch Behar	811	86	9	16	27	..	..	213	33	169	..

The following Statement VI.13 shows the number of 10,000 of districts' population speaking the major language as mother tongues in each district of West Bengal in 1951. The above state-

ment will show how concentrated is the population speaking mother tongues other than Bengali in the industrial cities and towns of Burdwan, Hooghly, Howrah, 24-Parganas and Calcutta.

RATIO OF MAJOR LANGUAGES

9 CENSUS

93 .

5 .

**RATIO OF
STATEMENT**

Number per 10,000 of total population speaking the major

State and District	Total	NUMBER PER 10,000 OF				
		Bengali	Hindi	Urdu	Oriya	
West Bengal	Total	10,000	8,462	635	184	73
	Urban		1,763	429	127	50
Burdwan Division	Total	10,000	8,793	428	167	68
	Urban		1,096	211	64	33
Burdwan	Total	10,000	8,120	912	378	45
	Urban		985	304	132	11
Asansol Subdivision	Urban		547	232	103	8
Birbhum	Total	10,000	8,983	321	69	39
	Urban		566	64	9	2
Bankura	Total	10,000	8,782	86	82	17
	Urban		667	33	6	6
Midnapur	Total	10,000	8,973	129	157	84
	Urban		521	81	15	36
Hooghly	Total	10,000	8,821	664	120	81
	Urban		1,576	466	84	62
Howrah	Total	10,000	9,187	519	83	118
	Urban		2,682	354	68	75
Presidency Division	Total	10,900	8,194	802	198	77
	Urban		2,304	605	187	63
24-Parganas	Total	10,000	9,045	623	172	74
	Urban		2,129	560	166	59
Calcutta	Urban	10,000	6,555	2,028	672	227
Nadia	Total	10,000	9,722	188	18	23
	Urban		1,718	76	11	7
Murshidabad	Total	10,000	9,615	213	41	2
	Urban		721	44	18	1
Malda	Total	10,000	8,829	271	57	2
	Urban		323	40	11	0.3
West Dinajpur	Total	10,000	7,791	561	9	8
	Urban		493	65	1	3
Jalpaiguri	Total	10,000	5,718	1,395	27	101
	Urban		576	132	1	2
Darjeeling	Total	10,000	1,447	679	67	32
	Urban		523	283	54	2
Cooch Behar	Total	10,000	9,729	201	6	4
	Urban		665	71	1	1

MAJOR LANGUAGES

VI.13

languages as mother tongue in each district of West Bengal, 1951

TOTAL POPULATION SPEAKING

Gurumukhi	Gujarati	Rajasthani	Marathi	Punjabi	Marwari	Sindhi	Others
13	6	3	3	2	2	1	616
12	6	3	3	2	2	1	88
7	1	0.05	1	1	0.03	0.05	534
4	1	..	1	1	0.02	0.03	47
21	3	..	1	..	..	0.04	520
11	3	..	1	..	..	0.04	32
10	3	..	1	..	..	0.04	19
1	0.2	0.5	..	0.04	0.1	0.1	586
1	0.2	..	..	..	0.04	..	3
0.4	0.4	..	..	..	0.1	..	1,032
0.4	0.4	..	..	..	0.1	..	4
3	0.3	..	2	2	..	..	650
3	0.03	..	2	2	..	..	93
2	0.3	..	1	..	..	0.01	311
1	..	..	0.2	..	..	0.01	29
10	0.2	..	3	..	..	0.2	80
8	0.05	..	2	..	..	0.2	53
19	10	6	4	4	4	1	681
18	10	6	4	3	3	1	111
6	1	..	0.4	1	0.1	0.3	77
6	1	..	0.4	1	0.1	0.3	41
32	53	30	19	16	18	5	295
1	..	..	0.03	..	..	..	48
1	..	..	0.02	..	..	..	5
0.3	1	..	0.2	..	1	..	126
0.2	0.4	..	0.1	..	0.2	..	1
0.02	..	..	0.2	..	..	..	841
..	..	..	0.2	..	..	..	0.5
0.4	0.1	..	..	..	..	..	1,630
0.4	..	..	..	..	..	..	19
14	0.3	1	6	1	1	..	2,736
0.04	0.1	1	0.2	0.2	0.1	..	12
9	1	16	7	5	6	0.3	7,731
9	1	16	..	3	2	0.3	1,228
1	..	..	2	0.3	1	..	56
0.9	..	..	2	..	..	..	6

NOTE ON MOTHER TONGUE

A NOTE ON THE RECORDING OF MOTHER TONGUES OF CERTAIN SCHEDULED CASTES AND SCHEDULED TRIBES

When the returns of mother tongues as recorded in census enumeration slips in the Census of 1951 were tabulated for West Bengal, Sikkim and Chandernagore it was noticed that the returns for several of them were (a) suspiciously small, and (b) the sex-ratio of the speakers unconvincingly lopsided. For instance, to mention only a few glaring instances, only 2 males were returned as speaking Rajbanshi as their mother tongue; only 2 males and 209 females were returned as speaking Rabha as their mother tongue, only 1,233 males and 4 females were returned as speaking Mech as their mother tongue. Although it is perfectly possible that the overwhelming majority of Rajbanshi and Meches, for example, returned Bengali or some other language as their mother tongue, these figures looked improbable enough and bore distinct traces of the enumerator's ignorance or the "tyranny" of a superior local dominant vernacular trying to minimise the existence of numerically weak and comparatively obscure mother tongues. But as census returns are not permitted to be arbitrarily corrected, and as a census record must be published as obtained, the seemingly improbable figures were published without gloss in Census of India, Vol. VI, Part II—Tables. The decision of the West Bengal Government to tabulate the numerical strength of each

Scheduled caste and Scheduled tribe, at their expense, provided an opportunity to match the strength of certain mother tongues with the strength of particular castes or tribes answering to each of those mother tongues. The following comparative statement is accordingly presented to the reader for such conclusions as he may wish to draw for himself. The strength of each caste or tribe, in the event where its numerical strength seems to be at substantial variance with the number of persons speaking its language as their mother tongue, has been obtained from the book "The Tribes and Castes of West Bengal", edited by me and published by the West Bengal Government in July 1953. The corresponding figures for mother tongue have been collected from Census of India, Vol. VI, Part II—Tables. The reader is reminded that if he wishes to equate or approximate the numerical strength of a caste or tribe with the probable adherents of the mother tongue which goes by the name of that particular caste or tribe, a corresponding number should be deducted from the strength of adherents of a major mother tongue like, say Bengali or Hindi or Nepali or 'Tribal' in the district. But it would be idle on the part of the Superintendent of Census Operations to speculate which major mother tongue should thus be deflated.

NOTE ON MOTHER TONGUE

A comparative Statement of (a) the numerical strength in the Census of 1951 of certain castes and tribes and of (b) the number of persons returned as speaking as mother tongue the languages that go by those caste or tribal names

Scheduled Castes, Scheduled Tribes and Mother Tongue	West Bengal		Burdwan Division		Burdwan		Birbhum		Bankura	
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
Scheduled Castes										
1 Baiti Population	2,414	1,979	1,643	1,273	542	521	423	104	148	93
Baiti Mother Tongue	6	..	5	..	..	..	..	..	5	..
2 Ghasi Population	2,034	1,500	254	272	6	71	1	5	8	13
Ghasi Mother Tongue	58	..	..	..	..	..	..	..	..	..
3 Khairia Population	21,128	22,859	18,632	20,664	2,627	2,288	267	243	12,322	13,335
Khairia Mother Tongue	22	1,369	..	..	..	..	..	..	..	..
4 Kora Population	22,117	21,337	18,333	18,706	7,306	7,295	2,460	2,225	2,367	2,963
Kora Mother Tongue	123	531	123	530	64	143	59	387	..	..
5 Mal Population	46,992	44,105	34,869	33,806	2,086	1,536	19,391	20,250	7,435	6,624
Mal Mother Tongue	..	5	..	..	..	..	..	..	..	..
6 Malpahariya Population	2,658	2,155	180	90	..	5	127	82	..	3
Malpaharia Mother Tongue	69	305	..	..	..	..	..	..	..	..
7 Rabha Population	3,304	1,809	1,265	175	1	2	..	..	..	..
Rabha Mother Tongue	2	209	..	..	..	..	..	..	..	..
8 Rajbanshi Population	392,429	350,190	48,670	49,452	1,331	1,577	2,276	1,939	..	6
Rajbanshi Mother Tongue	2	..	..	..	..	..	..	..	..	..
9 Turi Population	10,279	7,761	3,533	1,918	2,043	1,468	97	81	757	..
Turi Mother Tongue	32	25	..	..	..	..	..	..	..	..
Scheduled Tribes										
10 Bhutia Population	2,594	2,216	144	..	..	..	..	..	..	..
Bhotia Mother Tongue	4,483	2,919	..	..	..	..	..	..	..	..
11 Lepcha Population	6,927	6,503	35	..	..	..	..	..	..	..
Lepcha Mother Tongue	6,847	6,596	..	..	..	..	..	..	..	..
12 Mech Population	5,991	4,796	..	..	..	..	..	..	..	..
Mech Mother Tongue	1,233	4	..	..	..	..	..	..	..	..
13 Munda Population	42,668	40,255	5,106	4,534	1,339	1,108	76	99	89	145
Mundari Mother Tongue	3,915	2,176	503	52	151	15	39	21	..	..
14 Oraon Population	103,228	95,068	8,368	7,493	2,673	1,882	57	745	126	161
Oraon Mother Tongue	13,179	15,762	..	..	..	..	..	..	..	..
15 Santal Population	420,178	425,217	291,300	308,419	67,626	59,815	33,913	39,527	68,007	69,652
Santali Mother Tongue	336,065	327,438	258,077	255,996	53,721	53,592	29,263	32,485	62,410	72,401

A comparative Statement of (a) the numerical strength in the Census of 1951 of certain castes and tribes and of (b) the number of persons returned as speaking as mother tongue the languages that go by those caste or tribal names—contd.

Scheduled Castes, Scheduled Tribes and Mother Tongue	Midnapur		Hooghly		Howrah		Presidency Division	
	Males	Females	Males	Females	Males	Females	Males	Females
Scheduled Castes								
1 Baiti Population	81	113	67	83	332	354	771	706
Baiti Mother Tongue	..	..	..	..	..	..	1	..
2 Ghasi Population	45	25	43	5	151	153	1,780	1,228
Ghasi Mother Tongue	..	..	..	..	..	..	53	..
3 Khairia Population	1,583	2,716	1,800	2,053	33	29	2,496	2,195
Khairia Mother Tongue	..	..	..	..	..	..	22	1,369
4 Kora Population	4,451	4,490	1,517	1,716	232	17	3,784	2,631
Kora Mother Tongue	..	..	..	..	..	..	..	1
5 Mal Population	3,687	3,462	2,153	1,807	117	127	12,123	10,299
Mal Mother Tongue	..	..	..	..	..	..	..	5
6 Malpahariya Population	1	..	52	..	..	..	2,478	2,065
Malpaharia Mother Tongue	..	..	..	..	..	..	69	305
7 Rabha Population	160	171	1	..	1,103	2	2,039	1,634
Rabha Mother Tongue	..	..	..	..	..	..	2	209
8 Rajbanshi Population	26,087	25,597	6,728	7,760	11,748	12,523	343,759	300,738
Rajbanshi Mother Tongue	..	..	..	..	..	..	2	..
9 Turi Population	172	13	414	347	100	9	6,696	5,843
Turi Mother Tongue	..	..	..	..	..	..	32	25
Scheduled Tribes								
10 Bhutia Population	2	..	142	..	..	..	2,450	2,216
Bhotia Mother Tongue	..	..	..	..	..	..	4,483	2,919
11 Lepcha Population	3	..	31	..	1	..	6,392	6,503
Lepcha Mother Tongue	..	..	..	..	..	..	6,847	6,596
12 Mech Population	..	..	..	..	..	..	5,991	4,796
Mech Mother Tongue	..	..	..	..	..	..	1,233	4
13 Munda Population	2,491	2,539	737	506	324	137	37,562	35,721
Mundari Mother Tongue	313	16	..	..	..	..	3,407	2,124
14 Oraon Population	1,357	1,686	3,196	2,510	1,059	514	99,760	87,570
Oraon Mother Tongue	..	..	..	..	..	..	13,179	15,762
15 Santal Population	96,125	106,757	19,657	29,276	972	3,392	128,378	116,798
Santali Mother Tongue	37,312	33,295	25,293	14,016	168	207	77,988	71,442

NOTE ON MOTHER TONGUE

A comparative Statement of (a) the numerical strength in the Census of 1951 of certain castes and tribes and of (b) the number of persons returned as speaking as mother tongue the languages that go by those caste or tribal names—contd.

Scheduled Castes, Scheduled Tribes and Mother Tongue	24-Parganas		Calcutta		Nadia		Murshidabad		Malda	
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
Scheduled Castes										
1 Baiti Population	62	71	15	3	392	320	264	286	29	22
Baite Mother Tongue	..	..	..	..	..	..	..	..	..	..
2 Ghasi Population	637	543	13	..	54	38	..	..	50	95
Ghasi Mother Tongue	..	..	..	..	..	..	..	..	..	..
3 Khairia Population	242	38	83	3	110	76	26	50	472	274
Kharia Mother Tongue	..	..	..	11	..	..	..	..	..	..
4 Kora Population	1,813	342	198	11	1	10	283	465	645	1,013
Kora Mother Tongue	..	..	..	1	..	..	..	..	..	..
5 Mal Population	1,125	476	30	18	593	317	8,691	7,980	540	603
Mal Mother Tongue	..	..	..	..	..	..	..	5	..	..
6 Malpahariya Population	..	2	128	1	..	..	355	528	56	77
Malpaharia Mother Tongue	..	..	..	..	..	..	..	..	..	..
7 Rabha Population	41	63	61	..	..	..	1	14	..	..
Rabha Mother Tongue	..	..	..	..	..	..	..	..	..	..

A comparative Statement of (a) the numerical strength in the Census of 1951 of certain castes and tribes and of (b) the number of persons returned as speaking as mother tongue the languages that go by those caste or tribal names—contd.

Scheduled Castes, Scheduled Tribes and Mother Tongue	West Dinajpur		Jalpaiguri		Darjeeling		Cooch Behar		Chandernagore	
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
Scheduled Castes										
1 Baiti Population	4	..	..	..	5	3	..	1	1	..
Baite Mother Tongue	..	..	1	..	..	..	..	..	..	..
2 Ghasi Population	134	115	639	253	203	184	..	..	6	..
Ghasi Mother Tongue	..	..	..	..	53	..	..	..	..	..
3 Khairia Population	256	260	1,200	1,421	61	49	46	24	2	1
Kharia Mother Tongue	..	..	3	1,200	19	158	..	..	..	..
4 Kora Population	738	573	69	205	24	8	13	4	..	6
Kora Mother Tongue	..	..	..	..	..	..	..	..	..	..
5 Mal Population	699	682	167	58	157	83	121	82	26	43
Mal Mother Tongue	..	..	..	..	..	..	..	..	..	..
6 Malpahariya Population	64	110	1,131	722	744	623	..	2	..	..
Malpaharia Mother Tongue	..	..	..	..	69	305	..	..	..	..
7 Rabha Population	..	..	1,582	1,287	..	..	354	270	..	..
Rabha Mother Tongue	..	..	2	209	..	..	..	..	..	..

NOTE ON MOTHER TONGUE

A comparative Statement of (a) the numerical strength in the Census of 1951 of certain castes and tribes and of (b) the number of persons returned as speaking as mother tongue the languages that go by those caste or tribal names—contd.

Scheduled Castes, Scheduled Tribes and Mother Tongue	24-Parganas		Calcutta		Nadia		Murshidabad		Malda	
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
8 Rajbanshi Population	43,536	39,420	1,492	865	3,817	2,589	13,196	11,126	9,773	10,521
Rajbanshi Mother Tongue . . . . .	..	..	..	..	..	..	..	..	..	..
9 Turi Population	784	591	278	155	13	184	102	191	1,945	2,082
Turi Mother Tongue . . . . .	..	..	..	..	..	..	..	..	..	..
Scheduled Tribes										
10 Bhotia Population	14	4	2	12	..	..	..	..	..	..
Bhotia Mother Tongue . . . . .	..	..	18	2	..	..	..	..	1	..
11 Lepcha Population	21	2	4	3	..	..	..	..	..	..
Lepcha Mother Tongue . . . . .	..	..	20	6	..	..	..	..	..	..
12 Mech Population . . . . .	..	..	..	..	..	..	..	..	..	..
Mech Mother Tongue . . . . .	..	..	..	..	..	..	..	..	..	..
13 Munda Population	8,006	9,621	46	40	761	610	82	154	65	67
Mundari Mother Tongue	228	100	7	1	..	..	..	..	..	..

A comparative Statement of (a) the numerical strength in the Census of 1951 of certain castes and tribes and of (b) the number of persons returned as speaking as mother tongue the languages that go by those caste or tribal names—contd.

Scheduled Castes, Scheduled Tribes and Mother Tongue	West Dinajpur		Jalpaiguri		Darjeeling		Cooch Behar		Chandernagore	
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
8 Rajbanshi Population	35,997	31,492	93,465	79,245	8,550	7,344	133,933	118,136	97	17
Rajbanshi Mother Tongue . . . . .	..	..	2	..	..	..	..	..	..	..
9 Turi Population	1,810	1,573	1,613	997	131	118	20	2	6	1
Turi Mother Tongue . . . . .	..	..	..	..	32	25	..	..	..	..
Scheduled Tribes										
10 Bhotia Population . . . . .	..	..	350	266	2,034	1,934	..	..	..	..
Bhotia Mother Tongue . . . . .	..	..	245	73	4,219	2,844	..	..	..	..
11 Lepcha Population . . . . .	..	..	36	165	6,831	6,333	..	..	..	..
Lepcha Mother Tongue . . . . .	..	..	22	1	6,805	6,589	..	..	..	..
12 Mech Population . . . . .	..	..	5,833	4,674	120	104	38	13	..	..
Mech Mother Tongue . . . . .	..	..	1,053	..	165	2	10	2	..	..
13 Munda Population	4,562	3,812	20,806	18,684	3,124	2,623	110	105	30	52
Mundari Mother Tongue . . . . .	..	..	355	..	2,808	2,023	9	..	..	..

A comparative Statement of (a) the numerical strength in the Census of 1951 of certain castes and tribes and of (b) the number of persons returned as speaking as mother tongue the languages that go by those caste or tribal names—concl'd.

Scheduled Castes, Scheduled Tribes and Mother Tongues	24-Parganahs		Calcutta		Nadia		Murshidabad		Malda	
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
14 Oraon Population	11,188	9,240	34	18	1,934	1,447	535	704	3,934	3,569
Oraon Mother Tongue	322	172	1	..	27	67	114	101	..	..
15 Santal Population	13,357	9,645	141	25	3,687	2,547	10,867	10,986	36,705	36,095
Santali Mother Tongue	6,665	5,993	21	29	3,222	1,240	9,743	11,684	21,761	18,595

A comparative Statement of (a) the numerical strength in the Census of 1951 of certain castes and tribes and of (b) the number of persons returned as speaking as mother tongue the languages that go by those caste or tribal names—concl'd.

Scheduled Castes, Scheduled Tribes and Mother Tongues	West Dinajpur		Jalpaiguri		Darjeeling		Cooch Behar		Chandernagore	
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
14 Oraon Population	10,274	10,400	62,299	53,477	9,032	8,185	530	530	21	9
Oraon Mother Tongue . . . . .	..	..	3,782	7,979	8,768	7,293	165	150	..	..
15 Santal Population	48,582	46,328	12,863	9,065	1,843	1,638	833	469	26	1
Santali Mother Tongue	27,068	27,268	6,625	4,602	2,198	1,730	685	301	3	10

* NOTE.—The population of the scheduled tribe of 'Bhutias' in 1951 given in these tables as well as Union Table DIII, published at page 451 of Vol. VI, Part II Tables, has been compiled strictly on the returns of those persons who declared themselves as belonging to the special group of that scheduled tribe in answer to question 2(c) of the All-India Census Questionnaire of 1951. Presumably the 1941 census returns for Bhutias were also compiled on the same criterion, thus registering a decline from 1931. But it is pertinent to point out that the scheduled tribe of Bhutias probably also includes (1) Tibetans or Bhutias of Tibet; (2) Dukpas or Drukpas, or Bhutias of Bhutan; (3) Kagatays or Yolmos, or Bhutias of Nepal; (4) Sherpas, or Bhutias of Nepal and (5) Sikkimese Bhutias, or Bhutias of Sikkim. If we proceed on this assumption (See pages 75-6 of *Darjeeling Gazetteer* by A. J. Dash, Bengal Government Press, 1947) the population of the scheduled tribe of Bhutias would perhaps greatly increase.

As there was no information in the census slip answering to the above classification, no tabulation was possible of 'Bhutias' on the above mentioned scheme. But a detailed tabulation of mother tongue, even by dialects, was made specially for the district of Darjeeling at my instance (which constituted a departure from the general pattern of tabulation of mother tongues in the 1951 census), because the figures of the 1941 Census had been studied and it was anticipated that some difficulty was likely to arise in Darjeeling district owing to the lack of a general understanding in this district as to what a 'scheduled tribe' was. Accordingly the following populations speaking the following mother tongues (dialects) were tabulated. The sum of these populations may reasonably be regarded as belonging to the scheduled tribe of Bhutias:

Population speaking another tongues	West Bengal		Darjeeling		Jalpaiguri	
	Males	Females	Males	Females	Males	Females
1 Bhotia (Bhutia)	4,483	2,919	4,219	2,844	245	73
2 Dukpa (Drukpa)	603	518	603	518	..	..
3 Kagatay	147	203	147	203	..	..
4 Sharpa (Sherpa)	4,755	4,234	4,755	4,234	..	..
5 Tibetan	793	727	761	675	..	..
6 Yolmo	Nil	Nil	Nil	Nil	..	..
TOTAL	10,781	8,601	10,485	8,474	245	73

It is obvious from the above statement that many persons who even speak Bhotia as their mother tongue did not declare themselves as belonging to the special group of 'Bhutia' in answer to question 2(c) of the Census Questionnaire. But as it is not permitted to correct a census return, the figures as thrown up by the Census of 1951 are retained in this volume as well as in Vol. VI, Part II Tables, in reading which, however, the above remarks may be borne in mind.

A NOTE ON THE MATERNITY DATA OF MARRIED WOMEN IN RURAL AREAS OF WEST BENGAL

It is difficult to estimate population trends in West Bengal especially after what befell the State between 1941 and 1951. In the first half of the decade the Second World War, which transformed Bengal almost into a theatre of war and changed the composition and extent of its migrants, and the famine and epidemics of 1943-44 had far-reaching effects on the State's population, industry and agriculture. A series of communal riots followed in the beginning of the second half of the decade which culminated in the partition of the province of Bengal into two portions in August 1947. This upset the normal life of the province very thoroughly and a very large movement of population took place between 1946 and 1951 across the borders of the two Bengals, which even in 1952 showed no sign of abating. In such a state of flux and uncertainty it is useless to try to estimate what the population of West Bengal is likely to be in 1961 or 1981; the use of logistic curves would be, as it was in 1931, merely of academic interest, because it is impossible to estimate a truly natural population for the State or the extent of true migration occurring between it and other States of India and Pakistan. Unsettled camp life among Displaced persons and subsistence on government dole have been responsible for much illness, mortality and devitalisation and it is premature now to estimate how the Displaced population will fare or multiply in the years ahead. It would therefore be a point of no more than academic interest, fraught with many ifs and whereases and buts, to try to estimate the rate of change of West Bengal's total population in the course of the next few decades. Nevertheless it is quite one of the most important of a Census Superintendent's duties to try to estimate this rate of change and predict what the population of his State is likely to be in the next ten, twenty or thirty years. This he is precluded from

doing, so far as the present state of West Bengal is concerned, from a mere consideration of the record of vital statistics and mean decennial growth rates.

It occurred to him that, alternatively, it would be useful to carry out a survey on the maternity data of women in the State on the eve of the census of 1951. There was, however, no legal sanction behind such a survey, and as such, cities and big towns, where residents were likely to resist an unauthorised inquiry, had to be avoided. The survey was, therefore, confined to rural areas which had the advantage of a relatively stable and cooperating population. Sri Sailendranath Sengupta, the author of the following note, very kindly designed a comprehensive questionnaire but as no funds were available and as it was an unauthorised investigation, not backed up by a government notification, seeking to avoid publicity in the Press, his original design was abandoned for a much simpler schedule calculated to cause the minimum trouble to the unpaid enumerator-trainee and such as might go through unobserved. The final schedule is reproduced below. The survey was carried out by census enumerators as part of their training in December 1950. Only married women with their husbands alive were questioned. Precaution was taken to ensure a perfectly "random" selection of households as the following extract from the Instructions issued to enumerators will show:

You will be in-charge of a series of Census houses beginning with a number and ending in another number. Say you have census houses No. 1 to 123 to count. You will divide the number 123 by 3. The quotient is 41. You will begin with No. 3 as the first census household. Next you will count house No. $3 + 41 = 44$ as the second census household. Next you will count house No. $44 + 41 = 85$ as the third census household and finish your sample training census.

Or if you are in-charge of house numbers 146 to 205. You will divide the number

NOTE ON MATERNITY DATA

(205 - 145) = 59 by 3. The quotient is 19 in round numbers. You will begin with house number 153 (the first number after 146 ending in 3) as the first census household. Next you will count house number 153 + 19 = 172 as your second census household. Next you will count house number 172 + 19 = 191 as your third census household and finish.

Take into account only the range of whole numbers of census houses for your calculations and not the total sub-numbers of bye-numbers. For instance in the first example there may actually be 142 census houses instead of 123 (the range of whole numbers) counting the bye-numbers or sub-numbers or in the second example 88 instead of 59 (the range of whole numbers).

In the next place, if the No. of Census house so spotted after calculation happens to be a house which contains other than an ordinary family (for instance if it is a temple or a mosque or a school or any other institution which is not inhabited by a family) pass it by and count the next house in which a family resides and count that census house. For instance, take the households in Example 1. If, say, census house No. 44 is a temple, leave it and count house No. 45 if it holds an ordinary family. If house No. 45 is an institution leave it and count house No. 46 which holds an ordinary family. But for your third house come to house No. 85 if it holds a census family.

If the number of a census house thrown up by the above calculation contains a number of bye-numbers or sub-numbers, for instance,

if house No. 85 in the first Example continues a series of census houses as 85A, 85/1, 85/2 besides itself, or if census house No. 85 is itself numbered 85/1 as distinct from the sub-numbers that follow before No. 86 is reached count the house bearing house number 85 or 85/1 as the case may be.

The size of a family should be of no consideration. In a sample house, fixed upon according to the above calculation, there may be just one or two or 20 persons. If 25 slips are insufficient for you ask for a second pad of your Supervisor and complete all persons. Do not leave an allotted census house number only because it contains too few or too many members.

In each of the three household of which you will take the training Census, if you happen to enumerate one or more married women (as distinct from unmarried, widowed or divorced women) fill in the schedules on page 3 in respect of each such married woman. This you will not be asked to do in the final census because it is a laborious question which can be done only for a small number of households. But the answers, as you will realise, will give an indication of the rate of growth of our population in West Bengal and should be very carefully recorded on this paper.

The 'schedule' referred to in the last paragraph of the above instruction was as follows, each enumerator being required to fill in three schedules for three sample households:

SAMPLE HOUSEHOLD

Serial No.	Question	Location Code : District No.		Census House No.		
		Thana		Mauza		
		Municipality No.		J. L. No.	Ward No.	
		First married Woman	Second married Woman	Third married Woman	Fourth married Woman	Fifth married Woman
1	2	3	4	5	6	7
1	Age at which married					
2	Present age of married woman					
3	Age at birth of 1st child					
4	(a) Whether first child male or female and (b) Whether alive					
5	Total number of children born— (a) Male (b) Female					
6	Total number of children alive— (a) Male (b) Female					

NOTE ON MATERNITY DATA

The survey covered all districts of West Bengal except Calcutta and Cooch Behar but as the tabulation was not scheduled on the census budget, funds were scarce and the schedule for Midnapur and Hooghly could not be tabulated. Burdwan, 24-Parganas and Jalpaiguri were tabulated for only portions of their territory. Sorting and compilation of data were done under two different schemes of tables at two different stages by a few computers in their off-time. In the first scheme at the first stage covering the districts of Burdwan, Murshidabad, Jalpaiguri and Darjeeling no supervision over the work was possible. In the second scheme at the second stage the design of the final tables was changed and a new group of computers under good supervisors worked part time. The data for Darjeeling were tabulated by single-year ages and those for Murshidabad, Nadia, Jalpaiguri (Sadar Subdivision only) and Burdwan (Sadar and Asansol Subdivisions) by age groups: 'less than 11', '11-15', '15-20', etc. For the remaining districts of Birbhum, Bankura, Howrah, 24-Parganas, Malda and West Dinajpur, the age groups were less than 15, 15, 16, 17, 18, 19, 20-24, 25-29, etc.; that is, groups prescribed by the Registrar General for Census Tables. It is very unfortunate that the original schedules for Burdwan, Murshidabad and Darjeeling were accidentally sold off along with unused forms and waste paper. All other schedules have been preserved including the sorting, compilation and tabulation sheets and, provided the Census Office continues to be housed where it is, scholars will be welcome to examine them.

Information concerning a total of 61,712 married women in the districts of Burdwan, Birbhum, Bankura, Howrah, 24-Parganas, Nadia, Murshidabad, Malda, West Dinajpur, Jalpaiguri and Darjeeling was tabulated, the following

statement showing the number investigated for each district:

District	No. of married women tabulated
Burdwan	6,722
Birbhum	3,936
Bankura	6,729
Howrah	5,938
24-Parganas	13,742
Nadia	5,154
Murshidabad	6,405
Malda	4,418
West Dinajpur	3,704
Jalpaiguri	1,924
Darjeeling	3,040
TOTAL	61,712

The number of children born to these 61,712 was 181,100, the details of which are as follows:

District	No. of children born to married women
Burdwan	17,082
Birbhum	10,432
Bankura	16,777
Howrah	17,642
24-Parganas	39,688
Nadia	15,684
Murshidabad	20,605
Malda	13,883
West Dinajpur	12,539
Jalpaiguri	5,850
Darjeeling	10,918
TOTAL	181,100

A. MITRA

I

The scheme of tabulation precludes the calculation of even the Arithmetical Mean and the Standard Deviation. We have accordingly to be satisfied with the Median and the Quartiles.

An examination of the Darjeeling figures shows that the usual inaccuracies of age statement with lumping at ages ending in '0' and '5' occur here also. For the purpose of analysis individual ages are of no use and grouping of ages is essential. The data again are not accurate in other respects either. Women who do not know their own ages can hardly be expected to state correctly how many children of either sex were born to them at particular ages or how many months or years after their marriage their first child was born. Old illiterate women do not correctly remember all these and very often would not

NOTE ON MATERNITY DATA

possibly remember correctly even the age at which they were married. Many would not say how many children were born to them in all. Accordingly no fine statistical analysis is possible and what is presented in the following paragraphs is only the results of a preliminary routine analysis, and all that has been attempted is to emphasise the more salient features of the fertility pattern of married women living in the rural areas of the State. It may be assumed that the women surveyed have not been influenced by any idea of 'planning' of their issues.

The first set of the Tables appended relate to six districts: Birbhum, Bankura, Howrah, 24-Parganas, West Dinajpur and Malda. The second set relates to four districts: Jalpaiguri, Burdwan, Murshidabad and Nadia. The age groupings are slightly different in the two sets as already stated in the prefatory note. There is also a set of separate tables for Darjeeling which stands by itself due to differences in the racial composition.

II

The survey covered eleven districts of the State and no less than 61,712 women were questioned. Of these 46,187 are mothers. Altogether 181,100 children were born to these mothers and of these 125,030 are alive.

The Age Distribution of married women is given in Table I. For the first set of six districts: Bankura, Birbhum, Howrah, 24-Parganas, West Dinajpur and Malda, no less than 62 per cent. were married before they completed their thirteenth year. For women who are less than twenty years in age, the corresponding percentage is seventy-three which shows that the average age at marriage has perhaps decreased in recent years.

In Darjeeling girls are married much later. Only ten per cent. of girls were married before they completed their thirteenth year. No less than fortyeight per cent. were married at ages 15 to 19 and twentyfive per cent. at ages 20 to 24.

The median age of married women in Darjeeling is naturally much higher than the corresponding age of married women in the plains. Thus the median age of married women in the plains does not exceed 27.9 years while that in Darjeeling is 32.2.

In the plains there is some difference between district and district. The median and the quartiles are given below for comparison.

It will be seen that in the plains less than one per cent. of women were married after the age of twentyfour. But in Darjeeling about nine per cent. of the women were married after reaching their twentyfourth year.

Age Distribution of Married Women by Districts

District	First Quartile (yrs.)	Median (yrs.)	Third Quartile (yrs.)
1 Burdwan	19.5	25.7	36.5
2 Birbhum	19.0	26.5	36.6
3 Bankura	18.3	25.9	36.1
4 Howrah	19.2	26.5	35.9
5 24-Parganas	19.2	26.3	36.1
6 Nadia	19.1	25.5	35.8
7 Murshidabad	18.3	25.2	35.6
8 Malda	18.7	26.3	35.8
9 West Dinajpur	21.0	27.9	36.7
10 Jalpaiguri	21.4	26.2	41.3
11 Darjeeling	25.1	32.2	41.5

NOTE ON MATERNITY DATA

From the above it will be seen that compared to women elsewhere girls marry much later in West Dinajpur and Jalpaiguri. It is not known whether any racial factor is responsible for the lateness of marriage.

III

The proportion of married women without issue in the different age groups varies slightly from district to district. The proportions are given in Table 2. The proportions for Murshidabad are the lowest in almost every age-group. The pattern in Darjeeling is very much the same except that the proportion without issue in age group 20-24 is higher here than elsewhere, the reason obviously being the higher average age at marriage. In Bankura and Birbhum the proportions of married women without issue in age groups 15-19 and 20-24 are somewhat higher than in the other districts.

The overall percentage of women without issue irrespective of age is much lower in Darjeeling and Jalpaiguri than in the plains. This difference also is to a large extent attributable to the average age at marriage being much higher in these districts than elsewhere. The percentages in these districts are 14.5 and 18.6 as against 29 for Birbhum and 30 for Bankura.

IV

This leads us naturally to a consideration of "sterility" among women. While strictly speaking, it cannot be ascertained without medical examination whether a woman is incapable of child bearing, we can approach the question "statistically"; that is, we can find out what proportion of women are "not likely" to bear children at all.

Table 4 shows that women may bear

their first child even after 15 years of marriage. Until a woman is over 45, she is likely to have a child therefore at any time unless there is any physiological incapacity. For women over 25, there is certainly a fair chance of child bearing up to the tenth year of marriage—after the 10th year the probability becomes less than 5 per cent. as an examination of the statistics collected will show. So a workable formula which we may adopt in this connexion is that those women over 25 who have not borne any child within ten years of their marriage are 'not likely' (probability being more than 95 per cent.) to bear any child in future. This is quite a safe criterion to work with. For example in Burdwan (Sadar and Asansol Subdivisions) only 22 out of 1,054 women of this group bore children. The percentage is about two only. The percentage obviously varies from district to district. We may describe these women as "statistically sterile". For details we would refer to Table 3.

The percentage varies from 4.8 per cent. in case of Murshidabad to 7.8 in case of 24-Parganas. The ratio for Darjeeling is only 5.3 per cent.

Table 3 will further show that this proportion of "sterility" increases with increase of age at marriage. The increase is fairly pronounced for all districts except Nadia.

V

In the plains only about 8 per cent. of women bear their first child within two years of marriage while in Darjeeling the percentage is as high as 30.0. This difference is maintained for succeeding years also as will be seen from the following abstract table: (See Table 4A.)

Proportion of mothers bearing their first child (per cent.) within a certain time after marriage			
	Six Plains Districts	Four Plains Districts	Darjeeling
Within 2 years of marriage	7.9	8.5	30.0
" 3 years "	24.6	26.2	61.5
" 4 years "	40.1	42.6	75.2
" 5 years "	55.0	58.2	82.6
" 10 years "	91.8	92.8	96.5

NOTE ON MATERNITY DATA

The difference is to a large extent due to the difference in age at marriage. Thus girls married at the age of 10 or 11 will not bear their first child within 3 or 4 years. But even if due allowance is given for this factor, we find that in Darjeeling women become mothers earlier than women in the plains. To obviate the factor of pre-puberty marriage, statistics have been separately compiled for women married at ages "less than 15/16" and at ages "15/16 and

above". The above table shows a time lag of about three years, from 3 years and onwards corresponding to a difference of about 5 years in the average age at marriage. It is thus clear that proportionately more women of the hills bear their first child earlier than women of the plains of the same age group.

The proportions vary from district to district as will appear from the comparative table for six of the districts given below:

Proportion of mothers bearing their first child (per cent.) within a certain time after marriage

	Bankura	Birbhum	Howrah	24-Parganas	Malda	West Dinajpur
Within 2 years of marriage	4.3	8.3	9.2	7.8	7.5	13.2
„ 5 years „	42.0	57.6	58.1	52.8	59.8	69.6
„ 10 years „	88.5	92.5	92.3	91.8	93.3	95.1
„ 15 years „	98.4	98.6	98.6	98.3	98.9	99.2

For all the ten districts, except Bankura and West Dinajpur, the pattern is practically the same. West Dinajpur stands by itself. In Bankura it appears that a large proportion of women bear their first child after they have been married more than ten years.

Table 4 also gives us the sex ratio (Male to Female) of the First Child. On the whole it seems that up to the 9th year after marriage, the sex ratio slightly diminishes with increasing interval between marriage and birth. After the 10th year the ratio goes on increasing slowly. This will be obvious from the chart on "Sex ratio of first child born".

VI

In some districts the returns show that more male children are born to younger mothers than to older ones. But for other districts the experience is just the opposite. There seems to be no explanation of this, so that, generally speaking it seems that age of mother has no effect on the sex ratio of the children born. The reader should be warned that the Bengali equivalent of child is 'chhele' which is a common noun standing for both a male and female child.

Sex ratio (Male to Female)

District	Age of mothers	
	15-19	20-24
Birbhum	1.05	1.12
Bankura	1.13	1.08
Howrah	1.27	1.10
24-Parganas	1.048	1.045
Malda	1.21	0.97
West Dinajpur	1.02	0.82
Darjeeling	0.98	1.09
	Age of mothers	
	16-20	21-25
Burdwan	1.12	1.07
Nadia	0.96	1.14
Murshidabad	1.08	1.08
Jalpaiguri	0.92	1.05

VII

Many women do not complete their reproductive period at 40 and some bear children up to 44. Still in the calculation of the average number of children a woman is likely to bear during her reproductive period, women of 40-44 have been lumped with women of age 45 and above. From the returns obtained from certain districts women less than 45 years of age have been shown to have more children on the average than women aged 45 and above. This is due among other reasons to inaccurate statement of age and to lapse of memory frequent among old women.

NOTE ON MATERNITY DATA

The following tables summarise the maternity experience of 9,681 women of the ten plains districts who may be assumed to have completed their reproductive period:

Children born to mothers of present age 40 and above

A. SIX PLAINS DISTRICTS

Age at marriage	No. of mothers	No. of children born to each mother			No. of children alive per mother		
		M	F	T	M	F	T
Less than 15	5,220	3.30	2.90	6.20	2.21	1.84	4.05
15—19	1,352	2.82	2.45	5.27	1.96	1.58	3.54
20—24	188	2.27	2.11	4.38	1.65	1.30	2.95
25 and above	87	1.89	1.61	3.50	1.36 ¹	1.22	2.58
Total	6,847	3.16	2.79	5.95	2.13	1.77	3.90

¹With some unavoidable adjustment.

Age at marriage	Survival per hundred			Sex ratio, M/F of children	
	M	F	T	Born	Alive
Less than 15	67	63	65	1.13	1.21
15—19	69	65	67	1.15	1.24
20—24	73	61	67	1.07	1.27
25 and above	72	76	74	1.17	1.11
Total	68	64	66	1.13	1.20

Children born to mothers of present age 41 and above

B. FOUR PLAINS DISTRICTS

Age at marriage	No. of mothers	No. of children born to each mother			No. of children alive per mother		
		M	F	T	M	F	T
Less than 16	2,328	3.43	2.95	6.38	2.13	1.70	3.93
16—20	416	2.71	2.47	5.18	1.83	1.55	3.38
21—25	52	1.94	1.73	3.67	1.21	1.37	2.58
26 and above	38	1.84	1.47	3.31	1.11	0.84	1.95
Total	2,834	3.27	2.84	6.11	2.05	1.67	3.72

Age at marriage	Survival per hundred			Sex ratio M/F of children	
	M	F	T	Born	Alive
Less than 16	62	58	60	1.16	1.25
16—20	68	63	65	1.10	1.18
21—25	62	79	70	1.12	0.89
26 and above	60	57	59	1.25	1.31
Total	63	59	61	1.15	1.23

A few broad conclusions emerge from the above table:

(i) The average number of children born to a woman in course of about 27½ years of reproductive period is approximately 6.0, 3.25 boys and 2.75 girls. The average interval is 4.5 years and average number of child born per year is roughly 0.22.

(ii) The sex ratio at birth is not appreciably affected by age at marriage.

(iii) The number of children born is highly correlated to the age at marriage, that is to say, a woman married early bears more children than one married late.

(iv) A little less than four out of six children born to a mother

NOTE ON MATERNITY DATA

survive till she reaches the end of her reproductive period. Of these 1.75, that is, less than half, are females.

- (v) Generally speaking the survival rate is slightly higher for women married late. The size of the sample for women married 25/26 and above is too small to justify an inference being drawn from it.
- (vi) Male children have a somewhat better chance of survival (till the end of the mother's reproductive period) than female children.

The statistics for Darjeeling point to similar conclusions as above. One thing worthy of notice is that the women of Darjeeling are more prolific than women of the plains. Thus we find:

Age at marriage	No. of children born per mother		
	Plains		Darjeeling
	6 Districts	4 Districts	
Less than 15	6.2	6.4	6.8
15-19	5.3	5.2	6.3
20-24	4.4	3.7*	5.4
25 and above	3.5	3.3*	4.0

*Size of sample very small.

VIII

Instead of tabulating according to "age at marriage" we may tabulate according to present age of mother. The results of the latter tabulation will be somewhat different from those of the former as we take into account in the latter case not only women who have completed their reproductive period but all women who are mothers.

This analysis, however, will enable us to ascertain the relative fertility of women surveyed at different periods of their reproductive life.

We have seen before that the fertility of women is affected by age at marriage. So, strictly speaking, we should analyse the data in a bivariate distribution of Present Age and Age at Marriage, but this would render the analysis complicated and there is a further difficulty that the size of many of the groups is

very small. We would leave the task to the professional statistician.

Table 5 which refers to the ten Plains Districts shows how the number of children born per mother is affected by the age of the mother at marriage. The following statement is abstracted from Table 5.

Number of children born per mother

(A) SIX DISTRICTS

Present age of mother	Age at marriage		
	Less than 15	15-19	20-24
15-19	1.45	1.24	..
20-24	2.30	1.73	1.47
25-29	3.52	2.60	1.73
30-34	4.74	3.95	2.72
35-39	5.52	4.59	3.81
40-44	6.20	5.20	3.84(4.30) ^a
45 and above	6.25	5.31	4.75

^aA more likely value.

(B) FOUR DISTRICTS

Present age of mother	Age at marriage		
	Less than 16	16-20	21-25
16-20	1.42	1.03	..
21-25	2.54	1.84	1.32
26-30	3.94	2.95	2.25
31-35	5.01	3.85	3.02
36-40	5.98	4.61	4.27 ^a
41-45	6.47	5.10	3.47 ^a
46 and above	6.32	5.23	3.49

^aSize of sample very small.

These values are slightly discordant. The two in the last column are of no significance due to the extremely small size of the samples.

The smoothness of the progressions, up-down and right to left are noteworthy and the statistically-minded may easily work out fairly satisfactory regression equations.

The figures for all the ten Districts taken together would give a fairly smooth curve when plotted. The first differences give the numbers of children

NOTE ON MATERNITY DATA

expected to be born to a woman in quinquennial periods. Similar calcula-

tions may be made for individual districts. Thus we get :

Present age of mother	Bankura	Birbhum	Howrah	24-Paraganas	Malda	West Dinajpur	Darjeeling
15-19 . . .	1.23	1.39	1.45	1.44	1.37	1.57	0.43
20-24 . . .	0.62	0.61	0.58	0.76	0.87	1.29	0.90
25-29 . . .	1.09	0.99	1.25	0.99	1.25	1.00	1.14
30-34 . . .	1.20	1.17	1.28	1.32	0.75	1.21	1.30
35-39 . . .	0.85	0.71	0.99	0.65	1.19 ⁴	0.63	1.07

⁴Doubtful.

Present age of mother	Jalpaiguri	Burdwan	Nadia	Murshidabad
16-20 . . .	1.40	1.46	1.41	1.37
21-25 . . .	0.75	0.78	1.03	1.28
26-30 . . .	1.23	1.21	1.02	1.38
31-35 . . .	1.30	0.58 ⁵	1.59	1.23
36-40 . . .	0.55	0.95	1.00	1.10

⁵Doubtful.

The pattern for most of the plains districts is much the same. Age 15-19 or 16-20 is the period of highest fertility which diminishes in the next period; but fertility again increases in the next decade and a second maximum is reached at the age 30-34. It then steadily declines. In Malda, Murshidabad and Nadia the decline is very slow. In West Dinajpur there is no second maximum. Fertility steadily declines from age 15-19 or 16-20 to the end of the reproductive period. The pattern is entirely different in Darjeeling. Here fertility is low at age 15-19; it steadily increases and reaches the maximum at age 30-34 and the decline thereafter is gradual, as in the case of Malda. In Malda and Burdwan there is a rise at the end, but this is really illusory as the size of the sample for this age period is very small.

This discussion on the relative fertility at different periods of a woman's life must be regarded as purely tentative. The data are subject to inaccuracies and can hardly bear any complicated analysis, but it is clear from what has been stated, that if statistics are collected carefully and subjected to comprehensive analysis we should be able to get a fairly good idea of the maternity pattern of Bengali women and variations in the pattern due to variation of locality, racial composition and economic status.

IX

From a consideration of the average number of children born to women who have completed their reproductive period, we find that the women of Murshidabad are the most productive, with 7.29 children born to each mother on the average. Women of Burdwan are the least fertile with 5.22 children born to each mother. Assuming that the reproductive period of the women of Darjeeling, because of their late marriage, is 22½ years instead of 27½ years for women of the plains it appears that the women of the Darjeeling district are more prolific absolutely with 0.254 child per year than married women elsewhere in the State except in Murshidabad.

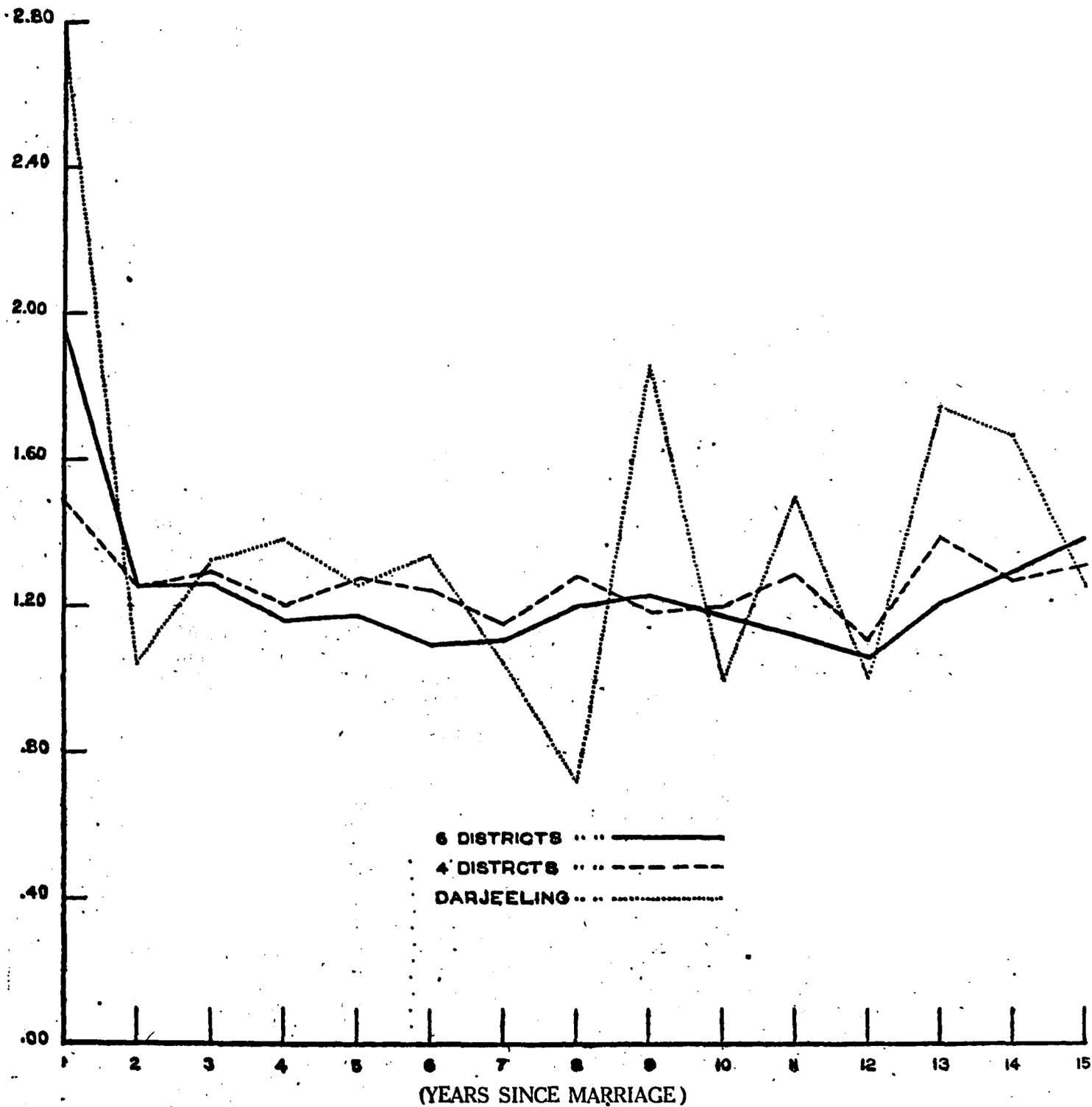
Number of children born per mother of present age 40 and above

District	Number of children born	Average interval (years)	Child born per year
Bankura . . .	5.38	5.13	0.195
Birbhum . . .	5.66	4.85	0.206
Howrah . . .	6.21	4.43	0.226
24-Paraganas . . .	6.00	4.59	0.218
Malda . . .	6.35	4.33	0.231
West Dinajpur . . .	6.27	4.39	0.228
Jalpaiguri . . .	6.16	4.46	0.224
Burdwan . . .	5.22	5.28	0.189
Nadia . . .	6.39	4.50	0.222
Murshidabad . . .	7.29	3.77	0.265
Darjeeling . . .	5.71	3.90	0.254

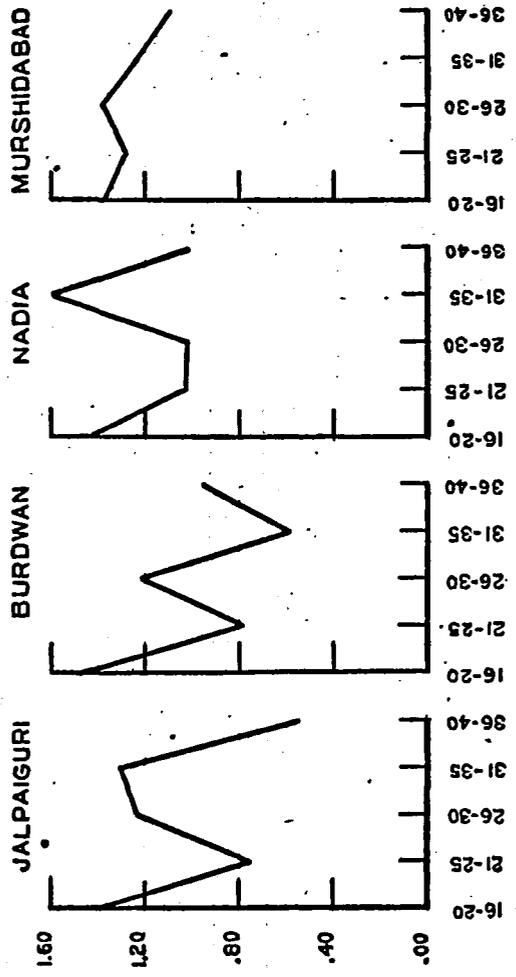
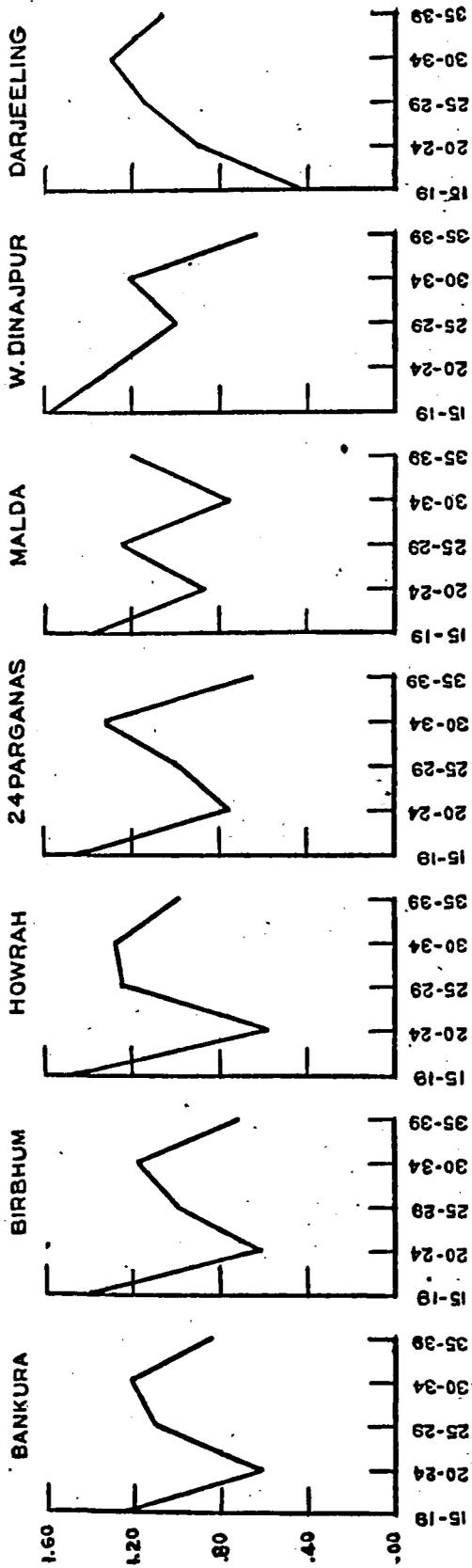
SAILENDRANATH SENGUPTA
(West Bengal Judicial Service)

I

SEX RATIO OF FIRST CHILD BORN



II
NUMBER OF CHILDREN BORN AT DIFFERENT AGES OF MOTHERS
 (QUINQUENNIAL PERIODS)



MATERNITY TABLES

SIX DISTRICTS

(Birbhum, Bankura, Howrah, 24-Parganas, Malda and West Dinajpur)

TABLE I—NUMBER OF MARRIED WOMEN

(Present age and age at marriage)

Present Age	AGE AT MARRIAGE										Proportion of total (38,467)
	Total	Less than 13	13	14	15—19	20—24	25—29	30—34	35—39	40 and over	
Less than 15	2,921	2,564	285	72	..	..	..	..	..	..	0.076
15—19	7,119	3,211	1,217	1,342	1,349	..	..	..	..	..	0.185
20—24	6,870	2,750	896	1,158	1,903	163	..	..	..	..	0.179
25—29	5,977	2,600	745	899	1,437	255	41	..	..	..	0.155
30—34	4,769	2,249	581	667	1,020	161	66	25	..	..	0.124
35—39	3,478	1,648	431	450	775	110	37	21	6	..	0.090
40—44	2,750	1,351	330	379	552	89	21	18	9	1	0.072
45 and over	4,583	2,353	556	560	903	128	48	13	13	9	0.119
TOTAL	38,467	18,726	5,041	5,527	7,939	906	213	77	28	10	1.000
Proportion all ages.	1.000	0.487	0.131	0.144	0.206	0.024	0.006	0.002	..	..	..

FOUR DISTRICTS

(Burdwan, Nadia, Murshidabad and Jalpaiguri)

TABLE I—NUMBER OF MARRIED WOMEN

(Present age and age at marriage)

Present Age	AGE AT MARRIAGE									Proportion of total (20,205)
	Total	Less than 16	16—20	21—25	26—30	31—35	36—40	41—45	46 and over	
Less than 16	2,143	2,143	..	..	..	..	..	..	..	0.106
16—20	3,941	3,431	510	..	..	..	..	..	..	0.195
21—25	3,791	2,976	749	68	..	..	..	..	..	0.188
26—30	3,230	2,524	591	92	23	..	..	..	..	0.160
31—35	2,032	1,636	322	49	20	5	..	..	..	0.101
36—40	1,986	1,603	321	39	11	5	7	..	..	0.098
41—45	1,196	968	181	23	15	6	2	1	..	0.059
46 and over	1,886	1,544	277	38	17	4	4	1	1	0.093
TOTAL	20,205	16,825	2,951	307	86	20	13	2	1	1.000
Proportion all ages.	1.000	0.833	0.146	0.015	0.004	0.001	0.001	..	..	..

DARJEELING

TABLE I—NUMBER OF MARRIED WOMEN

(Present age and age at marriage)

Present Age	AGE AT MARRIAGE									Proportion of total (3,040)
	Total	Less than 15	15—19	20—24	25—29	30—34	35—39	40—44	45 and above	
Less than 15	25	25	..	..	..	..	..	..	..	0.008
15—19	214	69	145	..	..	..	..	..	..	0.070
20—24	455	67	299	89	..	..	..	..	..	0.150
25—29	499	86	236	163	14	..	..	..	..	0.164
30—34	477	87	228	125	33	4	..	..	..	0.157
35—39	358	47	167	107	25	11	1	..	..	0.118
40—44	310	41	125	85	44	8	7	..	..	0.102
45 and above	702	104	254	202	90	35	13	4	..	0.231
TOTAL	3,040	526	1,454	771	206	58	21	4	..	1.000
Proportion all ages.	1.000	0.173	0.478	0.254	0.068	0.019	0.007	0.001	..	..

MATERNITY TABLES

SIX DISTRICTS

(Birbhum, Bankura, Howrah, 24-Parganas, Malda and West Dinajpur)

TABLE I-A NUMBER OF MOTHERS
(Present age and age at marriage)

Present Age	AGE AT MARRIAGE				
	Total	Less than 15	15—19	20—24	25 and above
Less than 15	64	64	..	..	..
15—19	2,836	2,440	396	..	..
20—24	5,561	4,098	1,397	66	..
25—29	5,385	3,919	1,268	174	24
30—34	4,411	3,296	932	132	51
35—39	3,260	2,409	711	98	42
40—44	2,558	1,936	510	77	35
45 and above	4,289	3,284	842	111	52
TOTAL	28,364	21,446	6,056	658	204

NOTE.—Discrepancy in respect of mothers between Tables IA, II and V and IV and IVA is due to unavoidable error in tabulation.

FOUR DISTRICTS

(Burdwan, Nadia, Murshidabad and Jalpaiguri)

TABLE I-A NUMBER OF MOTHERS
(Present age and age at marriage)

Present Age	AGE AT MARRIAGE				
	Total	Less than 16	16—20	21—25	26 and over
Less than 16	171	171	..	..	..
16—20	2,207	2,021	186	..	..
21—25	3,278	2,686	567	25	..
26—30	2,968	2,356	539	65	8
31—35	1,909	1,556	290	45	18
36—40	1,856	1,513	296	33	14
41—45	1,107	905	165	19	18
46 and over	1,727	1,423	251	33	20
TOTAL	15,223	12,631	2,294	220	78

NOTE.—Discrepancy in respect of mothers between Tables IA and IV is due to unavoidable error in tabulation. Tables IA, II, IVA and V agree in respect of mothers.

DARJEELING

TABLE I-A NUMBER OF MOTHERS
(Present age and age at marriage)

Present Age	AGE AT MARRIAGE				
	Total	Less than 15	15—19	20—24	25 and over
Less than 15	1	1	..	..	..
15—19	79	33	46	..	..
20—24	333	54	235	44	..
25—29	447	80	214	142	11
30—34	443	86	217	110	30
35—39	337	47	163	99	28
40—44	288	41	119	81	47
45 and above	672	103	247	192	130
TOTAL	2,600	445	1,241	668	246

MATERNITY TABLES

SIX DISTRICTS

(Birbhum, Bankura, Howrah, 24-Parganas, Malda and West Dinajpur)

TABLE II

NUMBER OF MARRIED WOMEN WITH AND WITHOUT ISSUE AND PROPORTION OF "WITHOUT ISSUE" BY AGE

Present Age	BANKURA				BIRBHUM			
	Married women	With issue	Without issue	Proportion without issue %	Married women	With issue	Without issue	Proportion without issue %
1	2	3	4	5	6	7	8	9
Less than 15	672	5	667	99	287	5	282	98
15—19	1,337	455	882	66	769	269	500	65
20—24	1,097	863	234	21	663	518	145	22
25—29	938	854	84	9	619	544	75	12
30—34	779	717	62	8	460	421	39	8
35—39	580	536	44	8	359	331	28	8
40—44	477	446	31	6	277	256	21	8
45 & above	849	813	36	4	502	456	46	9
TOTAL	6,729	4,639	2,040	30	3,936	2,808	1,136	29

Present Age	HOWRAH				24-PARGANAS			
	Married women	With issue	Without issue	Proportion without issue %	Married women	With issue	Without issue	Proportion without issue %
	10	11	12	13	14	15	16	17
Less than 15	338	8	330	98	1,041	32	1,009	97
15—19	1,105	453	652	59	2,577	1,063	1,444	57
20—24	1,169	917	252	22	2,551	2,097	454	18
25—29	906	813	93	10	2,143	1,913	230	11
30—34	781	731	50	6	1,675	1,538	137	8
35—39	536	497	39	7	1,168	1,107	61	5
40—44	439	412	27	6	969	881	88	9
45 & above	664	612	52	8	1,663	1,557	111	7
TOTAL	5,938	4,443	1,495	25	13,742	10,208	3,534	26

Present Age	MALDA				WEST DINAJPUR			
	Married women	With issue	Without issue	Proportion without issue %	Married women	With issue	Without issue	Proportion without issue %
	18	19	20	21	22	23	24	25
Less than 15	421	14	407	97	162	..	162	100
15—19	820	370	450	55	561	206	355	63
20—24	723	619	104	14	667	547	120	18
25—29	687	641	46	7	684	620	64	9
30—34	550	526	24	4	524	478	46	9
35—39	421	402	19	5	414	387	27	7
40—44	279	266	13	5	309	297	12	4
45 & above	517	494	23	4	383	357	26	7
TOTAL	4,418	3,332	1,086	25	3,794	2,892	812	22

MATERNITY TABLES

FOUR DISTRICTS

(Burdwan, Nadia, Murshidabad and Jalpaiguri)

TABLE II

NUMBER OF MARRIED WOMEN WITH AND WITHOUT ISSUE AND PROPORTION OF "WITHOUT ISSUE" BY AGE

Present Age	BURDWAN				NADIA			
	Married women	With issue	Without issue	Proportion without issue %	Married women	With issue	Without issue	Proportion without issue %
1	2	3	4	5	6	7	8	9
Less than 16 . . .	612	28	584	95.4	546	25	521	95.4
16-20 . . .	1,328	636	692	52.1	1,033	566	467	45.2
21-25 . . .	1,258	1,045	213	16.9	1,003	878	125	12.5
26-30 . . .	1,100	985	115	10.5	768	710	58	7.6
31-35 . . .	668	602	66	9.9	533	508	25	4.7
36-40 . . .	706	640	66	9.3	491	462	29	5.9
41-45 . . .	420	380	40	9.5	295	276	19	6.4
46 & Over . . .	630	549	81	12.9	485	446	39	8.0
TOTAL	6,722	4,865	1,857	27.6	5,154	3,871	1,283	24.9

Present Age	MURSHIDABAD				JALPAIGURI			
	Married women	With issue	Without issue	Proportion without issue %	Married women	With issue	Without issue	Proportion without issue %
	10	11	12	13	14	15	16	17
Less than 16 . . .	892	113	779	87.3	93	5	88	94.6
16-20 . . .	1,264	830	434	34.3	316	175	141	44.6
21-25 . . .	1,125	1,013	112	10.0	405	342	63	15.6
26-30 . . .	970	909	61	6.3	392	364	28	7.1
31-35 . . .	604	582	22	3.6	227	217	10	4.4
36-40 . . .	596	571	25	4.2	193	183	10	5.2
41-45 . . .	362	337	25	6.9	119	114	5	4.2
46 & Over . . .	592	565	27	4.6	179	167	12	6.7
TOTAL	6,405	4,920	1,485	23.2	1,924	1,567	357	18.6

DARJEELING

TABLE II

NUMBER OF MARRIED WOMEN WITH AND WITHOUT ISSUE AND PROPORTION OF "WITHOUT ISSUE" BY AGE

Present Age	DARJEELING			
	Married women	With issue	Without issue	Proportion without issue %
1	2	3	4	5
Less than 15 . . .	25	1	24	96.0
15-19 . . .	214	79	135	63.1
20-24 . . .	465	333	122	26.8
25-29 . . .	499	447	52	10.4
30-34 . . .	477	443	34	7.1
35-39 . . .	358	337	21	5.9
40-44 . . .	310	288	22	7.1
45 & above . . .	702	672	30	4.3
TOTAL	3,040	2,600	400	14.5

MATERNITY TABLES

SIX DISTRICTS

(Birbhum, Bankura, Howrah, 24-Parganas, Malda and West Dinajpur)

TABLE III

PROPORTION OF "STERILE" WOMEN BY AGE AT MARRIAGE

Age at Marriage Present Age	14 and less			15-19			20-24		
	25 and over			25 and over			30 and over		
	No. of women	Sterile	Proportion Sterile	No. of women	Sterile	Proportion Sterile	No. of women	Sterile	Proportion Sterile
I	2	3	4	5	6	7	8	9	10
Bankura	2,859	149	052	626	64	102	73	15	205
Birbhum	1,527	102	067	572	66	115	52	7	135
Howrah	2,633	171	065	571	64	112	48	8	167
24-Parganas	5,901	428	073	1,428	134	094	121	16	132
Malda	1,643	54	033	653	44	067	77	7	091
West Dinajpur	1,236	51	041	837	62	074	117	17	145
TOTAL	15,799	955	060	4,687	434	093	488	70	143

Age at Marriage Present Age	25-29			30-34			TOTAL		
	35 and over			40 and over					
	No. of women	Sterile	Proportion Sterile	No. of women	Sterile	Proportion Sterile	No. of women	Sterile	Proportion Sterile
District	11	12	13	14	15	16	17	18	19
Bankura . . . . .	..	..	..	..	..	..	3,558	228	064
Birbhum . . . . .	..	..	..	..	..	..	2,151	105	049
Howrah . . . . .	..	..	..	..	..	..	3,252	243	075
24-Parganas	28	4	143	..	..	..	7,478	582	078
Malda . . . . .	..	..	..	..	..	..	2,373	105	044
West Dinajpur	28	9	321	..	..	..	2,218	139	063
TOTAL	*106	*20	189	*30	*9	003	*21,110	*1,488	070

* Figures refer to only those age groups for which the total is not less than 25. The total for group concerned thus disagrees with the total of the six districts.

FOUR DISTRICTS

(Burdwan, Nadia, Murshidabad and Jalpaiguri)

TABLE III

PROPORTION OF "STERILE" WOMEN BY AGE AT MARRIAGE

Age at Marriage Present Age	Less than 16			16-20			21-25		
	26 & over			26 & over			31 & over		
	No. of Married women	Sterile	Proportion Sterile	No. of Married women	Sterile	Proportion Sterile	No. of Married women	Sterile	Proportion Sterile
I	2	3	4	5	6	7	8	9	10
Burdwan	2,777	246	089	620	83	134	55	8	145
Nadia	2,245	138	061	274	16	058	20	1	050
Murshidabad	2,708	118	044	323	22	068	39	7	179
Jalpaiguri	545	20	037	475	30	063	35	3	086
TOTAL	8,275	522	063	1,692	151	089	149	19	128

MATERNITY TABLES
FOUR DISTRICTS—contd.

(Burdwan, Nadia, Murshidabad and Jalpaiguri)

Age at Marriage Present Age	26—30			31—35			TOTAL		
	36 & over			41 & over					
District	No. of married women 11	Sterile 12	Pro- portion Sterile 13	No. of married women 14	Sterile 15	Pro- portion Sterile 16	No. of married women 17	Sterile 18	Pro- portion Sterile 19
Burdwan	8	3	.375	4	2	.500	3,464	342	.099
Nadia	8	2	.250	1	..	..	2,548	157	.062
Murshidabad	15	..	..	1	..	..	3,086	147	.048
Jalpaiguri	12	2	.167	4	..	..	1,071	55	.051
TOTAL	43	7	.163	10	2	.200	10,169	701	.069

DARJEELING

TABLE III

PROPORTION OF "STERILE" WOMEN BY AGE AT MARRIAGE

Age at Marriage Present Age	less than 15			15—19			20—24		
	25 & over			25 & over			30 & over		
District	No. of married women 2	Sterile 3	Pro- portion Sterile 4	No. of married women 5	Sterile 6	Pro- portion Sterile 7	No. of married women 8	Sterile 9	Pro- portion Sterile 10
Darjeeling	365	8	.022	1,010	50	.050	519	37	.071

Age at Marriage Present Age	25—29			30—34			TOTAL		
	35 & over			40 & over					
District	No. of married women 11	Sterile 12	Pro- portion Sterile 13	No. of married women 14	Sterile 15	Pro- portion Sterile 16	No. of married women 17	Sterile 18	Pro- portion Sterile 19
Darjeeling	159	14	.088	43	2	.047	2,096	111	.053

MATERNITY TABLES

SIX DISTRICTS

(Birbhum, Bankura, Howrah, 24-Parganas, Malda and West Dinajpur)

TABLE IV

SEX AND BIRTH OF FIRST CHILD AFTER STATED INTERVALS AFTER MARRIAGE

Interval after marriage	Male	Female	Total	Male/Female sex ratio	Proportion to total (28,525)%
Within 1 year . . .	77	52	129	1.48	0.5
" 2 years . . .	1,172	936	2,108	1.25	7.4
" 3 " . . .	2,688	2,089	4,777	1.29	16.7
" 4 " . . .	2,416	2,008	4,424	1.20	15.5
" 5 " . . .	2,380	1,867	4,247	1.27	14.9
Total . . .	8,733	6,952	15,685	1.26	55.0
Within 6 years . . .	1,795	1,451	3,246	1.24	11.4
" 7 " . . .	1,522	1,327	2,849	1.15	10.0
" 8 " . . .	1,060	828	1,888	1.28	6.6
" 9 " . . .	829	700	1,529	1.18	5.4
" 10 " . . .	536	446	982	1.20	3.4
Total . . .	5,742	4,752	10,494	1.21	36.8
Within 11 years . . .	444	344	788	1.29	2.8
" 12 " . . .	231	209	440	1.11	1.5
" 13 " . . .	217	156	373	1.39	1.3
" 14 " . . .	123	97	220	1.27	0.8
" 15 " . . .	84	64	148	1.31	0.5
Total . . .	1,099	870	1,969	1.26	6.9
Beyond 15 years . . .	211	166	377	1.27	1.3
Grand Total . . .	15,785	12,740	28,525	1.24	100.0

FOUR DISTRICTS

(Burdwan, Nadia, Murshidabad and Jalpaiguri)

TABLE IV

SEX AND BIRTH OF FIRST CHILD AFTER STATED INTERVALS AFTER MARRIAGE

Interval after marriage	Male	Female	Total	Male/Female sex ratio	Proportion to total (15,180)%
Within 1 year . . .	43	22	65	1.95	0.5
" 2 years . . .	677	540	1,217	1.25	8.0
" 3 " . . .	1,514	1,203	2,717	1.26	17.9
" 4 " . . .	1,307	1,124	2,431	1.16	16.0
" 5 " . . .	1,269	1,088	2,357	1.17	15.5
Total . . .	4,810	3,977	8,787	1.21	57.9
Within 6 years . . .	890	818	1,708	1.09	11.3
" 7 " . . .	747	671	1,418	1.11	9.3
" 8 " . . .	506	423	929	1.20	6.1
" 9 " . . .	416	338	754	1.23	5.0
" 10 " . . .	263	225	488	1.17	3.2
Total . . .	2,822	2,475	5,297	1.14	34.9
Within 11 years . . .	199	177	376	1.12	2.5
" 12 " . . .	110	104	214	1.06	1.4
" 13 " . . .	82	68	150	1.21	1.0
" 14 " . . .	71	55	126	1.29	0.8
" 15 " . . .	39	28	67	1.39	0.4
Total . . .	501	432	933	1.16	6.1
Beyond 15 years . . .	92	71	163	1.30	1.1
Grand Total . . .	8,225	6,955	15,180	1.18	100.0

NOTE.—Discrepancy in respect of mothers between Tables IV and IVA is due to unavoidable error in tabulation. Other tables agree so far as mothers are concerned.

MATERNITY TABLES

DARJEELING

TABLE IV

SEX AND BIRTH OF FIRST CHILD AFTER STATED INTERVALS AFTER MARRIAGE

Interval after marriage	Male	Female	Total	Male/Female sex ratio	Proportion to total (2,600) %
Within 1 year	30	11	41	2.73	1.6
" 2 years	379	363	742	1.04	28.5
" 3 "	468	355	823	1.32	31.7
" 4 "	205	149	354	1.38	13.6
" 5 "	106	85	191	1.25	7.3
Total	1,188	963	2,151	1.23	82.7
Within 6 years	78	58	136	1.34	5.2
" 7 "	53	51	104	1.04	4.0
" 8 "	21	29	50	0.72	1.9
" 9 "	26	14	40	1.86	1.6
" 10 "	14	14	28	1.00	1.1
Total	192	166	358	1.16	13.8
Within 11 years	12	8	20	1.50	0.8
" 12 "	8	8	16	1.00	0.6
" 13 "	7	4	11	1.75	0.4
" 14 "	10	6	16	1.67	0.6
" 15 "	5	4	9	1.25	0.4
Total	42	30	72	1.40	2.8
Beyond 15 years	11	8	19	1.38	0.7
Grand Total	1,433	1,167	2,600	1.23	100.0

SIX DISTRICTS

(Birbhum, Bankura, Howrah, 24-Parganas, Malda and West Dinajpur)

TABLE IV-A

NUMBER OF MARRIED WOMEN TO WHOM FIRST CHILD IS BORN AFTER CERTAIN YEARS OF MARRIAGE

First Child born after marriage	Age at marriage		Proportion %		Total of marriages at all ages	Proportion to total (28,525) %		
	less than 15	15 and above	less than 15 (Total 21,606)	15 and above (Total 6,919)		Total	less than 15	15 and above
Within 1 year	26	103	0.1	1.5	129	0.5	0.1	0.4
" 2 years	901	1,207	4.2	17.5	2,108	7.4	3.2	4.2
" 3 "	2,574	2,203	11.9	31.8	4,777	16.7	9.0	7.7
" 4 "	3,149	1,275	14.6	18.4	4,424	15.5	11.0	4.5
" 5 "	3,443	804	15.9	11.6	4,247	14.9	12.1	2.8
Total	10,093	5,592	46.7	80.8	15,685	53.0	35.4	19.6
Within 6 years	2,752	494	12.7	7.1	3,246	11.4	9.6	1.8
" 7 "	2,577	272	11.9	3.9	2,849	10.0	9.0	1.0
" 8 "	1,699	189	7.9	2.7	1,888	6.6	6.0	0.6
" 9 "	1,415	114	6.6	1.7	1,529	5.4	5.0	0.4
" 10 "	908	74	4.2	1.1	982	3.4	3.2	0.2
Total	9,351	1,143	43.3	16.5	10,494	36.8	32.8	4.0
Within 11 years	713	75	3.3	1.1	788	2.8	2.5	0.3
" 12 "	419	21	1.9	0.3	440	1.5	1.4	0.1
" 13 "	333	40	1.5	0.6	373	1.3	1.2	0.1
" 14 "	202	18	1.0	0.2	220	0.8	0.7	0.1
" 15 "	136	12	0.6	0.2	148	0.5	0.5	0.0
Total	1,803	166	8.3	2.4	1,969	6.9	6.3	0.6
Beyond 15 years	359	18	1.7	0.3	377	1.3	1.2	0.1
Grand Total	21,606	6,919	100.0	100.0	28,525	100.0	75.7	24.3

MATERNITY TABLES
FOUR DISTRICTS
(Burdwan, Nadia, Murshidabad and Jalpaiguri)

• TABLE IV-A

NUMBER OF MARRIED WOMEN TO WHOM FIRST CHILD IS BORN AFTER CERTAIN YEARS OF MARRIAGE

First Child born after marriage	Age at marriage		Proportion %		Total of marriages at all ages	Proportion to total (15,223) %		
	Less than 16	16 and above	Less than 16 (Total 12,694)	16 and above (Total 2,529)		Total	Less than 16	16 and above
Within 1 year	33	40	0.3	1.6	73	0.5	0.2	0.3
" 2 years	685	536	5.4	21.2	1,221	8.0	4.5	3.5
" 3 "	1,825	862	14.4	34.1	2,687	17.7	12.0	5.7
" 4 "	2,114	379	16.6	15.0	2,493	16.4	13.9	2.5
" 5 "	2,065	312	16.3	12.3	2,377	15.6	13.6	2.0
Total	6,722	2,129	53.0	84.2	8,851	58.2	44.2	14.0
Within 6 years	1,571	143	12.3	5.6	1,714	11.2	10.3	0.9
" 7 "	1,340	80	10.6	3.2	1,420	9.3	8.8	0.5
" 8 "	873	53	6.9	2.1	926	6.1	5.8	0.3
" 9 "	690	39	5.4	1.5	729	4.8	4.5	0.3
" 10 "	456	27	3.6	1.1	483	3.2	3.0	0.2
Total	4,930	342	38.8	13.5	5,272	34.6	32.4	2.2
Within 11 years	352	26	2.8	1.1	378	2.5	2.3	0.2
" 12 "	214	7	1.7	0.3	221	1.5	1.4	0.1
" 13 "	137	6	1.1	0.2	143	0.9	0.9	0.0
" 14 "	116	5	0.9	0.2	121	0.8	0.8	0.0
" 15 "	69	3	0.5	0.1	72	0.5	0.5	0.0
Total	888	47	7.0	1.9	935	6.2	5.9	0.3
Beyond 15 years	154	11	1.2	0.4	165	1.0	1.0	0.0
Grand Total	12,694	2,529	100.0	100.0	15,223	100.0	83.5	16.5

DARJEELING

TABLE IV-A

NUMBER OF MARRIED WOMEN TO WHOM FIRST CHILD IS BORN AFTER CERTAIN YEARS OF MARRIAGE

First Child born after marriage	Age at marriage		Proportion %		Total marriages at all ages	Proportion to total (2,600) %		
	Less than 15	15 & over	Less than 15 (Total 452)	15 & over (Total 2,148)		Total	Less than 15	15 & over
Within 1 year	2	31	0.4	1.4	33	1.3	0.1	1.2
" 2 years	68	680	14.6	31.6	746	28.7	2.5	26.2
" 3 "	83	736	18.4	34.3	819	31.5	3.2	28.3
" 4 "	49	307	10.8	14.3	356	13.7	1.9	11.8
" 5 "	55	139	12.2	6.5	194	7.4	2.1	5.3
Total	255	1,893	56.4	88.1	2,148	82.6	9.8	72.8
Within 6 years	45	93	10.0	4.3	138	5.3	1.7	3.6
" 7 "	44	60	9.7	2.8	104	4.0	1.7	2.3
" 8 "	22	28	4.9	1.4	50	1.9	0.9	1.0
" 9 "	19	22	4.2	1.0	41	1.6	0.7	0.9
" 10 "	17	11	3.7	0.5	28	1.1	0.7	0.4
Total	147	214	32.5	10.0	361	13.9	5.7	8.2
Within 11 years	14	6	3.1	0.3	20	0.8	0.6	0.2
" 12 "	9	7	2.0	0.3	16	0.6	0.3	0.3
" 13 "	5	6	1.1	0.3	11	0.4	0.2	0.2
" 14 "	10	6	2.2	0.3	16	0.6	0.4	0.2
" 15 "	3	5	0.7	0.2	8	0.3	0.1	0.2
Total	41	30	9.1	1.4	71	2.7	1.6	1.1
Beyond 15 years	9	11	2.0	0.5	20	0.8	0.4	0.4
Grand Total	452	2,148	100.0	100.0	2,600	100.0	17.5	82.5

MATERNITY TABLES

SIX DISTRICTS

(Birbhum, Bankura, Howrah, 24-Parganas, Maldá and West Dinajpur)

TABLE V

TOTAL NUMBER OF CHILDREN BORN AND ALIVE RELATED TO AGE OF MOTHER AT MARRIAGE

Present Age	Total Number of Children Born/Alive						
	Age at Marriage						
	Total	Less than 15		15—19			
	Number of Mothers	Children born	Children alive	Children born	Children alive	Children born	Children alive
1	2	3	4	5	6	7	8
Less than 15	64	80	57	80	57	..	..
15—19	2,836	4,036	2,962	3,546	2,585	490	377
20—24	5,561	11,925	8,805	9,405	6,841	2,423	1,883
25—29	5,385	17,441	12,633	13,798	9,684	3,300	2,689
30—34	4,411	19,790	14,411	15,624	11,321	3,682	2,725
35—39	3,260	17,054	12,007	13,298	9,340	3,264	2,325
40—44	2,558	14,943	10,077	11,872	7,930	2,650	1,859
45 & above	4,289	25,692	16,645	20,513	13,231	4,472	2,921
Total	28,364	110,961	77,597	88,136	60,989	20,281	14,779

Total Number of Children Born/Alive Children Born/Alive per Mother

Present Age	Total Number of Children Born/Alive				Children Born/Alive per Mother			
	Age at Marriage				Age at Marriage			
	20—24		25 & above		Total		Less than 15	
	Children born	Children alive	Children born	Children alive	Children born	Children alive	Children born	Children alive
9	10	11	12	13	14	15	16	
Less than 15 . . . . .	..	..	..	..	1.250	0.891	1.250	0.891
15—19 . . . . .	..	..	..	..	1.423	1.044	1.045	1.06
20—24	97	81	..	..	2.144	1.583	2.30	1.67
25—29	301	226	42	34	3.239	2.346	3.52	2.47
30—34	359	274	125	91	4.486	3.267	4.74	3.43
35—39	373	260	119	82	5.231	3.683	5.52	3.88
40—44	296	189	125	99	5.841	3.939	6.13	4.10
45 & above	527	366	180	127	5.990	3.881	6.25	4.03
Total	1,953	1,396	591	433	3.912	2.736	4.11	2.84

MATERNITY TABLES
SIX DISTRICTS—concl'd.

TABLE V

Children Born/Alive per Mother

Present Age	Age at Marriage					
	15—19		20—24		25 & above	
	Children born 17	Children alive 18	Children born 19	Children alive 20	Children born 21	Children alive 22
Less than 15	..	..	..	..	..	..
15—19	1.24	0.95	..	..	..	..
20—24	1.73	1.35	1.47	1.23	..	..
25—29	2.60	2.12	1.73	1.30	1.75	1.42
30—34	3.95	2.92	2.72	2.08	2.45	1.78
35—39	4.59	3.27	3.81	2.65	2.83	1.95
40—44	5.20	3.65	3.84	2.45	3.57	2.83
45 & above	5.31	3.47	4.75	3.30	3.46	2.44
Total	3.35	2.44	2.97	2.12	2.90	2.12

FOUR DISTRICTS

(Burdwan, Nadia, Murshidabad and Jalpaiguri)

TABLE V

TOTAL NUMBER OF CHILDREN BORN AND ALIVE RELATED TO AGE OF MOTHER AT MARRIAGE

Total Number of Children Born/Alive

Present Age	Age at Marriage						
	Total	Less than 16				16—20	
	Number of Mothers 2	Children born 3	Children alive 4	Children born 5	Children alive 6	Children born 7	Children alive 8
1	..	..	..	..	..	..	..
Less than 16	171	184	132	184	132	..	..
16—20	2,207	3,112	2,252	2,871	2,077	241	175
21—25	3,278	7,909	5,765	6,833	4,945	1,043	788
26—30	2,968	11,047	7,817	9,290	6,475	1,590	1,220
31—35	1,909	9,071	6,164	7,793	5,257	1,117	814
36—40	1,856	10,572	6,969	9,042	5,905	1,366	947
41—45	1,107	6,817	4,268	5,855	3,591	842	596
46 & over	1,727	10,509	6,273	9,000	5,334	1,312	812
Total	15,223	59,221	39,640	50,868	33,716	7,511	5,352

Total Number of Children Born/Alive

Children Born/Alive per Mother

Present Age	Age at Marriage				Age at marriage			
	21—25		26 & above		Total		Less than 16	
	Children born 9	Children alive 10	Children born 11	Children alive 12	Children born 13	Children alive 14	Children born 15	Children alive 16
Less than 16	..	..	..	..	1.076	0.772	1.076	0.772
16—20	..	..	..	..	1.410	1.020	1.42	1.03
21—25	33	32	..	..	2.413	1.759	2.54	1.84
26—30	146	111	21	11	3.722	2.634	3.94	2.75
31—35	136	76	25	17	4.752	3.229	5.01	3.38
36—40	141	99	23	18	5.696	3.755	5.98	3.90
41—45	66	50	54	31	6.158	3.855	6.47	3.97
46 & over	125	84	72	43	6.085	3.632	6.32	3.75
Total	647	452	195	120	3.890	2.604	4.03	2.67

MATERNITY TABLES
FOUR DISTRICTS—concl'd.

TABLE V
Children Born/Alive per Mother

Present Age	Age at Marriage					
	16—20		21—25		26 and above	
	Children born 17	Children alive 18	Children born 19	Children alive 20	Children born 21	Children alive 22
Less than 16	..	..	..	..	..	..
16—20	1.30	0.94	..	..	..	..
21—25	1.84	1.39	1.32	1.28	..	..
26—30	2.95	2.26	2.25	1.71	2.62	1.38
31—35	3.85	2.81	3.02	1.69	1.39	0.94
36—40	4.61	3.20	4.27	3.00	1.64	1.29
41—45	5.10	3.61	3.47	2.63	3.00	1.72
46 & over	5.23	3.24	3.79	2.55	3.60	2.15
Total	3.27	2.33	2.94	2.05	2.50	1.54

DARJEELING

TABLE V
TOTAL NUMBER OF CHILDREN BORN AND ALIVE RELATED TO AGE OF MOTHER AT MARRIAGE
Total Number of Children Born/Alive

Present Age	Age at Marriage						
	Number of Mothers 2	Total		Less than 15		15—19	
		Children born 3	Children alive 4	Children born 5	Children alive 6	Children born 7	Children alive 8
1	..	..	..	..	..	..	..
Less than 15	1	1	1	1	1	..	..
15—19	79	91	69	39	30	52	39
20—24	333	601	477	129	109	401	317
25—29	447	1,228	981	272	217	681	544
30—34	443	1,793	1,409	418	328	942	723
35—39	337	1,723	1,248	305	188	899	680
40—44	288	1,545	1,106	259	166	701	480
45 & above	672	3,936	2,502	720	425	1,612	953
Total	2,600	10,918	7,793	2,143	1,464	5,288	3,736

Total Number of Children Born/Alive Children Born/Alive per Mother

Present Age	Age at Marriage							
	20—24		25 & above		Total		Less than 15	
	Children born 9	Children alive 10	Children born 11	Children alive 12	Children born 13	Children alive 14	Children born 15	Children alive 16
Less than 15	..	..	..	..	1.000	1.000	1.000	1.000
15—19	..	..	..	..	1.152	0.873	1.18	0.91
20—24	71	61	..	..	1.805	1.432	2.39	2.02
25—29	262	210	13	10	2.747	2.194	3.40	2.71
30—34	380	315	53	43	4.047	3.181	4.86	3.81
35—39	429	313	90	67	5.113	3.703	6.49	4.00
40—44	403	324	182	136	5.365	3.841	6.32	4.05
45 & above	1,070	734	534	390	5.857	3.723	6.99	4.13
Total	2,615	1,947	872	646	4.199	2.997	4.82	3.29

MATERNITY TABLES
DARJEELING—concl'd.

TABLE V

Present Age	Children Born/Alive per Mother					
	Age at Marriage					
	15—19		20—24		25 & above	
	Children born	Children alive	Children born	Children alive	Children born	Children alive
	17	18	19	20	21	22
Less than 15	..	..	..	..	..	..
15—19	1.13	0.85	..	..	..	..
20—24	1.71	1.35	1.61	1.16	..	..
25—29	3.18	2.54	1.85	1.48	1.18	0.91
30—34	4.34	3.33	3.45	2.86	1.77	1.43
35—39	5.52	4.17	4.33	3.16	3.21	2.39
40—44	5.89	4.03	4.98	4.00	3.87	2.89
45 & above	6.53	3.86	5.57	3.82	4.11	3.00
Total	4.26	3.01	3.91	2.91	3.54	2.63

ANNEXURE

Extract from Letter of Registrar General for India to Superintendent of Census Operations, West Bengal, on the latter's 'Note on Maternity Data'.

I enclose herewith a note (Appendix I) entitled "Logistic graduation of maternity data and derivation of table of age specific maternity rates". It explains a method of processing the materials received from Travancore-Cochin and Madhya Pradesh, which, I think, leads to fruitful results. Your material was also subjected to this processing with very satisfactory results. I enclose herewith three tables (Appendix II).

You will observe from table 3 that it leads to the conclusion that "upper limit estimates" of the crude birth rate (for the 10-year period 1941-50) for the rural areas in each of the two groups of districts in West Bengal are 35.5 and 37.4 respectively. If the number of children born, as returned by women aged 15 to 44 may be accepted as correct, it is fairly certain that the Birth Rates cannot exceed these limits. It is also possible that they are not too far below these limits either.

It is important to note that the foregoing limits tally almost exactly with Jain's estimates; which, as you know, were reached on the basis of wholly different data. There is good agreement, similarly, in Travancore-Cochin and Madhya Pradesh also.

These facts have encouraged me to hope that the working hypothesis underlying the "logistic graduation" will stand the test of repeated observation; and if this happens, we shall have developed a technique for working out age specific maternity tables for inter-censal periods which would match the current practice of preparing smoothed Age Tables and Life Tables for inter-censal periods. The censuses will then throw much clearer light on the order of magnitude as well as the Trends of inter-censal Birth Rates and Death Rates.

One word about nomenclature. It is customary in established scientific parlance to describe the data about number of children born, etc., as "Fertility Data". I prefer to describe them as "Maternity Data". Both are equally justified, as the data fall on the boundary line which divides the natural sciences from Sociology. But I prefer the latter, in order mainly to emphasise the sociological aspect. I want our readers to think about their mothers and their children's mothers and not about fields and animals when they read our reports. I would like you to make the necessary verbal changes in your note.

APPENDIX I

Logistic Graduation of Maternity Data: and Derivation of Table of Age Specific Maternity Rates

1. The 10 per cent. sample data on maternity collected during the 1951 Census and published in this paper relate to all women (other than unmarried women) in Travancore-Cochin and the three divisions of Madhya Pradesh. This note relates only to those mothers who were still married on Census day and explains the results of an

attempt to fit a curve to the observed values of Child birth indices or "average number of children born" to each mother of different maternal groups.

2. All the mothers are divided into four groups according to the age at which they had their first child birth. The four groups are as follows:—

	Age at birth of First Child
Maternity Type A	15 to 19
Maternity Type B	20 to 24
Maternity Type C	Over 24
Maternity Type D	Under 15

This is the observed order in every natural division. The maternity type D is found to be numerically insignificant. Both maternity types C and D taken together account for a little more than one-tenth of the total

number. Accordingly, curve fitting was attempted only for the maternity types A and B. The table below furnishes the figures of child birth indices computed from the maternity data of these two States.

REGISTRAR GENERAL'S NOTE

TABLE I
Child birth indices (Number of children born per mother)

Division	Travancore-Cochin		East Madhya Pradesh		North West Madhya Pradesh		South West Madhya Pradesh	
	15-19	20-24	15-19	20-24	15-19	20-24	15-19	20-24
Age of the mother at birth of first child								
Present age of mother								
1	2	3	4	5	6	7	8	9
All ages	4.6	4.0	4.5	4.0	4.5	3.9	4.4	4.1
Completed Maternity ages (45 & over)	7.3	6.4	6.8	5.9	6.9	6.0	7.1	6.2
Incomplete Maternity								
(1) 15-19	1.2	..	1.3	..	1.3	..	1.3	..
(2) 20-24	2.0	1.3	2.2	1.4	2.4	1.5	2.2	1.3
(3) 25-29	3.6	2.3	3.7	2.4	3.7	2.2	3.7	2.2
(4) 30-34	4.8	3.7	5.1	3.7	4.9	3.7	5.0	3.5
(5) 35-39	6.0	4.9	6.0	4.8	5.9	4.7	6.0	4.7
(6) 40-44	6.8	5.8	6.4	5.5	6.5	5.4	6.6	5.5

3. The child birth indices were plotted against the age of the mother for the maternity types A and B, one for each Division. The plotted points were observed to fall along a logistic shaped curve. Therefore a curve

$$\text{of the type: } Yt = L / (1 + C \frac{\beta t}{\alpha})$$

(where Yt is the child birth index at time

t and L, β and α are constants) was fitted by the method of 3 selected points. The median ages of the Incomplete Maternity groups (1), (3) and (5), were selected as the points through which the curve should pass. The values of L, β and α which were obtained for 8 child birth curves are shown in table below:—

TABLE II

Division	Travancore-Cochin		East Madhya Pradesh		North West Madhya Pradesh		South West Madhya Pradesh	
	15-19	20-24	15-19	20-24	15-19	20-24	15-19	20-24
Age of the mother at birth of first child								
Parameters								
1								
L	7.64	6.78	6.68	5	6.22	7.18	6.02	7.21
β	29.09	31.49	26.22	30.04	27.23	29.53	27.37	31.37
α	6.42	6.35	5.22	6.22	6.57	6.13	6.09	6.57

4. Table III below shows the comparison of the observed values of child birth indices (in table I) and corresponding graduated values read off from the curves (in table II) for the

median ages of quinquennial age groups below 45. For age groups 45 and over the asymptotic value (L) is furnished for comparison in the column for graduated values.

TABLE III
Child birth indices

Division	Age of the mother at birth of first child	Age group	Travancore-Cochin		East Madhya Pradesh		North West Madhya Pradesh		South West Madhya Pradesh	
			Observed value	Graduated value	Observed value	Graduated value	Observed value	Graduated value	Observed value	Graduated value
		1	2	3	4	5	6	7	8	9
15-19	15-19		1.2	1.0	1.3	1.1	1.3	1.3	1.3	1.2
	20-24		2.0	2.0	2.2	2.2	2.4	2.4	2.2	2.2
	25-29		3.6	3.3	3.7	3.7	3.7	3.7	3.7	3.6
	30-34		4.8	4.8	5.1	5.1	4.9	4.9	5.0	5.0
	35-39		6.0	6.0	6.0	6.0	5.9	5.9	6.0	6.0
	40-44		6.8	6.8	6.4	6.4	6.5	6.5	6.6	6.6
20-24	45 & over		7.3	7.6	6.8	6.7	6.9	7.2	7.1	7.2
	20-24		1.3	1.3	1.4	1.4	1.5	1.5	1.3	1.3
	25-29		2.0	2.3	2.4	2.5	2.2	2.5	2.2	2.3
	30-34		3.7	3.7	3.7	3.7	3.7	3.7	3.5	3.5
	35-39		4.9	4.9	4.8	4.8	4.7	4.7	4.7	4.7
	40-44		5.8	5.8	5.5	5.5	5.4	5.4	5.5	5.5
	45 & over		6.4	6.7	5.9	6.2	6.0	6.0	6.2	6.5

REGISTRAR GENERAL'S NOTE

5. Since the observed values and the values read off from the curve are sufficiently close, it is assumed that the logistic curve may be accepted as a reliable basis for estimating the child birth index corresponding to any individual year of age. Accordingly, values of Y_t (which are deemed to be child birth indices of mothers of age t) have been computed from the logistic curve for each age from age 15 to age 44. At this stage, the following assumption was made, viz.:—If, at the beginning of the year, the average number of children born to mothers of age t is Y_t , and to mothers of age $t+1$ is Y_{t+1} , the average number of children born to the former by the end of the year would be Y_{t+1} . Hence the number of children born during a period of one year to 1,000 mothers of age t would be 1,000 ($Y_{t+1}-Y_t$). The number may be referred to as the "Age-Specific Maternity Rate". Accordingly, a series of values for 1,000 ($Y_{t+1}-Y_t$) have

been computed and set out in "Table of Age-Specific Maternity Rates" annexed to this note. The validity of these rates is necessarily dependent on the validity of the assumption made above. It seems to be a reasonable assumption to make, at any rate as a working hypothesis, to be confirmed or revised on the basis of further study. Even if the assumptions were valid, an error might still be imported into these rates if, for any reason, the basic data contained an element of systematic error. In particular, any element of understatement which might be present in the returns of the "number of children born" would be reflected in the child birth indices and might also be reflected in the maternity rates. In view of the possibility of forgetfulness among the older women, the possibility of a systematic error cannot be overlooked.

6. The following table illustrates one of the uses to which the "Table of Age-Specific Maternity Rates" may be put:—

TABLE IV

Division	Upper Limit Estimate Birth Rate		Registered birth rate (1941-50)	Number of un-registered birth per 100 registered births (Upper Limit Estimate)	
	1951	1941-50			
1	2	3	4	5	
Travancore-Cochin	36.6	35.8	20.3	81	
Madhya Pradesh	East	44.8	46.4	35.2	32
	North West	40.5	41.7	36.8	13
	South West	42.8	43.5	39.4	10

The figures of column 2 and column 3 of the foregoing table were obtained as below:—

First, the upper limit of the probability that any married female of a given age will have a child birth during a period of twelve months was taken to be the higher of the two values furnished for Maternity types A and B in the table annexed.

Secondly, Maternity rates were then deduced for all five-year age groups of incomplete maternity on the assumption that the rate for the five-year age groups is the same as that of the mother of median age in that group. The median ages are 17-471, 22-381, 27-368, 32-393, 37-411 and 42-632 for Travancore-Cochin and 17-404, 22-503, 27-471, 32-415, 37-390 and 42-388 for each of the three divisions of Madhya Pradesh. The median ages have been worked out from the smoothed age table for females. The rates for the three ten-year age groups 15 to 24, 25 to 34 and 35 to 44 were then determined by combining pairs of rates for corresponding quinquennial

groups, the rates being weighted by the number of mothers in each quinquennial age group (15 to 19, 20 to 24, etc.).

Thirdly, the number of married females in each of the three ten-year age groups mentioned above for each of the four territorial units are known both for 1951 and for 1941 from Census tables. Applying the rates to these numbers the upper limit to the total number of live births to be expected in a twelve months' period can be computed and the corresponding upper limits of the Birth Rates determined therefrom.

There are other methods (entirely independent of Maternity Data) by which the Birth Rate as well as the extent of omissions present in registration of births, may be estimated. The extent to which the results obtained by such methods corroborate the results set out in Table IV is under examination and will be explained in the All-India Report on the 1951 Census, which is separately under preparation.

REGISTRAR GENERAL'S NOTE

ANNEXURE

Age Specific Maternity Rates

Number per 1,000 married women of age specified in column (1) who may be expected to have child birth during a period of 12 months

Division	Travancore-Cochin		East Madhya Pradesh		North West Madhya Pradesh		South West Madhya Pradesh	
	A	B	A	B	A	B	A	B
Maternity Type								
Age								
(In number of complete years)	2	3	4	5	6	7	8	9
15	114	..	129	..	135	..	129	..
16	129	..	150	..	149	..	146	..
17	145	..	170	..	165	..	163	..
18	161	..	194	..	181	..	181	..
19	178	..	217	..	197	..	200	..
20	196	136	240	146	213	149	219	135
21	213	152	263	161	227	165	236	148
22	231	168	282	177	241	179	253	163
23	248	184	299	192	252	195	268	178
24	262	200	312	206	262	208	280	192
25	275	215	318	219	268	221	289	206
26	286	229	320	231	272	231	294	218
27	293	242	315	240	273	238	296	228
28	296	253	305	246	271	241	293	235
29	297	260	290	249	265	248	287	246
30	294	265	271	249	257	244	277	250
31	287	267	251	247	246	239	264	249
32	277	265	227	240	233	231	249	248
33	264	260	204	231	220	221	232	243
34	251	253	180	221	204	209	214	236
35	234	242	159	207	185	196	195	226
36	216	228	138	193	175	180	177	215
37	199	216	118	178	157	165	158	202
38	182	200	102	162	141	150	142	188
39	164	183	86	147	127	135	125	174
40	147	168	74	132	113	120	110	160
41	132	151	62	119	101	107	97	144
42	116	137	52	104	88	95	84	131
43	103	121	43	98	79	82	73	118
44	91	108	37	76	68	57	63	105

APPENDIX II

TABLE I

Districts	Age Groups	Child Birth Indices	
		Observed	Graduated
Birbhum, Bankura, Howrah, 24-Parganas, Malda, and West Dinajpur.	15-19	1.4	1.3
	20-24	2.3	2.3
	25-29	3.5	3.5
	30-34	4.7	4.7
	35-39	5.5	5.6
	40-44	6.2	6.2
	45 & over	6.3	6.8
Burdwan, Nadia, Murshidabad, and Jalpaiguri.	16-20	1.5	1.4
	21-25	2.5	2.5
	26-30	3.8	3.9
	31-35	5.0	5.0
	36-40	5.9	6.0
	41-45	6.5	6.5
	45 and over	6.3	7.1

REGISTRAR GENERAL'S NOTE

TABLE II

Age Specific Maternity Rates

Age (in Number of complete years)	Number per 1,000 married women of Age specified in Column (1) who may be expected to have child birth during a period of 12 months	
	Birbhum, Bankura, Howrah, 24-Parganas, Malda and West Dinajpur	Burdwan, Nadia, Murshidabad, and Jalpaiguri
1	2	3
15	132	131
16	147	145
17	161	160
18	176	174
19	191	189
20	205	203
21	218	216
22	230	229
23	240	239
24	248	248
25	253	254
26	256	258
27	256	259
28	252	258
29	246	254
30	238	247
31	227	238
32	215	227
33	202	214
34	187	201
35	173	186
36	158	172
37	143	157
38	129	143
39	116	129
40	103	116
41	92	104
42	81	92
43	71	82
44	63	72

REGISTRAR GENERAL'S NOTE

TABLE III

1	District		
	2	3	
	Birbhum, Bankura, Howrah, 24- Parganas, Malda, and West Dinajpur	Burdwan, Nadia, Mur- shidabad, and Jalpaiguri	
	168	166	
	235	233	
	255	259	
	213	222	
Age group specific Maternity Rates (Number per 1,000 married women who may be expected to have child birth during a period of 12 months)	35-30	138	152
	40-44	77	89
	15-24	210	204
	25-34	236	244
	35-44	111	128
Crude Birth Rate	1951	34.8	38.1
	1941	36.1	36.7
Mean Decennial Birth Rate	1941-50	35.5	37.4

VITAL INDEX

A Note on Vital Index for West Bengal

JATINDRA MOHAN DATTA and A. MITRA

According to Raymond Pearl, the Vital Index, obtained by dividing the birth-rate by death-rate multiplied by 100, gives the net biological health of a given population. The registered births and deaths for each district of West Bengal have been given in Vol. VI, Part IB of the Census Tables for 1951. From these primary data the vital indices for each district and for West Bengal as a whole have been calculated. The calculated figures for each year and for quinquennial periods and for decennial periods from 1901 to 1950 are shown below.

These vital Indices as calculated are significantly enough, independent of inaccuracies in registration, provided that the order of inaccuracy in the registration of both births and deaths is assumed to be of the same order throughout the period of time considered.

Barring the inner and outer limits or freaks (the lowest figure was 59 in 1919; and the highest was 148 in 1940 for entire West Bengal), if we group the vital indices by quinquennial periods, we find that the Vital Index decreased steadily from 103.0 in 1901-05 continuously till 1916-20, when it reached the figure of 85.6. Since then it rose steadily and reached the peak of 135.4 in the period 1936-40. It suddenly dropped down to 104.8 in 1941-45, the period containing the famine years 1943-44; and it is mounting again.

Much the same phenomenon is observed for each district, excepting Calcutta. Here the vital index is very much below the provincial figure. As to why it should be so there can be no ready answer, except that the age and sex-structure of Calcutta is very different from that of the State or any other district.

In the above discussion, we have assumed that the order of inaccuracy in the registration of both births and deaths is of the same order. But there

are good reasons to suppose that more births are unregistered than deaths; which means that the vital index ought to be generally higher than it shows up.

In the Bengal Census Report of 1911, p. 81, it has been noticed "that the tendency to omission is greater in the case of births than deaths". "The returns showing the percentage of unreported births and deaths in Bengal that were detected by the vaccination staff (out of several millions inquired into) are proof that there has been a gradual improvement in accuracy, especially since 1905".

The figures for 1901-10 for West Bengal were:

Year	Percentage of Omission	
	Births	Deaths
1901	1.23	0.99
1902	0.85	0.66
1903	0.80	0.62
1904	0.91	0.81
1905	0.87	0.72
1906	0.66	0.61
1907	0.68	0.57
1908	0.42	0.38
1909	0.28	0.30
1910	0.42	0.29
10	7.12	5.95
Average	0.71	0.59

Thus the Vital Index for 1901-10 obtained from registered births and deaths has to be correspondingly increased by $(100+71)/(100+59)$ or by 1.001.

W. H. Thompson in the Bengal Census Report, 1921, p. 212, came to the conclusion "that the omission in the record of births is generally between 1 and 2 per cent. more than in the record of deaths". So the Vital Index obtained from registered vital statistics has to be augmented by 102/100 or by 1.020.

In 1948 a sample enquiry was conducted by Dr. P. G. Choudhury,

VITAL INDEX

Assistant Director of Public Health, West Bengal, on the defect in the registration of births and deaths in certain areas. It was found that the percentage of omissions in registration of births over total detection was 49.3 per cent. In the case of deaths the corresponding percentage was 42.6. Thus, relatively, $49.3 - 42.6 = 6.7$ per cent. more births went unregistered than deaths. So the vital index calculated on recorded births and deaths has to be increased by $106.7/100$ or 1.067.

But these corrections are the upper limits of correction. The actual corrections will depend upon the absolute amount of non-registration of births and deaths. For example, for the year 1948, the number of *actual* births is $100 + 49.3$ and the number of *actual* deaths $100 + 42.6$.

The correction factor is, therefore, $149.3/142.6 = 1.048$.

If, therefore, this variation in vital index (calculated from recorded figures) were plotted on a graph the x-axis would need to be corrected correspondingly as shown in the figure at the conclusion of this note.

In the following pages vital indices have been worked out for 1901-50 for West Bengal and each district.

The indices of each district are followed by extracts from Chapter I of Part IA of the General Report for West Bengal, Sikkim and Chandernagore. Only the pages of the Report from which the passages have been extracted are quoted in the text. They will assist the reader in relating the vital index for a particular period to the contemporaneous conditions of the district and will provide the background against which a study of the index may be profitably undertaken. It gives no small satisfaction to the Census Superintendent that many of his observations, recorded in July-September 1952, and published in April 1953, have been borne out by the Vital Indices worked out independently by Sri. J. M. Datta in May-June 1953.

I Annual, Quinquennial and Decennial Vital Indices for West Bengal and Districts 1901-1950

WEST BENGAL

(a)

Annual Indices

Year	Index	Year	Index
1901	110	1926	110
1902	93	1927	97
1903	97	1928	115
1904	115	1929	129
1905	100	1930	115
1906	91	1931	124
1907	87	1932	120
1908	94	1933	127
1909	135	1934	117
1910	91	1935	142
1911	117	1936	139
1912	100	1937	136
1913	93	1938	117
1914	98	1939	127
1915	85	1940	158
1916	103	1941	141
1917	119	1942	146
1918	69	1943	70
1919	59	1944	65
1920	78	1945	102
1921	82	1946	126
1922	110	1947	110
1923	121	1948	116
1924	110	1949	131
1925	123	1950	125

(b)

Quinquennial Indices

Year	Index
1901-05	103.0
1906-10	99.6
1911-15	98.6
1916-20	85.6
1921-25	109.2
1926-30	113.2
1931-35	126.0
1936-40	135.4
1941-45	104.8
1946-50	121.6

(c)

Decennial Indices

Year	Index
1901-10	101.3
1911-20	92.1
1921-30	111.2
1931-40	130.7
1941-50	113.2

VITAL. INDEX

The conclusion that may be drawn is that the influenza epidemic of 1918-19 retarded the growth of the population and carried off large sections of it and had a more lasting effect than was supposed when the census reports of 1921 and 1931 were written. The decrease in the populations of those districts where it is not masked by heavy immigration stares one in the face even as the decrease due to the Burdwan Fever and famine did in the census of 1881. Returns of age in India being uncertain and varying between absurdly wide limits it is unprofitable to try to trace the effects of the epidemic through age pyramids in successive decades. But there is a readier means of ascertaining with reasonable certitude the age groups affected by the epidemic: which is by comparing to the total population over several decades the percentage strength of a group of age class intervals. Where the percentage in 1921 of any age class interval is substantially lower than those in other censuses it may be safely assumed that that age class was struck down by the epidemic. Following this line of reasoning it will appear that the age groups that in almost every district were affected more than any others in 1921 were 0-5, 5-10, 30-40, 50-60 and 60 and over. It is not possible to detect any indisputable decrease in other age groups that can be at once attributed to the influenza epidemic. Statement 1-38 printed in its entirety at the end of the section is by itself so instructive that all that is done here is to draw attention to the more striking effect on mortality of the influenza epidemic and of a later occurrence, the famine of 1943.

As for the influenza epidemic the age groups most affected in Burdwan, Birbhum, Bankura, Midnapur, Hooghly, Howrah, 24-Parganas, Nadia, Murshidabad, Malda, West Dinajpur, Jalpaiguri, Darjeeling, Cooch Behar and Sikkim were 0-5, 30-40, 50-60 and 60 and over as revealed in the 1921 census or 0-3, 23-38, 48-58, and 58 and over in 1918-19. That is, the epidemic struck

down the very young, the population in the prime of life, and the elderly and old. The average span of life or the mean age of the population being short it is not possible to draw firm conclusions on the effect of the mortality on ages above 30, nor do the statistics permit of them. But heavy mortality in the age group 0-5 left its mark on the age structure of the next decade, and even that of the decade after the next. For instance, in Burdwan, Birbhum, Bankura, Midnapur, Hooghly, Howrah, 24-Parganas, Murshidabad and Sikkim the age group 10-15 in 1931 was definitely proportionately smaller than in any other decade, and in 1941 the age group 20-30 was on the low side as between 1921 and 1951.

As for the famine of 1943, this pestilence also was selective in its assault and marked down specific age groups for its victim uniformly in almost every district. These age groups are revealed in 1951 census as 5-10, 30-40 and 50-60. As the famine occurred eight years before followed by a devastating epidemic in 1944 which took away what the famine had spared but left debilitated, the age group affected by the famine must have been 0-3, 23-33, 43-53. To a lesser extent age group 53 and over in 1943 was affected in the districts of Howrah, Calcutta, Nadia, Murshidabad, Malda, West Dinajpur, Jalpaiguri, Darjeeling and Cooch Behar. (Paras 132-34, pp. 207-8.)

This leads to two conclusions: first, that the population is precariously alive and has little stamina or vitality to withstand disease or a change for the worse; secondly, that being still very young it possesses all the potentialities of growth and age which have hardly come into play yet, but given the opportunity has still to make great strides of expansion in its cycle before it will slacken its pace and approach a stationary state again. In short, India's population is still in the same stage as those of most underdeveloped countries in the East. No very significant improvement has yet been made in the health of her people,

VITAL INDEX

her agricultural and industrial economy to warrant the assumption that she is definitely headed for a period of larger birth rates and lower death rates, inevitable in a country of rising standards of living. There is no indication that the standard of living has improved since 1921. (Para 471, p. 371.)

This was not so much an improvement of her industrial or agricultural production but an appreciable decline in general and infantile mortality. The birth rate has maintained as high an average as any country could aim at and it is unlikely that it will increase further even under better circumstances. A birth rate of 43 or 44 per *mille*, as in West Bengal, maintained over several decades, is stupendous and is unlikely to be exceeded. It is possible only for the death rate to fall and already in West Bengal the general death rate has fallen from 35 per *mille* in 1921-30 to about 27 or 28 in 1941-50. The infantile mortality rate has reduced from 1901-1911 or even from 1911-21. The average uncorrected figures for undivided Bengal for the decade 1901-1911 were 207.2 for males and 188.0 for females. For 1911-21 the corresponding averages as computed by W. H. Thompson were 216.67 per *mille* male births and 202.0 per *mille* female births. But as the actuarial reports for each census has shown, these uncorrected rates computed on registered events are gross under-estimates and infantile mortality up to 1931 was of the steady order of 250 per *mille* births. W. H. Thompson observed that the relation between the rate for males and that for females is always very much the same. In spite of the admitted and well known fact that in this country greater care is taken of male than of female infants, the mortality among males under twelve months old is regularly about 10 to 20 per *mille* more than among females. (Para 472, p. 372.)

The fact that, in spite of the famine and epidemics of 1943-44, the civil commotions and bloody riots of 1946 and

1950, West Bengal's natural population has shown a small but clearly positive rate of growth during 1941-50, whereas under similar stress and strain in an earlier period, say 1872-1881 or 1911-1921, it registered an appreciable decline, and therefore proves an appreciable improvement in the State's vitality, does not bear scrutiny, but rather underlines the fact that the famine and epidemics of 1943-44 did not uniformly affect every district but were restricted to certain localities only. For in East Bengal where the famine and epidemics swept over almost every district, there has been a decline in its natural population in 1941-50 (allowing fully for migration after the partition), as the preliminary bulletins of the Census Commissioner for Pakistan on the 1951 census of Pakistan indicate. As the populations of East Bengal and West Bengal belong to the same stock, rather, if anything, the East Bengal branch is sturdier and less liable to malnutrition ordinarily than the West Bengal stock, it may be readily conceded that if the famine and epidemic of 1943-44 had struck all West Bengal districts with the same ferocity as in East Bengal, mortality would have been perhaps heavier than that caused by the influenza epidemic of 1918-19. On the other hand, taking the picture of India as a whole, the last thirty years have shown a greater ability to fight famines by localising them. (Para 476, p. 374.)

It may, therefore, be generally agreed that while up to 1920 the State population was inhibited from growing in a normal manner by epidemics and malaria and by the limitations imposed on her agriculture and industry by injurious laws and tariffs, after 1920, and especially after 1947, many of them having disappeared, the country, 'while still in poverty has found its voice', and West Bengal's population may have a less inhibited growth, in spite of the fact that the state of her agriculture and industry, 'although dangerously low, is still falling'. (Para 482, p. 377.)

VITAL INDEX

It is easy to belittle the progress made in improving the health services of the State and, indeed, the Government itself does not claim that it has touched more than a fringe of the problem. But they certainly deserve to be complimented for the efficiency with which the veteran epidemics of cholera and small-pox are combated and reduced in a short space of time whenever they raise their ugly heads. With so little money spent on protected water supply in rural areas, sanitation, isolation of infected cases and the present dismally low standard of housing, living and food it is idle to wish that preventive and curative measures alone will rid the country of recurrent epidemics. The state of the water supply cannot but preserve cholera as an endemic, while the state of sanitation and mode of treating infected cases cannot extirpate small-pox however efficient and thorough-going a State's programme of compulsory vaccination may be. Nevertheless the skill and efficiency which the public health services in this State have reached in dealing with these two scourges cannot fail to earn a compliment when it is recalled that the virulence of these pestilences has been nothing in the last thirty years compared to what it used to be in an earlier period. The manner in which plague was swiftly localised and stamped out in the city of Calcutta in 1948-49, where every circumstance was congenial to its rapid propagation, is a good enough testimony to the efficiency of the public health services. In short, not a little of the rapid increase of population since 1920 is due, as any reader of this chapter will doubtless agree, to the improvement of the public health services. (Para 483, p. 378.)

It will take a long time at the present rate to upgrade the standard of living of population since 1920 is due, as any more food the immediate effect will be a rapid increase in population, as has been the case in England, America and every other country in the 18th century, caused by a falling death rate on

account of better nutrition and medical care. Already the birth rate is very high by any standards and it is improbable that this very high rate, which has obtained for at least eighty years, can be very much exceeded. But it is also improbable that the birth rate will fall suddenly and steeply. It is only after this stage of rapid increase is worked off that we can expect a falling birth rate. (Para 488, p. 381.)

The indications, once again are that the population will increase more rapidly than in the past and the problem is to find employment and sustenance for the growing population. As will be seen, this problem has scarcely been tackled so far and it has been allowed to grow more and still more serious owing to the diminishing livelihood agriculture and industry provide with the passage of time. (Para 495, p. 384.)

BURDWAN DISTRICT

(a)

Annual Indices

Year	Index	Year	Index
1901 . . .	107	1926 . . .	122
1902 . . .	97	1927 . . .	113
1903 . . .	96	1928 . . .	110
1904 . . .	130	1929 . . .	128
1905 . . .	92	1930 . . .	107
1906 . . .	84	1931 . . .	120
1907 . . .	78	1932 . . .	114
1908 . . .	59	1933 . . .	119
1909 . . .	123	1934 . . .	102
1910 . . .	130	1935 . . .	139
1911 . . .	118	1936 . . .	172
1912 . . .	95	1937 . . .	152
1913 . . .	92	1938 . . .	107
1914 . . .	78	1939 . . .	102
1915 . . .	74	1940 . . .	142
1916 . . .	100	1941 . . .	138
1917 . . .	116	1942 . . .	153
1918 . . .	56	1943 . . .	84
1919 . . .	42	1944 . . .	73
1920 . . .	70	1945 . . .	106
1921 . . .	75	1946 . . .	138
1922 . . .	110	1947 . . .	115
1923 . . .	117	1948 . . .	106
1924 . . .	109	1949 . . .	123
1925 . . .	134	1950 . . .	117

VITAL INDEX

(b)

Quinquennial Indices

Year	Index
1901-05	104.4
1906-10	94.8
1911-15	91.4
1916-20	76.8
1921-25	109.0
1926-30	116.0
1931-35	118.8
1936-40	135.0
1941-45	110.8
1946-50	119.8

(c)

Decennial Indices

Year	Index
1901-10	99.6
1911-20	84.1
1921-30	112.5
1931-40	126.9
1941-50	115.3

Between 1901 and 1911 there were repeated epidemics of cholera, those of 1907 and 1908 being especially virulent, while malaria continued to levy its annual toll. Some scarcity was felt in 1904, and in the Katwa subdivision in 1908. The supply of agricultural labourers continued to be unequal to the demand in the sowing and harvesting seasons, and wages consequently went up. Between 1911 and 1921 every part of the district except the industrial area of Asansol subdivision suffered from a decrease in population. The decrease ran very high in the parts of the Sadar subdivision adjoining Bankura district; but much lower in the south-east corner. The three eastern subdivisions suffered most from the floods in 1913 of such rivers as the Damodar, Ajay, Khari, Kumar and Bhagirathi. From the water-logged condition in which so much of these subdivisions lay so many months of the year, they were full of malaria, and they also suffered badly in the influenza epidemic. There were floods again in the Ajay and Damodar in 1916-17, 1917-18, and 1918-19 and in 1920-21 inundations in some parts caused extensive damage to crops. But towards the close of the decade there were signs

of relief from malaria and some hope of security from disastrous floods after the systematic repair of the embankment of the Damodar by Government, the opening of the Ahmadpur-Katwa railway in 1917-18, the Bankura-Damodar River railway in 1913-14, the Burdwan-Katwa railway in 1915, the Howrah-Burdwan Chord railway in 1917 and the Bandel-Nabadwip-Katwa railway in 1912. In the Katwa and Kalna subdivisions also there was genuine progress attributed to a general improvement in the health of the people and in the economic condition of the agriculturists. Strenuous public health measures consisted particularly in anti-malarial measures in some of the worst villages, improvement in the supply of pure drinking water, the opening of mufassil dispensaries, free distribution of quinine, vaccination and inoculation and prompt prophylactic measures taken by the district board against epidemics. All this good work was continued in 1931-41 and improved upon, although the fall in agricultural prices during the decade did not give full play to the growth of the population. Then again in 1932-33 and 1935-36 there were droughts affecting parts of the district and in 1934-35 there was a severe flood caused by a breach in the Damodar embankments inflicting extensive damage to crops on either side of the river. Between 1941 and 1951 there was a failure of crops in certain parts in 1940-41. The Damodar Flood of 1943 did not inflict much loss of life, although a great deal of property was damaged. As Burdwan is a rice-growing district it did not greatly suffer from the famine of 1943 but in the following year the epidemics took a toll of about double the average yearly loss by death. (Para 145, pp. 212-13.)

That even the stamina of the population has improved between 1921 and 1951 with a tendency for the average unitary family to grow in size during the same period is demonstrated in the following statement. It shows that the size of the young population, although it looks as though it is decreasing, may

VITAL INDEX

not be actually doing so because of the losing relation its ratio bears to the increasing adult immigrant population in some parts of the district. That of the working age shows a slight increase during 1921 and 1951 from what it was before. The percentage of total number of children aged 0—5 to total married women aged 15 to 40 also shows a slight increase independently of the proportion of married women of those ages to the total population. (Para 147, p. 213.)

BIRBHUM DISTRICT

(a)

Annual Indices

Year	Index	Year	Index
1901	149	1926	143
1902	143	1927	126
1903	136	1928	127
1904	140	1929	162
1905	103	1930	144
1906	77	1931	128
1907	78	1932	116
1908	59	1933	129
1909	125	1934	94
1910	145	1935	147
1911	126	1936	162
1912	100	1937	104
1913	108	1938	119
1914	74	1939	105
1915	54	1940	156
1916	102	1941	156
1917	144	1942	162
1918	70	1943	82
1919	38	1944	52
1920	60	1945	82
1921	87	1946	96
1922	133	1947	84
1923	138	1948	114
1924	129	1949	108
1925	176	1950	87

(b)

Quinquennial Indices

Year	Index
1901-05	134.2
1906-10	96.8
1911-15	92.4
1916-20	82.8
1921-25	132.6
1926-30	140.4
1931-35	122.8
1936-40	129.2
1941-45	106.8
1946-50	97.8

(c)

Decennial Indices

Year	Index
1901-10	115.5
1911-20	87.6
1921-30	136.5
1931-40	126.0
1941-50	102.3

But Birbhum, being entirely dependent on agriculture, the growth of its population seems to vary directly with the state of agriculture. A serious flood in the Rampurhat subdivision in 1902 caused great loss to cultivators. There were short-crops in 1906 to 1908 and some scarcity in 1908-09. The health of the district was generally good, except in 1906-08, when it suffered from a wave of fever and epidemics of cholera, which resulted in heavy mortality. Between 1911 and 1921, almost every part of the district lost equally. The Sadar subdivision suffered severely from floods between 1911 and 1913. There was malaria and the district was hard hit by influenza. Aboriginal tribes seem to have suffered more severely in the epidemic everywhere, and those in Birbhum were no exception to the rule. Between 1921 and 1931 immigration of Santals, Koras and other aboriginal labourers from Bihar continued, and the healthiness of Rampurhat and Nalhati is said to have encouraged immigration into these two thanas. There was also a stimulus from industrial developments and the establishment of a railway settlement in Rampurhat. Sainthia and Ahmadpur developed as trading centres and opened several rice mills. A healthy climate prevailed throughout the decade and except for an acute spell of distress in Rampurhat subdivision in 1934 extensive damage caused by a flood in 1939, and a pretty severe scarcity due to drought in 1940, the factors mentioned above generally continued to operate in the decade 1931-41 causing almost as big an increase in the population of the district as in 1921-31. Between 1941 and 1951 however, the famine in 1943 and

VITAL INDEX

epidemics in 1944 took a heavy toll and sapped vitality as a result of which it took about four years to restore an excess of births over deaths. There were two small floods one in 1946 which affected about 30 square miles and washed away embankments on the Ajay worth about Rs. 195,000, and another in 1949 affecting about 40 square miles. The district has periodically got rid of populations in excess of this average density (300-400 per square mile) on the pretext of the slightest disturbance in the salubrity of the climate. Even Rampurhat, of which Nalhati and Murarai police stations are supposed to be two healthy and agriculturally prosperous police stations, has grown at a rate less than one per cent. per annum over any twenty-year period. The people do not seem to have any reserves of stamina either and are easier preys to epidemics than in the neighbouring districts of Burdwan and Murshidabad. (Para 152, pp. 215-16.)

BANKURA DISTRICT

(a)

Annual Indices			
Year	Index	Year	Index
1901	133	1926	156
1902	101	1927	126
1903	104	1928	147
1904	155	1929	140
1905	117	1930	120
1906	117	1931	124
1907	108	1932	178
1908	80	1933	124
1909	127	1934	115
1910	152	1935	135
1911	136	1936	178
1912	120	1937	151
1913	99	1938	139
1914	84	1939	135
1915	88	1940	156
1916	101	1941	136
1917	111	1942	153
1918	65	1943	84
1919	68	1944	77
1920	89	1945	120
1921	82	1946	166
1922	131	1947	111
1923	139	1948	111
1924	120	1949	129
1925	158	1950	118

(b)

Quinquennial Indices

Year	Index
1901-05	122.0
1906-10	116.8
1911-15	105.4
1916-20	86.8
1921-25	126.0
1926-30	137.8
1931-35	135.2
1936-40	151.8
1941-45	114.0
1946-50	127.0

(c)

Decennial Indices

Year	Index
1901-10	119.4
1911-20	96.1
1921-30	131.9
1931-40	143.5
1941-50	120.5

The Bengal-Nagpur Railway had opened in 1898 and the public health was good during the first 7 years. At the close of 1907, however, the crops failed over a large area, the parts most affected being Raipur, Onda and Khatra police stations. Distress was felt from January till September 1908, when the death-rate exceeded the birth-rate. Between 1911 and 1921 the population of the district decreased and in 1915-16 there was so serious a failure of crops that, before the middle of 1916, a famine was declared. As a matter of fact famine conditions had prevailed for several months previously. Relief works, the largest of which was the re-excavation of the old irrigation channel known as the Subhankari Danra, were reopened. The Bankura-Damodar River railway, opened in December 1916, was then under construction and gave employment to many cultivators, and 4,500 Bankura people were recruited for the tea gardens in Assam against less than 200 in the year before. Famine conditions continued in Bankura until the winter harvest of 1916. The district suffered very severely from the influenza epidemic, coming as it did after famine had sapped the vitality of the

VITAL INDEX

population. The hand-weaving industry is an important one in Bankura, and a systematic employment of the industry did much at that time to help the people engaged. Between 1921 and 1931 malaria raged in an endemic form. Although economic distress led to some emigration in search of labour in other districts, the establishment of mills and factories attracted labourers from outside. In Onda and Chhatna police stations mills were opened and the manufacture of bell-metal was encouraged. There was a good deal of preventive work against malaria, small-pox and other epidemic diseases owing to the opening of health centres and the improvement of village sanitation in Gangajalghati, Barjora, Saltora, and Mejhia police stations. Ranibandh, Raipur, and Simlapal remained free from epidemic diseases and enjoyed a succession of good seasons and improvement of village sanitation. Between 1931 and 1941 there was a combined flood and drought in 1934 affecting almost half the district and half the population. Between 1941 and 1951 the chief events were the famine of 1943 and the epidemic year of 1944 which were responsible for decreases in population in Onda, Gangajalghati, Mejhia, and Saltora police stations in Sadar subdivision and Jaypur, Sonamukhi and Patrasair police stations in Vishnupur subdivision. The decrease in Mejhia and Saltora in spite of the mines and mills is all the more appalling. (Para 164, pp. 220-21.)

Year	Index	Year	Index
1925	132	1938	123
1926	122	1939	147
1927	109	1940	175
1928	125	1941	151
1929	152	1942	142
1930	131	1943	60
1931	124	1944	84
1932	123	1945	148
1933	133	1946	170
1934	126	1947	125
1935	148	1948	129
1936	139	1949	131
1937	139	1950	140

(b)

Quinquennial Indices

Year	Index
1901-05	116.0
1906-10	117.4
1911-15	106.8
1916-20	83.8
1921-25	114.0
1926-30	127.4
1931-35	130.8
1936-40	144.6
1941-45	117.0
1946-50	139.0

(c)

Decennial Indices

Year	Index
1901-10	116.7
1911-20	95.3
1921-30	120.7
1931-40	137.4
1941-50	128.0

During 1901-11 there were only three healthy years 1903, 1904 and 1908-10. Epidemics were persistent and wide-spread; cholera raged in 1901, 1902, 1906, and 1907, and there was a virulent epidemic of small-pox in 1902. Fever, the most important element in the life of the district was rife in the water-logged areas, and the outturn of the crops was poor for several years. The volume both of emigration and immigration increased owing to the extension of the railway. The increase of population was small along the sea coast and the estuary of the river Hooghly. During 1911-21 the influenza epidemic caused great mortality and malaria took its usual toll. It is sad to reflect that

MIDNAPUR DISTRICT

(a)

Annual Indices

Year	Index	Year	Index
1901	96	1913	91
1902	75	1914	117
1903	168	1915	100
1904	142	1916	101
1905	99	1917	108
1906	87	1918	73
1907	92	1919	60
1908	106	1920	77
1909	156	1921	86
1910	146	1922	119
1911	132	1923	123
1912	94	1924	110

VITAL INDEX

the district as a whole and every police station except Khedgree, Ramnagar, Mahisadal, Nandigram, Sutahata on the sea-coast, and Jhargram and Jambani on the Bihar border suffered from a decrease in population. The outstanding event of 1921-31 was the expansion of the Khargpur railway settlement and an increase in the number of employees in the railway workshops, and an influx of unemployed relatives of employees from other parts of India. The next decade 1931-41 was comparatively uneventful except for the civil disobedience movement in 1931-33, drought in 1933-34 and scarcity in 1939-40. The events of 1941-51 have been described in detail in the Introduction and the district suffered heavily between 1942 and 1945, causing depopulation in a number of police station: Dantan and Mohanpur in Sadar subdivision; Contai, Pataspur, Ramnagar and Egra in Contai; and Nandigram in Tamluk subdivision. This indicates that the coastal areas have not yet been able to recover from the combined effects of the Cyclone of October 1942 and the famine and epidemics of 1943-44.

The district presents a less dismal aspect than the three other districts considered so far inasmuch as between 1872-1921 it showed a small increase of 4.8 per cent. on the 1872 population; an increase of 26 per cent. on the 1921 population in 30 years, 1921-51; and an increase of 20.4 per cent. in 50 years, 1901-51. Areas congenial to steady and continuous growth have been the Contai and Tamluk subdivisions which are well-drained and irrigated and contain soil of great fertility and Jhargram subdivision which is rocky, on a high level, well sloped and drained. The areas of decay and bad growth have been the heavily embanked, water-logged, and ill-drained central portion of the district and Ghatal subdivision. Although they contain some excellent fertile soil disease and malaria take heavy tolls. The areas susceptible to decrease of population consist of police stations in two blocks. viz., (1) an upland block to

the north consisting of the Garhbeta Salbani and Keshpur police stations, all lying to the north of the Kasai; and (2) an alluvial block to the south-east consisting of Midnapur, which lies mainly to the south of the Kasai, and Debra Sabang and Pingla, which are entirely to the south of that river. In the former of these areas cholera and fever have been prevalent and the harvests poor: the latter block is a low-lying depression mostly under canal irrigation where the country is fertile, but swampy and malarious. (Paras 173-74 pp. 224-25.)

HOOGHLY DISTRICT

(a)

Annual Indices

Year	Index	Year	Index
1901	80	1926	102
1902	74	1927	92
1903	77	1928	99
1904	106	1929	113
1905	90	1930	113
1906	89	1931	122
1907	80	1932	115
1908	85	1933	122
1909	113	1934	119
1910	121	1935	155
1911	110	1936	143
1912	90	1937	152
1913	79	1938	104
1914	87	1939	124
1915	88	1940	182
1916	99	1941	164
1917	107	1942	172
1918	54	1943	120
1919	60	1944	98
1920	77	1945	111
1921	79	1946	158
1922	97	1947	131
1923	112	1948	119
1924	99	1949	135
1925	104	1950	136

(b)

Quinquennial Indices

Year	Index
1901-05	85.4
1906-10	97.6
1911-15	90.8
1916-20	79.4
1921-25	98.2
1926-30	103.8
1931-35	126.6
1936-40	141.0
1941-45	133.0
1946-50	135.8

VITAL INDEX

(c)

Decennial Indices

Year	Index
1901-10	91.5
1911-20	85.1
1921-30	101.0
1931-40	133.8
1941-50	134.4

During 1901-1911 the district gained more by the influx of immigrants than by natural growth. The birth-rate exceeded the death-rate only in 1904, 1909 and 1910. Fever was rife during the decade. During 1911-21 malarial fever removed large populations in 1912 and 1913, and the influenza epidemic wrought a similar havoc in 1917-19. Every police station except Chinsurah, Polba and Magra, and the industrial areas of Serampur, Bhadreswar and Uttarpara lost heavily during the decade. But the Howrah-Burdwan Chord line in 1917 opened up the central, malarious police stations of Chanditala, Singur, Tarakeswar and Dhaniakhali, and earlier, the Bandel-Nabadwip line in 1912 opened up another malarious area, Balagarh. During 1921-31 improved public health measures in Pandua, Balagarh, Chinsurah and Magra resulted in an increase in population. In Magra and Pandua an increase in the number of rice mills led to immigration of Santals, Bauris, and other aboriginals who also brought waste land under cultivation. Uttarpara saw a large increase in the number of its brickfields and rose in favour as a residential suburb of Calcutta owing to the construction of the Willingdon Bridge across the Hooghly and the Howrah-Burdwan Chord line. Pursura and Khanakul, being in the spill area of the Damodar river, were comparatively free from epidemic or endemic diseases, and in some places the fertility of the soil increased. During 1931-41 there was no event of outstanding importance likely to affect the growth of population. The outbreak of World War II in 1939 made the mill wheels hum again full steam. During 1941-51

the district was not in the direct famine zone but suffered from epidemics in 1944. (Para-180, pp. 228-29.)

HOWRAH DISTRICT

(a)

Annual Indices

Year	Index	Year	Index
1901	97	1926	92
1902	90	1927	84
1903	90	1928	107
1904	120	1929	123
1905	130	1930	112
1906	100	1931	139
1907	98	1932	139
1908	113	1933	138
1909	128	1934	136
1910	143	1935	146
1911	135	1936	131
1912	117	1937	155
1913	100	1938	116
1914	107	1939	149
1915	106	1940	171
1916	137	1941	143
1917	123	1942	138
1918	90	1943	74
1919	80	1944	70
1920	85	1945	92
1921	92	1946	109
1922	103	1947	88
1923	132	1948	84
1924	113	1949	98
1925	113	1950	102

(b)

Quinquennial Indices

Year	Index
1901-05	105.4
1906-10	116.4
1911-15	113.0
1916-20	103.0
1921-25	110.6
1926-30	103.6
1931-35	139.6
1936-40	144.4
1941-45	103.4
1946-50	96.2

(c)

Decennial Indices

Year	Index
1901-10	110.9
1911-20	108.0
1921-30	107.1
1931-40	142.0
1941-50	99.8

VITAL INDEX

During 1901-11 agricultural conditions were on the whole favourable. The special industrial census carried out in this decade showed that no other district in the Burdwan Division was so little dependent on the outturn of its crops. One-seventh of the total male population was at work in manufacturing or industrial concerns employing 20 persons or more. It was during this decade that the tramway from Calcutta was extended into Howrah. During 1911-21 the influenza epidemic did not affect the district to the point of forcing a decrease in population, but in 1921-31 three police stations suffered decrease, as already noted, ascribed to the closing down of mills and factories and the retrenchment of staff. During 1931-41 there was no event of special note but 1941-51 was marked by the famine and epidemics of 1943-44 and the communal riots of 1950. (Para 186, p. 231.)

24-PARGANAS DISTRICT

(a)

Annual Indices			
Year	Index	Year	Index
1901	120	1926	98
1902	106	1927	90
1903	103	1928	114
1904	119	1929	141
1905	114	1930	136
1906	103	1931	152
1907	96	1932	141
1908	119	1933	158
1909	163	1934	148
1910	144	1935	154
1911	133	1936	126
1912	105	1937	136
1913	105	1938	121
1914	118	1939	180
1915	93	1940	183
1916	165	1941	153
1917	147	1942	165
1918	95	1943	73
1919	67	1944	61
1920	70	1945	111
1921	73	1946	154
1922	101	1947	131
1923	108	1948	126
1924	92	1949	135
1925	109	1950	144

(b)

Quinquennial Indices

Year	Index
1901-05	112.4
1906-10	126.0
1911-15	110.8
1916-20	108.8
1921-25	96.6
1926-30	115.8
1931-35	150.6
1936-40	149.2
1941-45	112.6
1946-50	138.0

(c)

Decennial Indices

Year	Index
1901-10	119.2
1911-20	109.8
1921-30	106.2
1931-40	149.9
1941-50	125.3

During 1901-11 the most important event was the Magrahat drainage scheme, which was designed for the drainage of a marshy tract extending over 290 square miles, where, thanks to the embankments, the inhabitants had been inured to a semi-amphibious life by a long course of preparation resulting in the survival of the fittest. The drainage scheme at once improved the productivity of the soil and the growth of population. The construction of a sluice in the neighbourhood of Diamond Harbour completed in 1909 had remarkable consequences: 100 square miles of swampy waste land was reclaimed and covered with rice cultivation. Nothing of note happened in 1911-21 except the influenza epidemic. The decades 1921-41 were uneventful but the cyclone of 1942, the famine and epidemics of 1943-44, and the cyclone of 1950 took heavy tolls of human lives. (Para 201, p. 235.)

VITAL INDEX

CALCUTTA DISTRICT

NADIA DISTRICT

(a)

(a)

Annual Indices

Annual Indices

Year	Index	Year	Index
1901	28	1926	49
1902	39	1927	48
1903	44	1928	65
1904	56	1929	99
1905	49	1930	74
1906	50	1931	87
1907	51	1932	83
1908	62	1933	74
1909	67	1934	75
1910	72	1935	74
1911	80	1936	82
1912	77	1937	80
1913	70	1938	79
1914	68	1939	86
1915	65	1940	94
1916	85	1941	81
1917	88	1942	81
1918	58	1943	38
1919	44	1944	41
1920	43	1945	66
1921	56	1946	93
1922	66	1947	81
1923	70	1948	88
1924	62	1949	138
1925	59	1950	93

Year	Index	Year	Index
1901	128	1926	89
1902	79	1927	110
1903	83	1928	113
1904	110	1929	98
1905	80	1930	83
1906	81	1931	107
1907	85	1932	106
1908	100	1933	116
1909	171	1934	122
1910	142	1935	156
1911	110	1936	179
1912	105	1937	146
1913	101	1938	110
1914	73	1939	152
1915	72	1940	162
1916	99	1941	139
1917	118	1942	159
1918	58	1943	60
1919	60	1944	62
1920	91	1945	101
1921	75	1946	104
1922	114	1947	106
1923	131	1948	114
1924	116	1949	108
1925	116	1950	104

(b)

(b)

Quinquennial Indices

Quinquennial Indices

Year	Index
1901-05	43.2
1906-10	60.4
1911-15	72.0
1916-20	63.6
1921-25	62.6
1926-30	67.0
1931-35	78.6
1936-40	84.2
1941-45	61.4
1946-50	99.8

Year	Index
1901-05	96.0
1906-10	115.8
1911-15	92.2
1916-20	85.2
1921-25	110.4
1926-30	98.6
1931-35	121.4
1936-40	149.8
1941-45	104.2
1946-50	107.2

(c)

(c)

Decennial Indices

Decennial Indices

Year	Index
1901-10	51.8
1911-20	67.8
1921-30	64.8
1931-40	81.4
1941-50	80.6

Year	Index
1901-10	105.9
1911-20	88.7
1921-30	104.5
1931-40	135.6
1941-50	105.7

VITAL INDEX

Conditions between 1901 and 1911 were very unfavourable, the only healthy years being 1904, 1909, and 1910. Not only was fever generally prevalent, but there were constant epidemics of cholera from 1902 to 1908, the death rate from cholera in those seven years averaging over 4 per mille and as high as 7 per mille in 1907. There was, moreover, scarcity in 1908, when conditions approached a famine, though it was not found necessary to declare famine under the Famine Code. The rainfall of 1905, though in excess of the normal, was badly distributed. Next year it was below the average and was again unequally distributed, while in 1907 it was still more deficient, there being an almost complete failure of the monsoon in September and October. The distress which ensued in 1908 affected the north-east of the district. This decade, however, saw the opening of the Ranaghat-Murshidabad line in 1905, while the Santipur-Krishnagar Light railway had opened in 1899. The influenza epidemic was responsible for great loss of life in 1918-19. There was a flood in 1912. During 1921-31, a filtered water supply was installed in Krishnagar which improved the health of the town and attracted middle class residents from rural areas to settle there particularly for the education of their children. Nabadwip grew in importance as a sacred place of the Hindus, whilst the village of Mayapur on the east of the Bhagirathi developed into a large settlement. The Churni Bridge to Santipur railway opened in 1925 and the Krishnagar-Nabadwipdham Light railway opened in 1926. There was acute scarcity in 1927. The period 1931-41 saw short periods of scarcity and distress in 1940. In 1935 there was a heavy flood followed by continued drought and distress. In 1938 there was a flood of moderate intensity and in 1939 a devastating flood which caused extensive damage. During 1941-51 the cyclone of 1942 caused modest damage, but the famine and epidemic of 1943-44 took a heavy toll; the Partition of the

district came in 1947 and quite a large scale virtual exchange of population took place between 1948 and 1951. There was a period of severe distress in 1951 caused by failure of crops. The last ten years have therefore been responsible for large changes in the district. (Para 249, p. 252.)

MURSHIDABAD DISTRICT

(a)

<i>Annual Indices</i>			
Year	Index	Year	Index
1901	123	1926	111
1902	113	1927	81
1903	114	1928	144
1904	113	1929	155
1905	95	1930	121
1906	102	1931	135
1907	91	1932	153
1908	113	1933	150
1909	170	1934	117
1910	143	1935	180
1911	125	1936	152
1912	117	1937	168
1913	109	1938	139
1914	80	1939	92
1915	72	1940	188
1916	112	1941	181
1917	128	1942	165
1918	63	1943	56
1919	61	1944	51
1920	93	1945	91
1921	100	1946	102
1922	131	1947	103
1923	157	1948	147
1924	154	1949	153
1925	153	1950	146

(b)

Quinquennial Indices

Year	Index
1901-05	111.6
1906-10	123.8
1911-15	100.6
1916-20	91.4
1921-25	139.0
1926-30	122.4
1931-35	147.0
1936-40	167.8
1941-45	108.8
1946-50	130.2

VITAL INDEX

(c)

Decennial Indices	
Year	Index
1901-10	117.7
1911-20	96.0
1921-30	130.7
1931-40	157.4
1941-50	118.5

The decade 1901-1911 was one of chequered prosperity. In 1904 there were several floods by which a considerable area was submerged. Next year there was an epidemic of cholera, which caused over 8,000 deaths, and this was followed by an epidemic of small-pox in 1907. In that year too the Lalitakuri embankment in the Lalbagh subdivision gave way, and there was a partial failure of the winter crop. Taking the average of the whole decade, however, crops were almost normal, and a demand for labour was created by the construction of three new railway lines, viz., the Ranaghat-Murshidabad-Krishnapur branch of the Eastern Bengal State Railway in 1905, and the Barharwa-Azimganj-Katwa line (opened in 1913). The effect of these lines being opened was apparent in an increasing exodus of labourers during the cold weather. The feverish police stations east of the Bhagirathi suffered from decreases in population. During 1911-21 the district suffered heavily from the depopulation caused by the influenza epidemic and the increase in 1921-31 was very largely due to the ordinary recuperation generally noticed when a calamity has reduced the population. Specific explanations are available only in Domkal and Jalangi police stations which owed their increase to a healthy climate and the settlement of immigrants in Jalangi police station as a result of erosion in the river Padma elsewhere. In Bel-danga the increase was partly due to immigration of labourers on the railway and in the brickfields. During 1931-41 the health situation steadily improved. In 1941-51 the famine and epidemics of 1943-44 did not inflict much damage. The partition in 1947

did not entail any loss in territory but the district experienced heavy immigration of Displaced persons and a small exodus of Muslims. (Para 257, pp. 255-56.)

MALDA DISTRICT

(c)

Annual Indices

Year	Index	Year	Index
Not available		1926	103
Not available		1927	90
Not available		1928	121
Not available		1929	114
1905	110	1930	85
Not available		1931	102
Not available		1932	138
1908	144	1933	137
1909	176	1934	113
1910	158	1935	169
1911	108	1936	172
1912	84	1937	178
1913	111	1938	132
1914	95	1939	149
1915	83	1940	150
1916	116	1941	145
1917	137	1942	189
1918	79	1943	88
1919	79	1944	58
1920	106	1945	92
1921	144	1946	103
1922	138	1947	121
1923	137	1948	168
1924	128	1949	167
1925	140	1950	145

(b)

Quinquennial Indices

Year	Index
1905, 1908, 1909, 1910	(approximate) 147.0
1911-15	96.4
1916-20	103.4
1921-25	137.4
1926-30	102.6
1931-35	131.8
1936-40	156.2
1941-45	114.4
1946-50	140.8

(c)

Decennial Indices

Year	Index
1905, 1918, 1909, 1910	(approximate) 147.0
1911-20	99.9
1921-30	120.0
1931-40	144.0
1941-50	127.6

VITAL INDEX

During 1901-11 the district made steady progress. The crops were good except in 1908-09, when short rainfall led to a failure of the winter rice crop—the principal crop in the Barind area—and some distress was experienced which was remedied by the issue of loans and the opening of relief works. In the rest of the district, however, good *bhadoi* and *rabi* crops were obtained and, owing to the high prices of food grains, the condition of the people was, if anything, more prosperous than in other years. The scarcity had no deterrent effect on the growth of population. The most important feature in the economic history of the decade was the opening of the Katihar-Godagari railway in 1909, which traversed the district from north-west to south-east. The railway did much to develop the district. At every railway station a bazar sprang up, and the cultivator profited largely by the competition of traders, in jute, rice and other country produce. Growers of the mango fruit were now able to reach markets at a greater distance and command better prices. Another result was to facilitate immigration into the thinly populated areas in the east of the district. Immigrants consisted chiefly of Santals, who reclaimed waste lands in the Barind, and Shershabadia Muslims who cultivated the new alluvial formations in the *diara* tract, besides Bihari settlers who came into the northern police stations of the district and settled in Harischandrapur, Ratua and Manickchak. During 1911-21 the district suffered from a serious setback after the rapid advance in the decade before. The cause was mainly malaria which was all over the district, but particularly so round the headquarters station where, on more than one occasion, it assumed epidemic form. During 1921-31 the silk industry declined and with it the rate of increase in Kaliachak. The decline of the lac industry in Ratua and Manickchak caused a decline in the growth of popu-

lation which was concealed by the Ganges moving over to Santal Parganas and throwing up *chars* on the Malda side which attracted immigrants from Murshidabad. The whole of the Barind area suffered from decreasing fertility and severe scarcity in 1925-26 and resisted immigration of Santals. There was a large growth of mango gardens which increasingly replaced lac and mulberry fields. During 1931-41 there was a bad flood in 1938, which was the only event of importance. During 1941-51 the district suffered more from epidemics in 1944 than from the famine in 1943; the partition brought about some voluntary migration in either direction; there was a bad flood in 1948, and in 1950-51 there was a big spate of immigration of Displaced persons from East Bengal. (Para 261, pp. 257-58.)

WEST DINAJPUR DISTRICT

(a)

Annual Indices

Year	Index	Year	Index
1901 . . .	116	1926 . . .	95
1902 . . .	119	1927 . . .	112
1903 . . .	100	1928 . . .	104
1904 . . .	107	1929 . . .	99
1905 . . .	112	1930 . . .	97
Not available		1931 . . .	119
Not available		1932 . . .	117
1908 . . .	108	1933 . . .	112
1909 . . .	118	1934 . . .	110
1910 . . .	112	1935 . . .	116
1911 . . .	94	1936 . . .	116
1912 . . .	108	1937 . . .	94
1913 . . .	120	1938 . . .	110
1914 . . .	114	1939 . . .	133
1915 . . .	107	1940 . . .	146
1916 . . .	103	1941 . . .	133
1917 . . .	112	1942 . . .	138
1918 . . .	90	1943 . . .	117
1919 . . .	72	1944 . . .	74
1920 . . .	91	1945 . . .	84
1921 . . .	104	1946 . . .	108
1922 . . .	101	1947 . . .	94
1923 . . .	100	1948 . . .	112
1924 . . .	114	1949 . . .	133
1925 . . .	115	1950 . . .	96

VITAL INDEX

(b)

Quinquennial Indices

Year	Index
1901-05	110.8
1908-10	112.7
1911-15	108.6
1916-20	93.6
1921-25	106.8
1926-30	101.4
1931-35	114.8
1936-40	119.8
1941-45	109.2
1946-50	108.6

(c)

Decennial Indices

Year	Index
1901-10	111.7 (approximate)
1911-20	101.1
1921-30	104.1
1931-40	117.3
1941-50	108.9

During 1901-11 conditions were generally favourable. There was some scarcity during 1908 and 1909 in Raiganj. All distress disappeared with the bumper crops next year, and it does not seem to have affected the growth of population. During 1911-21 the district suffered heavily from the influenza epidemic. The population contains a large proportion of tribes and these as elsewhere seem to have suffered more severely than other races. During 1921-31 the immigration of Santals, Sher-shabadia Muslims and other colonists account for the increase in Kumarganj, Gangarampur, Bansihari, Kaliaganj, Hemtabad and Itahar. General health also improved. During 1931-41 Hili gained importance as a centre of rice and paddy while other areas steadily gained in population. During 1941-51 the district suffered both from the famine of 1943 and epidemics of 1944. It acquired its present size and importance in the partition of 1947. Between 1947 and 1951 there was some emigration of Muslims to East Bengal. According to West Bengal Government the number of emigrating Muslims amounted to 14,000 of whom 12,375 later returned. The influx of Displaced

persons from East Bengal amounted to 115,510, quite the largest for any district barring 24 Parganas, Calcutta and Nadia. (Para 266, p. 260.)

JALPAIGURI DISTRICT

(a)

Annual Indices

Year	Index	Year	Index
1901	105	1926	95
1902	109	1927	125
1903	95	1928	120
1904	101	1929	125
1905	108	1930	121
Not available		1931	133
Not available		1932	129
1908	97	1933	123
1909	93	1934	118
1910	103	1935	130
1911	94	1936	121
1912	97	1937	120
1913	104	1938	127
1914	106	1939	118
1915	108	1940	127
1916	99	1941	127
1917	108	1942	119
1918	67	1943	74
1919	76	1944	59
1920	116	1945	76
1921	100	1946	107
1922	112	1947	130
1923	117	1948	148
1924	102	1949	148
1925	112	1950	134

(b)

Quinquennial Indices

Year	Index
1901-05	103.6
1908-10	97.7
1911-15	101.8
1916-20	93.2
1921-25	108.6
1926-30	117.2
1931-35	126.6
1936-40	122.6
1941-45	91.0
1946-50	133.2

(c)

Decennial Indices

Year	Index
1901-10	100.7 (approximate)
1911-20	97.5
1921-30	112.9
1931-40	124.6
1941-50	112.1

VITAL INDEX

During 1901-11 the central police stations filled up rapidly, and cultivation extended in Alipur Duars in every direction. There was a constant stream of immigration attracted by the fertility of the land and the lowness of the rents. The Dam Dim Odlabari-Bagrakot railway line opened in 1901-2 and the Mal-Chalsa-Chengmari-Dalgaon-Madarihat line in 1901-3. Between 1911 and 1921 the Chalsa-Matiali line was opened in 1918 and almost all that was not taken up for tea or remained reserved forest was brought under cultivation. But the increase during 1911-21 was very much less than in the 20 years before. The reason was that the tea industry ever since 1898 did not flourish as it had done earlier. The birth rate ran comparatively high but the district being very malarious, the death rate was also very high and would be higher still but for the careful attention given by tea garden managers to the health of their labour. During 1921-31 the agricultural population suffered from distress caused by the very low price of tobacco. New tea gardens were opened in Sadar, Kumargram, Madarihat and Kalchini police stations. Public health measures greatly improved during the decade. During 1931-41 Alipur Duars subdivision saw steady immigration and in 1931-33 several miles of railway line were extended from Domohoni to Barnesghat and elsewhere. The fall in agricultural prices hit the population towards the end of the decade but with the opening of the Far Eastern Front in 1942 Jalpaiguri and especially Alipur Duars subdivision sprang into sudden importance. A number of large air strips were built all over the Duars and Alipur Duars subdivision and the towns were practically rid of malaria by army efforts. The roads were improved and the tea industry prospered as never before. In the 1943 famine although the district of Jalpaiguri itself remained unaffected, it attracted distressed persons from Rangpur. There was a

devastating flood in the Tista in June 1950 which completely submerged 56 mauzas in Maynaguri and Mal police stations and 3 wards of Jalpaiguri municipality. An area of about 30 square miles was affected on either bank of the river and although the loss of human lives was small, 4,135 families with a population of 17,779 were affected, 3,163 head of cattle were lost and 25,460 maunds of food grains were destroyed. Standing jute and paddy over about 1,154 acres were lost and 1,171 houses damaged. Large settlements of Displaced persons were made in Rajganj and Jalpaiguri; the most important being Phatapokhori midway on the road between Siliguri and Jalpaiguri. The district has seen a great deal of activity since 1947 on account of the new Assam Rail Link Project, the development of Alipur Duar town as a large railway centre, and several road building projects connecting Assam and the Duars. (Para 271, pp. 262-63.)

DADJEELING DISTRICT

(a)

Annual Indices

Year	Index	Year	Index
1901	93	1926	112
1902	95	1927	116
1903	82	1928	116
1904	92	1929	115
1905	98	1930	113
1906	76	1931	131
1907	83	1932	118
1908	86	1933	132
1909	92	1934	116
1910	96	1935	123
1911	93	1936	120
1912	93	1937	113
1913	84	1938	117
1914	89	1939	111
1915	94	1940	115
1916	79	1941	107
1917	91	1942	106
1918	63	1943	86
1919	62	1944	66
1920	69	1945	93
1921	69	1946	116
1922	83	1947	134
1923	102	1948	130
1924	94	1949	140
1925	104	1950	129

VITAL INDEX

(b)

Quinquennial Indices

Year	Index
1901-05	92.0
1906-10	86.6
1911-15	90.6
1916-20	72.8
1921-25	90.4
1926-30	114.4
1931-35	124.0
1936-40	115.2
1941-45	91.6
1946-50	129.8

(c)

Decennial Index

Year	Index
1901-10	89.3
1911-20	81.7
1921-30	102.4
1931-40	119.6
1941-50	110.7

The net result in 1901-11 was a progressive decrease in the rate of increase and a shrinkage of the volume of immigration. During 1911-21 the influenza epidemic caused great mortality in the hills and hung about longer than in the plains, probably because the greater distance and the less frequent intercourse between one collection of homesteads and the next caused infection to spread less rapidly. There were also local epidemics of relapsing fever. The *terai* and Kalimpong were opened up by the Siliguri-Kissenganj and the Siliguri-Giellekhola railways in 1914-15. During 1921-31 there was less immigra-

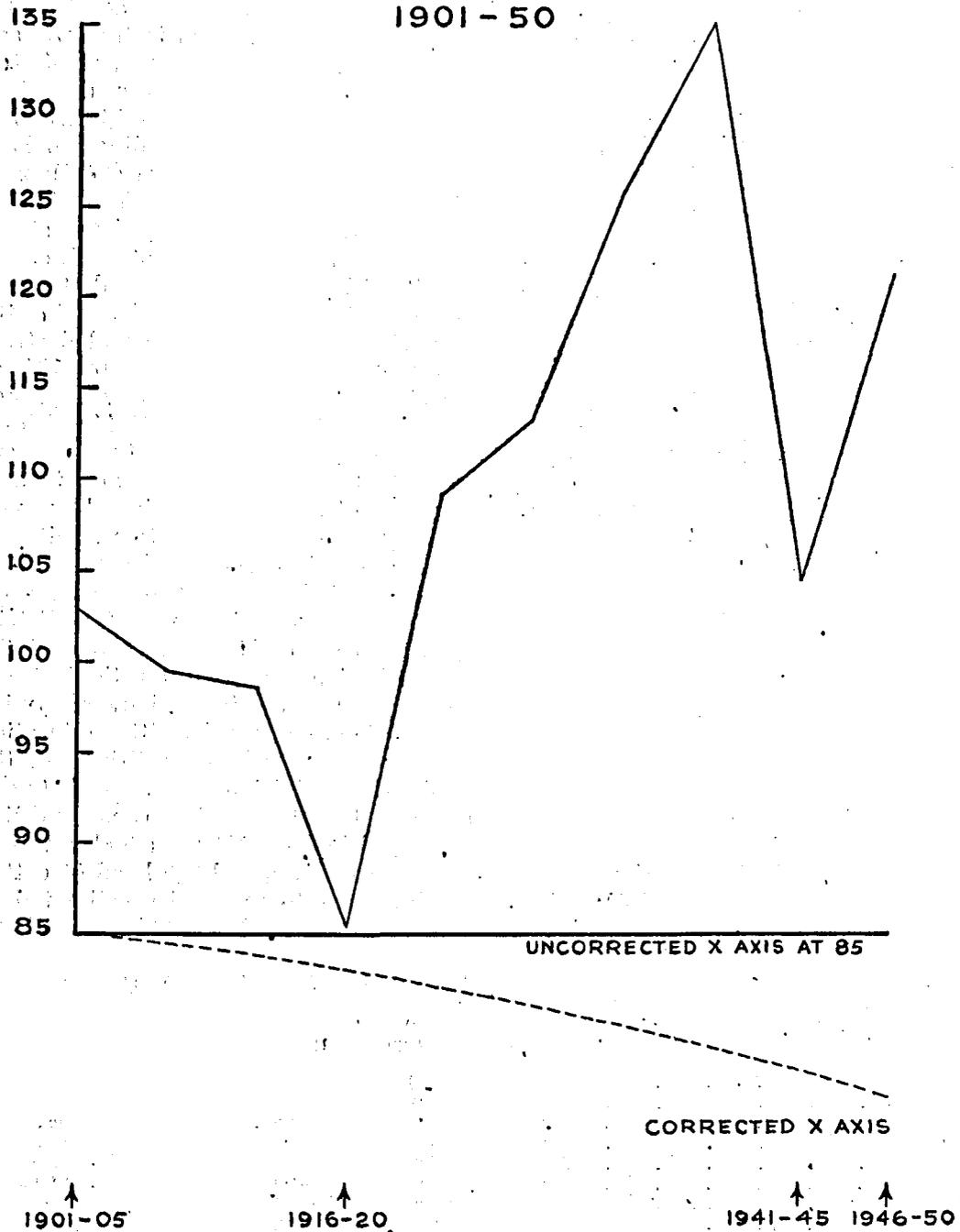
tion from Nepal. Siliguri police station improved as a consequence of the extension of the broad-gauge railway to the town. There was considerable immigration from Bihar in the *terai* and Kurseong improved because of tea. During 1931-41 there was a severe earth-quake in January 1934 when a large number of old buildings in Darjeeling town and Tindharia collapsed. In 1935 there was heavy flood in the Mechi river which destroyed the standing crop over 2,664 acres of land, covered it with sand and rendered the area useless for cultivation. In 1937 the Mechi changed its course and destroyed 216 acres of forest. In 1941-51 Darjeeling did not suffer very much from the famine of 1943-44. World War II brought prosperity in every way to tea, to agriculture and to contractors of military supplies. The war also gave a great fillip to recruitment in the armed services, and the first half of the last decade was the most prosperous quinquennium that the district has even seen. It was also one of the first districts where full rationing was introduced early in 1944 over a wide area. There was very little migration in the hills after the partition but the Siliguri subdivision saw some between 1949 and 1951. A disastrous landslide occurred in June 1950. It took a toll of 102 human lives and 285 head of cattle, besides loss to properties estimated at Rs. 1.1 million. Para. 282, pp. 267-68.)

II Decennial Vital Index for West Bengal and Districts 1901-1950

	(I) 1901-10	(II) 1911-20	(III) 1921-30	(IV) 1931-40	(V) 1941-50
West Bengal	101.3	92.1	111.2	130.7	113.2
1 Bardwan	99.6	84.1	112.5	126.9	115.3
2 Bhirbhum	115.5	87.6	136.5	126.0	102.3
3 Bankura	119.4	96.1	131.9	143.5	120.5
4 Midnapur	116.7	95.3	120.7	137.4	128.0
5 Hooghly	91.5	85.1	101.0	133.8	134.4
6 Howrah	110.9	108.0	107.1	142.0	99.8
7 24 Parganas	119.2	109.8	106.2	149.9	125.3
8 Calcutta	51.8	67.8	64.8	81.4	80.6
9 Nadia	105.9	88.7	104.5	135.6	105.7
10 Murshidabad	117.7	96.0	130.7	157.4	118.5
11 Malda	147.0	99.9	120.0	144.0	127.6
12 West Dinajpur	111.7	101.1	104.1	117.3	108.9
13 Jalpaiguri	100.7	97.5	112.9	124.6	112.1
14 Darjeeling	89.8	81.7	102.4	119.6	110.7

VITAL INDEX

CHANGES IN VITAL INDEX BY QUINQUENNIAL PERIODS
WEST BENGAL
1901 - 50



SUBSIDIARY TABLES

SUBSIDIARY TABLE I-1

Area and Population, Actual and Percentage, by Thana Density

[In this table the area figures supplied by the Director of Land Records and Surveys, West Bengal, have been adopted as the Surveyor General of India was unable to supply the area figures for the thanas.]

Division and District	Thana with Density (per square mile)							
	Under 100		100-150		150-200		200-300	
	Area	Population	Area	Population	Area	Population	Area	Population
1	2	3	4	5	6	7	8	9
1.25 Himalayan West Bengal Division	172.5 3.52	16,978 0.84	..	..	..	..	998.5 20.35	236,482 11.65
2.11 West Bengal Plain Division	1,630.0 6.23	2,496 0.01	..	..	..	..	419.5 1.61	109,187 0.48
Chandernagore . . . . .	..	..	..	..	..	..	..	..
Sikkim	2,745.0 100.00	137,725 100.00	..	..	..	..	..	..
West Bengal	1,802.5 6.81	19,474 0.08	..	..	..	..	1,416.0 4.56	345,669 1.89
<i>Burdwan Division</i> . . . . .	..	..	..	..	..	..	195.2 1.38	57,944 0.52
Burdwan . . . . .	..	..	..	..	..	..	..	..
Birbhura . . . . .	..	..	..	..	..	..	..	..
Bankura . . . . .	..	..	..	..	..	..	..	..
Münapur . . . . .	..	..	..	..	..	..	195.2 3.72	57,944 1.73
Hooghly . . . . .	..	..	..	..	..	..	..	..
Howrah . . . . .	..	..	..	..	..	..	..	..
<i>Presidency Division</i>	1,802.5 10.65	19,474 0.14	..	..	..	..	1,220.8 7.21	287,725 2.10
24-Parganas	1,630.0 28.90	2,496 0.05	..	..	..	..	224.3 3.98	51,243 1.11
Calcutta . . . . .	..	..	..	..	..	..	..	..
Nadia . . . . .	..	..	..	..	..	..	..	..
Murshidabad . . . . .	..	..	..	..	..	..	..	..
Malda . . . . .	..	..	..	..	..	..	..	..
West Dinajpur . . . . .	..	..	..	..	..	..	..	..
Jalpaiguri . . . . .	..	..	..	..	..	..	785.1 83.06	185,895 20.88
Darjeeling	172.5 14.38	16,978 8.81	..	..	..	..	211.4 17.62	50,587 11.36
Cooch Behar . . . . .	..	..	..	..	..	..	..	..

SUBSIDIARY TABLE I-1—concl'd.

Area and Population, Actual and Percentage, by Thana Density

Division and District	Thana with Density (per square mile)							
	300—450		450—600		600—750		750 and over	
	Area	Population	Area	Population	Area	Population	Area	Population
	10	11	12	13	14	15	16	17
1.25 Himalayan West Bengal Division	1,956.1 39.95	769,557 37.89	1,049.9 21.44	520,444 25.62	681.3 13.91	424,324 20.89	40.4 0.83	63,171 3.11
2.11 West Bengal Plain Division	3,985.4 15.24	1,559,502 6.63	7,382.0 28.23	3,873,975 16.97	4,815.3 16.50	2,922,972 12.81	8,419.1 32.19	14,361,129 62.90
Chandernagore . . . . .	..	..	..	..	..	..	3.73 100.00	49,909 100.00
Sikkim . . . . .	..	..	..	..	..	..	..	..
West Bengal	5,941.5 19.14	2,329,059 9.39	8,431.9 27.16	4,394,419 17.71	4,996.5 16.09	3,347,296 13.49	8,455.9 27.24	14,374,391 57.94
Burdwan Division	3,149.4 22.31	1,229,172 11.07	4,448.7 31.52	2,348,275 21.15	1,920.3 13.60	1,311,836 11.82	4,403.2 31.19	6,155,303 55.44
Burdwan	291.8 8.57	90,632 4.14	800.6 31.81	467,595 21.33	560.8 20.73	380,213 17.35	1,052.2 33.89	1,253,227 57.18
Birbhum	206.2 11.83	86,918 8.15	584.1 83.51	326,200 30.57	814.8 46.75	550,301 51.58	137.8 7.91	103,470 9.70
Bankura	760.4 28.73	304,501 23.08	1,728.8 65.81	872,908 66.17	..	..	157.7 5.96	141,850 10.75
Midnapur	1,951.0 37.14	747,121 22.24	1,129.9 21.51	594,988 17.71	544.8 10.36	380,990 11.34	1,432.7 27.27	1,578,034 46.98
Hooghly . . . . .	..	..	145.3 12.02	86,639 5.58	..	..	1,063.1 87.98	1,467,681 94.42
Howrah . . . . .	..	..	..	..	0.45 0.08	332 0.02	559.66 99.92	1,611,041 99.98
Presidency Division	2,792.1 16.50	1,099,337 8.02	3,983.2 23.63	2,046,144 14.93	3,076.2 18.17	2,035,460 14.85	4,052.7 23.94	8,219,088 59.96
24-Parganas	245.8 4.36	97,819 2.12	769.4 13.64	389,908 8.46	958.8 17.00	641,212 13.91	1,811.6 32.12	3,426,631 74.35
Calcutta . . . . .	..	..	..	..	..	..	32.32 100.0	2,548,677 100.0
Nadia . . . . .	..	..	776.0 51.42	430,551 37.61	182.4 12.09	116,001 10.13	550.6 36.49	598,372 52.26
Murshidabad . . . . .	..	..	251.7 12.15	184,988 7.87	695.8 33.58	473,211 27.58	1,124.6 54.27	1,107,560 64.55
Malda	285.7 20.52	110,591 11.80	232.9 16.73	111,859 11.93	414.2 29.76	279,241 29.78	459.2 32.99	435,890 46.49
West Dinajpur	304.5 21.98	121,920 16.92	908.3 65.20	458,395 63.61	143.7 10.37	101,471 14.08	34.0 2.45	38,787 5.39
Jalpaiguri	774.8 32.63	309,228 33.81	628.9 26.49	303,956 33.24	185.6 7.82	115,459 12.62	..	..
Darjeeling	541.6 45.14	190,371 42.76	238.8 19.49	124,153 27.88	..	..	40.4 3.37	63,171 14.19
Cooch Behar	639.7 48.37	269,958 40.22	187.2 14.15	92,335 13.70	495.7 37.43	308,865 46.02	..	..

SUBSIDIARY TABLE I-1a

Area and Population, Actual and Percentage, by Thana Density

[In this table the area figured supplied by the Director of Land Records and Surveys, West Bengal, have been adopted as the Surveyor General of India was unable to supply the area figures for the thanas.]

Division and District	Thana with Density (per square mile)									
	Under 100		100-150		150-200		200-300		300-450	
	Area	Population	Area	Population	Area	Population	Area	Population	Area	Population
1	2	3	4	5	6	7	8	9	10	11
1.25 Himalayan West Bengal Division	172.5 3.52	16,978 0.84	..	..	..	..	996.5 20.35	236,482 11.65	1,956.1 39.95	769,557 37.89
2.11 West Bengal Plain Division	1,630.0 6.23	2,496 0.01	..	..	..	..	419.5 1.61	109,187 0.48	3,985.4 15.24	1,559,502 6.83
Chandernagore . . . . .	..	..	..	..	..	..	..	..	..	..
Sikdim	2,745.0 100.00	137,725 100.00	..	..	..	..	..	..	..	..
West Bengal	1,802.5 6.81	19,474 0.08	..	..	..	..	1,416.0 4.58	345,669 1.39	5,941.5 13.14	2,329,059 9.39
Burdwan Division . . . . .	..	..	..	..	..	..	195.2 1.33	57,944 0.52	3,149.4 22.31	1,229,172 11.07
Burdwan . . . . .	..	..	..	..	..	..	..	..	231.8 8.57	90,632 4.14
Birbhum . . . . .	..	..	..	..	..	..	..	..	206.2 11.83	86,918 8.15
Bankura . . . . .	..	..	..	..	..	..	..	..	760.4 28.73	304,501 23.08
Midnapur . . . . .	..	..	..	..	..	..	195.2 3.72	57,944 1.73	1,951.0 37.14	747,121 22.24
Hooghly . . . . .	..	..	..	..	..	..	..	..	..	..
Howrah . . . . .	..	..	..	..	..	..	..	..	..	..
Presidency Division	1,802.5 10.05	19,474 0.14	..	..	..	..	1,229.8 7.21	287,725 2.10	2,792.1 16.50	1,099,837 8.02
24 Parganas	1,680.0 28.90	2,496 0.05	..	..	..	..	224.8 3.98	51,243 1.11	245.8 4.36	97,819 2.12
Calcutta . . . . .	..	..	..	..	..	..	..	..	..	..
Nadia . . . . .	..	..	..	..	..	..	..	..	..	..
Murshidabad . . . . .	..	..	..	..	..	..	..	..	..	..
Malda . . . . .	..	..	..	..	..	..	..	..	285.7 20.52	110,591 11.80
West Dinajpur . . . . .	..	..	..	..	..	..	..	..	304.6 21.98	121,920 16.92
Jalpaiguri . . . . .	..	..	..	..	..	..	785.1 33.06	185,895 20.83	774.8 32.63	309,228 33.81
Darjeeling	172.5 14.88	16,978 3.81	..	..	..	..	211.4 17.62	50,587 11.36	541.6 46.14	190,371 42.76
Cooch Behar . . . . .	..	..	..	..	..	..	..	..	639.7 48.37	269,958 40.22

SUBSIDIARY TABLE I-1a—contd.

Area and Population, Actual and Percentage, by Thana Density

Division and District	Thana with Density (per square mile)									
	450—600		600—750		750—900		900—1,050		1,050—1,200	
	Area	Population	Area	Population	Area	Population	Area	Population	Area	Population
	12	13	14	15	16	17	18	19	20	21
1.25 Himalayan West Bengal Division	1,049.9 21.44	520,444 25.62	681.3 13.91	424,324 20.89	..	..	..	..	..	..
2.11 West Bengal Plain Division	7,382.0 28.23	3,873,975 16.97	4,315.3 16.50	2,922,972 12.81	2,597.4 9.93	2,126,359 9.31	1,676.0 6.41	1,600,424 7.01	1,796.9 6.87	2,032,883 8.90
Chandernagore . . . . .	..	..	..	..	..	..	..	..	..	..
Sikkim . . . . .	..	..	..	..	..	..	..	..	..	..
West Bengal	8,431.9 27.16	4,394,419 17.71	4,996.5 16.09	3,347,296 13.49	2,597.4 8.37	2,126,359 8.57	1,676.0 5.40	1,600,424 6.45	1,796.9 5.79	2,032,883 8.19
<i>Burdwan Division</i>	4,448.7 31.52	2,348,275 21.15	1,920.3 13.60	1,311,836 11.82	1,547.1 10.96	1,270,188 11.44	900.6 6.38	867,298 7.81	655.4 4.64	743,981 6.70
Burdwan	860.6 31.81	467,595 21.33	560.8 20.73	380,213 17.35	294.9 10.90	235,264 10.73	474.7 17.54	451,279 20.59	..	..
Birbhum	584.1 33.51	326,200 30.57	814.8 46.75	550,301 51.58	137.8 7.91	103,470 9.70	..	..	..	..
Bankura	1,728.8 65.31	872,908 66.17	..	..	157.7 5.96	141,850 10.75	..	..	..	..
Midnapur	1,120.9 21.51	594,933 17.71	544.8 10.86	380,990 11.34	435.1 8.28	362,568 10.79	425.9 8.11	416,019 12.38	407.5 7.76	458,184 13.64
Hooghly	145.3 12.02	86,639 5.58	..	..	521.6 43.16	427,036 27.47	..	..	247.9 20.52	285,847 18.39
Howrah . . . . .	..	..	0.45 0.08	332 0.02	..	..	..	..	..	..
<i>Presidency Division</i>	3,983.2 23.53	2,046,144 14.93	3,076.2 18.17	2,035,460 14.85	1,050.3 6.20	856,171 6.24	775.4 4.58	733,126 5.35	1,141.5 6.74	1,288,902 9.40
24-Parganas	769.4 13.64	389,908 8.46	958.8 17.00	641,212 13.91	174.6 3.10	143,212 3.11	467.7 8.29	443,512 9.62	360.9 6.40	438,393 9.51
Calcutta . . . . .	..	..	..	..	..	..	..	..	..	..
Nadia	776.0 51.42	430,551 37.61	182.4 12.09	116,001 10.13	171.1 11.34	151,852 13.26	125.8 3.34	117,495 10.26	213.5 14.15	237,645 20.76
Murshidabad	251.7 12.15	184,988 7.87	695.8 33.58	473,211 27.58	550.9 26.59	445,273 25.95	83.5 4.03	78,247 4.56	326.0 15.73	347,953 20.23
Malda	232.9 16.73	111,858 11.93	414.2 29.76	279,241 29.78	153.7 11.04	115,834 12.35	98.4 7.07	93,872 10.01	207.1 14.88	226,184 24.13
West Dinajpur	903.3 65.20	458,395 63.61	143.7 10.37	101,471 14.08	..	..	..	..	34.0 2.45	38,787 5.39
Jalpalguri	628.9 26.49	303,956 33.24	185.6 7.82	115,459 12.62	..	..	..	..	..	..
Darjeeling	233.8 19.49	124,153 27.88	..	..	..	..	..	..	..	..
Cooch Behar	187.2 14.15	92,335 13.76	495.7 37.48	308,865 46.02	..	..	..	..	..	..

SUBSIDIARY TABLE I-1a—concl.

Area and Population, Actual and Percentage, by Thana Density

Division and District	Thana with Density (per square mile)											
	1,200—1,350		1,350—1,500		1,500—2,000		2,000—2,500		2,500—3,000		3,000 and over	
	Area	Popula- tion	Area	Popula- tion	Area	Population	Area	Population	Area	Population	Area	Population
	22	23	24	25	26	27	28	29	30	31	32	33
1.25 Himalayan West Bengal Division	..	..	..	..	40.4 0.83	63,171 3.11	..	..	..	..	..	..
2.11 West Bengal Plain Division	555.9 2.13	705,586 3.09	220.2 0.84	305,276 1.34	761.7 2.91	1,268,357 5.56	261.7 1.00	562,416 2.46	120.4 0.46	320,373 1.40	428.9 1.64	5,439,455 23.83
Chandernagore	..	..	..	..	..	..	..	..	..	..	3.73 100.00	49,809 100.00
Sikkim	..	..	..	..	..	..	..	..	..	..	..	..
West Bengal	555.9 1.79	705,586 2.84	220.2 0.71	305,276 1.23	802.1 2.68	1,331,528 5.37	261.7 0.84	562,416 2.27	120.43 0.39	320,373 1.29	425.25 1.37	5,389,546 21.73
Burdwan Division	265.6 1.88	328,563 2.96	100.0 0.71	138,195 1.24	443.6 3.14	730,011 6.58	221.5 1.57	471,036 4.24	65.0 0.46	172,088 1.55	204.36 1.45	1,433,943 12.92
Burdwan	162.0 5.99	197,558 9.01	..	..	..	..	57.4 2.12	131,429 6.00	..	..	63.2 2.34	237,697 10.85
Birbhum	..	..	..	..	..	..	..	..	..	..	..	..
Bankura	..	..	..	..	..	..	..	..	..	..	..	..
Midnapur	57.8 1.09	69,639 2.08	..	..	94.0 1.79	142,038 4.23	..	..	..	..	12.9 0.24	129,636 3.86
Hooghly	46.3 3.83	61,366 3.95	..	..	95.7 7.92	154,261 9.92	88.1 7.29	181,020 11.65	..	..	63.5 5.26	358,151 23.04
Howrah	..	..	100.0 17.85	138,195 8.58	253.9 45.33	433,712 26.92	76.0 13.57	158,587 9.84	65.0 11.61	172,088 10.68	64.76 11.56	708,459 43.96
Presidency Division	290.3 1.71	377,023 2.75	120.2 0.71	167,081 1.22	358.5 2.12	601,517 4.39	40.2 0.24	91,380 0.67	55.43 0.33	148,285 1.08	220.89 1.31	3,955,603 28.66
24-Parganas	188.3 3.34	244,390 5.30	100.5 1.73	137,951 3.00	275.6 4.89	464,022 10.07	..	..	55.0 0.97	147,123 3.19	189.00 3.35	1,408,088 30.55
Calcutta	..	..	..	..	..	..	..	..	0.48 1.30	1,162 0.05	31.89 93.70	2,547,515 99.95
Nadia	..	..	..	..	..	..	40.2 2.66	91,380 7.98	..	..	..	..
Murshidabad	102.0 4.92	132,633 7.73	19.7 0.95	29,130 1.70	42.5 2.05	74,324 4.33	..	..	..	..	..	..
Malda	..	..	..	..	..	..	..	..	..	..	..	..
West Dinajpur	..	..	..	..	..	..	..	..	..	..	..	..
Jalpaguri	..	..	..	..	..	..	..	..	..	..	..	..
* Darjeeling	..	..	..	..	40.4 3.37	63,171 14.19	..	..	..	..	..	..
Cooch Behar	..	..	..	..	..	..	..	..	..	..	..	..

SUBSIDIARY TABLE 1·2

Variation and Density of General Population

(In calculating the density for 1941, 1931 and 1921, the adjusted population for those years is taken for calculation with reference to the present area of each district as given by the local authority)

Division and District	Population							
	Percentage	Increase (+)			Density			
		decrease (-)			1951	1941	1931	1921
1	1941-51 2	1931-41 3	1921-31 4	5	6	7	8	
1.25 Himalayan West Bengal Division	+ 9·0	+ 12·9	+ 5·1	415	380	337	320	
2.11 West Bengal Plains Division	+ 14·1	+ 24·8	+ 8·0	873	765	613	568	
Chandernagore	+ 30·4	+ 40·4	+ 7·2	13,380	10,264	7,309	6,816	
Sikkim	+ 13·8	+ 10·7	+ 34·4	50	44	40	30	
West Bengal	+ 13·6	+ 23·6	+ 7·7	789	703	569	528	
Burdwan Division	+ 7·9	+ 19·0	+ 7·4	786	729	613	570	
Burdwan	+ 15·9	+ 20·0	+ 9·8	810	699	562	530	
Birbhum	+ 1·8	+ 10·6	+ 11·8	612	601	544	489	
Bankura	+ 2·3	+ 16·0	+ 9·0	498	487	420	385	
Midnapur	+ 5·8	+ 14·0	+ 5·0	639	607	533	508	
Hooghly	+ 12·8	+ 23·6	+ 8·2	1,286	1,140	922	894	
Howrah	+ 8·1	+ 35·6	+ 10·2	2,877	2,661	1,962	1,781	
Presidency Division	+ 18·7	+ 28·1	+ 8·0	810	682	538	493	
24-Parganas	+ 25·6	+ 27·0	+ 9·6	817	661	512	468	
Calcutta	+ 20·9	+ 84·9	+ 10·6	78,858	65,250	35,399	31,921	
Nadha	+ 36·3	+ 16·4	+ 1·4	759	557	478	472	
Murshidabad	+ 4·6	+ 19·7	+ 12·0	828	792	661	591	
Malda	+ 11·0	+ 17·2	+ 5·0	674	607	518	493	
West Dinajpur	+ 23·5	+ 11·4	+ 6·8	520	421	378	354	
Jalpaiguri	+ 8·1	+ 14·4	+ 6·5	385	356	311	292	
Darjeeling	+ 18·8	+ 17·7	+ 13·0	371	314	266	236	
Cooch Behar	+ 4·7	+ 8·5	- 0·3	507	485	447	448	

SUBSIDIARY TABLE I-3

Mean Decennial Growth Rates during Three Decades

General Population .

EXPLANATION

The instructions given for preparing this Table were as follows :—

Columns 2 to 4—These are arithmetical means of the Census General Population at the beginning and at the end of the decade in each column.

Columns 5 to 7—These are arithmetical means of the General Population of the area under registration at the beginning and at the end of the decade in each column. In West Bengal (excluding Cooch Behar), the General Population of the area under registration is the same as the Census General Population.

Columns 8 to 10—These are the differences between the Census General Population at the end and at the beginning of the decade in each column.

Column 11= $100 \times \text{Col. 8} \div \text{Col. 2}$

Column 12= $100 \times \text{Col. 9} \div \text{Col. 3}$

Column 13= $100 \times \text{Col. 10} \div \text{Col. 4}$

Columns 14 to 16—These are the total number of births in the General Population registered during the decade in each column.

Column 17= $100 \times \text{Col. 14} \div \text{Col. 5}$

Column 18= $100 \times \text{Col. 15} \div \text{Col. 6}$

Column 19= $100 \times \text{Col. 16} \div \text{Col. 7}$

Columns 20 to 22—These are the total number of deaths in the General Population registered during the decade in each column.

Column 23= $100 \times \text{Col. 20} \div \text{Col. 5}$

Column 24= $100 \times \text{Col. 21} \div \text{Col. 6}$

Column 25= $100 \times \text{Col. 22} \div \text{Col. 7}$

Column 26= $\text{Col. 17} - \text{Col. 23}$

Column 27= $\text{Col. 18} - \text{Col. 24}$

Column 28= $\text{Col. 19} - \text{Col. 25}$

Column 29= $\text{Col. 11} - \text{Col. 26}$

Column 30= $\text{Col. 12} - \text{Col. 27}$

Column 31= $\text{Col. 13} - \text{Col. 28}$

SUBSIDIARY TABLE I-3

Mean Decennial Growth Rates during Three Decades

General Population

Division and District	Mean population of decade			Mean population of decade for area under registration of births and deaths			Growth of population during decade		
	1941-50	1931-40	1921-30	1941-50	1931-40	1921-30	1941-50	1931-40	1921-30
1	2	3	4	5	6	7	8	9	10
1.25 Himalayan West Bengal Division	1,946,934	1,756,297	1,609,487	1,290,934	1,140,433	1,017,800	+ 168,043	+ 213,232	+ 8,035
2.11 West Bengal Plain Division	21,420,964	18,026,837	15,448,988	21,376,867	17,994,064	15,422,645	+ 2,816,595	+ 3,971,658	+ 1,184,041
Chandernagore	44,096	32,773	26,342	..	..	..	+ 11,625	+ 11,022	+ 1,839
Sikkim	129,622	115,664	95,764	..	..	..	+ 16,205	+ 11,712	+ 23,087
West Bengal	23,323,802	19,750,361	17,032,132	22,667,802	19,134,497	16,440,444	+ 2,973,013	+ 4,173,868	+ 1,262,590
Burhuan Division	10,694,950	9,467,279	8,348,916	10,694,950	9,467,279	8,348,916	+ 815,161	+ 1,640,180	+ 596,547
Burdwan	2,041,200	1,733,216	1,505,235	2,041,200	1,733,216	1,505,235	+ 300,935	+ 315,033	+ 140,928
Birbhum	1,057,603	997,936	899,640	1,057,603	997,936	899,640	+ 18,572	+ 100,763	+ 95,829
Bankura	1,304,450	1,200,680	1,065,831	1,304,450	1,200,680	1,065,831	+ 29,619	+ 177,919	+ 91,780
Midnapur	3,274,834	2,994,870	2,732,876	3,274,834	2,994,870	2,732,876	+ 168,375	+ 391,554	+ 132,433
Hooghly	1,460,024	1,245,992	1,097,198	1,460,024	1,245,992	1,097,198	+ 176,591	+ 263,474	+ 34,113
Howrah	1,550,838	1,294,586	1,048,135	1,550,838	1,294,586	1,048,135	+ 121,069	+ 391,437	+ 101,464
Presidency Division	12,628,852	10,283,082	8,683,216	11,972,852	9,667,218	8,091,529	+ 2,157,852	+ 2,533,688	+ 666,043
24-Parganas	4,139,400	3,279,092	2,762,702	4,139,400	3,279,092	2,762,702	+ 939,819	+ 780,796	+ 251,984
Calcutta	2,328,784	1,624,876	1,086,280	2,328,784	1,624,876	1,086,280	+ 439,786	+ 968,029	+ 109,165
Nadia	992,614	781,105	716,806	992,614	781,105	716,806	+ 304,621	+ 118,396	+ 10,201
Murshidabad	1,678,144	1,505,604	1,297,429	1,678,144	1,505,604	1,297,429	+ 75,229	+ 209,853	+ 146,406
Malda	890,948	782,378	703,307	890,948	782,378	703,307	+ 93,265	+ 123,875	+ 34,266
West Dinajpur	652,028	553,730	507,206	652,028	553,730	507,206	+ 137,089	+ 59,507	+ 33,543
Jalpalguri	880,120	792,431	716,608	880,120	792,431	716,608	+ 68,836	+ 100,542	+ 45,104
Darjeeling	410,814	348,002	301,192	410,814	348,002	301,192	+ 68,891	+ 56,734	+ 36,887
Cooch Behar	656,000	615,864	591,683	..	..	..	+ 30,316	+ 49,956	- 1,603

SUBSIDIARY TABLE I-3—concl'd.

Mean Decennial Growth Rates during Three Decades

General Population

Division and District	Mean decennial growth rate			Registered births during decade			Mean decennial birth rate (registered)		
	1941-50	1931-40	1921-30	1941-50	1931-40	1921-30	1941-50	1931-40	1921-30
	11	12	13	14	15	16	17	18	19
1.25 Himalayan West Bengal Division	+ 8.6	+12.1	+ 5.0	338,187	366,772	302,963	26.2	32.2	29.8
2.11 West Bengal Plain Division	+13.1	+22.0	+ 7.7	4,309,172	4,889,913	4,411,093	20.2	27.2	28.6
Chandernagore	+26.4	+33.6	+ 7.0	..	..	..	..	..	..
Sikkim	+12.5	+10.1	+29.3	..	..	..	..	..	..
West Bengal	+12.7	+21.1	+ 7.4	4,647,359	5,256,685	4,714,056	20.5	27.5	28.7
Burdwan Division	+ 7.6	+17.3	+ 7.1	2,340,766	2,629,014	2,413,255	21.9	27.8	28.9
Burdwan	+14.7	+18.2	+ 9.4	421,817	448,740	424,043	20.7	25.9	28.2
Birbhum	+ 1.8	+10.1	+10.7	278,579	344,454	320,771	26.3	34.5	36.3
Bankura	+ 2.3	+14.8	+ 8.6	315,624	364,166	351,768	24.2	30.3	33.0
Midnapur	+ 5.1	+13.1	+ 4.8	771,046	836,631	769,983	23.5	27.9	28.2
Hooghly	+12.0	+21.1	+ 3.1	308,863	331,100	274,843	21.1	26.6	25.0
Howrah	+ 7.8	+30.2	+ 9.7	244,837	303,923	265,847	15.8	23.5	25.4
Presidency Division	+17.1	+24.6	+ 7.7	2,306,593	2,627,671	2,300,801	19.3	27.2	28.4
24-Parganas	+22.7	+23.8	+ 9.1	668,187	787,478	640,053	16.1	24.0	23.2
Calcutta	+18.9	+59.6	+10.0	331,119	272,871	195,761	14.2	16.8	18.0
Nadia	+30.7	+15.2	+ 1.4	229,461	277,428	244,325	23.1	35.5	34.1
Murshidabad	+ 4.5	+17.9	+11.3	427,636	540,758	519,421	25.5	35.9	40.0
Malda	+10.5	+15.8	+ 4.9	166,769	222,572	226,611	18.7	28.4	32.2
West Dinajpur	+21.0	+10.7	+ 6.6	145,234	159,792	171,567	22.3	28.9	33.8
Jalpaiguri	+ 7.8	+13.4	+ 6.3	232,362	245,643	208,392	26.4	31.0	29.1
Darjeeling	+16.8	+16.3	+12.2	105,825	121,129	94,571	25.8	34.8	31.4
Cooch Behar	+ 4.6	+ 8.1	- 0.3	..	..	..	..	..	..

Division and District	Registered deaths during decade			Mean decennial death rate (registered)			Decennial rate of natural increase (registered)			Migration-cum-Registration error		
	1941-50	1931-40	1921-30	1941-50	1931-40	1921-30	1941-50	1931-40	1921-30	1941-50	1931-40	1921-30
	20	21	22	23	24	25	26	27	28	29	30	31
1.25 Himalayan West Bengal Division	313,637	299,169	279,330	24.3	26.2	27.4	+1.9	+ 6.0	+ 2.4	+ 6.7	+ 6.1	+ 2.
2.11 West Bengal Plain Division	3,978,584	3,697,819	4,007,906	18.6	20.6	26.0	+1.6	+ 6.6	+ 2.6	+11.5	+15.4	+ 5.1
Chandernagore	..	..	..	..	..	..	..	..	..	..	..	..
Sikkim	..	..	..	..	..	..	..	..	..	..	..	..
West Bengal	4,292,221	3,996,988	4,287,236	18.9	20.9	26.1	+1.6	+ 6.6	+ 2.6	+11.1	+14.5	+ 4.8
Burdwan Division	2,069,259	1,970,937	2,067,548	19.3	20.8	24.8	+2.6	+ 7.0	+ 4.1	+ 5.0	+10.3	+ 3.0
Burdwan	372,196	361,591	381,987	18.2	20.9	25.4	+2.5	+ 5.0	+ 2.8	+12.2	+13.2	+ 6.6
Birbhum	277,684	268,681	243,789	26.3	26.9	27.1	+0.0	+ 7.6	+ 9.2	+ 1.8	+ 2.5	+ 1.5
Bankura	278,651	263,605	272,305	21.4	22.0	25.5	+2.8	+ 8.3	+ 7.5	- 0.5	+ 6.5	+ 1.1
Midnapur	649,963	611,463	644,010	19.8	20.4	23.0	+3.7	+ 7.5	+ 4.6	+ 1.4	+ 5.6	+ 0.2
Hooghly	233,495	250,299	271,392	15.9	20.1	24.7	+5.2	+ 6.5	+ 0.3	+ 6.8	+14.6	+ 2.8
Howrah	257,270	215,348	254,065	10.6	16.6	24.2	-0.8	+ 6.9	+ 1.2	+ 8.6	+23.3	+ 8.5
Presidency Division	2,222,962	2,026,001	2,219,638	18.6	21.0	27.4	+0.7	+ 6.2	+ 1.0	+16.4	+18.4	+ 6.7
24-Parganas	571,877	529,729	614,982	13.8	16.2	22.3	+2.3	+ 7.8	+ 0.9	+20.4	+16.0	+ 8.2
Calcutta	427,269	335,982	322,117	18.3	20.7	29.7	-4.1	- 3.9	- 11.7	+23.0	+63.5	+21.7
Nadia	227,413	208,242	236,860	22.9	26.7	33.0	+0.1	+ 8.8	+ 1.1	+30.5	+ 6.4	+ 0.3
Murshidabad	398,734	367,372	412,404	23.8	23.7	31.8	+1.7	+12.2	+ 8.2	+ 2.8	+ 5.7	+ 3.1
Malda	144,743	157,067	189,064	10.2	20.1	27.0	+2.5	+ 8.3	+ 5.2	+ 8.0	+ 7.5	- 0.3
West Dinajpur	139,289	138,440	164,331	21.4	25.0	32.4	+0.0	+ 3.9	+ 1.4	+20.1	+ 6.8	+ 5.2
Jalpaiguri	215,593	197,552	184,893	24.5	24.9	25.8	+1.9	+ 6.1	+ 3.3	+ 5.9	+ 7.3	+ 3.0
Darjeeling	93,044	101,617	94,437	23.9	29.2	31.4	+1.9	+ 5.6	+ 0.0	+14.9	+10.7	+12.2
Cooch Behar	..	..	..	..	..	..	..	..	..	..	..	..

SUBSIDIARY TABLE 1-4

Immigration

Division and District where enumerated	Born in								
	District of enumeration			Other districts of same natural division			Other parts of the State		
	Persons	Males	Females	Persons	Males	Females	Persons	Males	Females
1	2	3	4	5	6	7	8	9	10
1.25 Himalayan West Bengal Division	1,469,078	770,242	698,836	22,621	12,533	10,088	14,188	7,942	6,246
2.11 West Bengal Plain Division	17,456,187	9,100,389	8,355,798	1,266,890	646,080	620,810	15,748	9,738	6,010
Chandernagore	35,076	20,492	14,584	..	..	..	..	..	..
Sikkim	132,283	68,044	64,239	..	..	..	..	..	..
West Bengal	18,890,189	9,850,139	9,040,050	1,289,511	658,613	630,898	29,936	17,680	12,256
Burdwan Division	9,572,504	5,029,361	4,643,143	594,631	223,976	370,655	3,184	2,009	1,175
Burdwan	1,692,038	885,857	806,181	152,709	70,860	81,849	833	469	364
Birbhum	986,130	508,433	477,697	32,685	8,595	24,040	103	58	45
Bankura	1,288,889	630,603	608,236	49,898	21,639	28,259	172	134	88
Midnapur	3,122,159	1,627,545	1,494,614	112,164	21,185	90,970	780	542	288
Hooghly	1,246,527	676,424	570,103	125,539	46,803	78,736	346	118	223
Howrah	1,286,811	700,490	586,812	121,686	54,834	66,852	950	688	262
Presidency Division	9,317,685	4,820,778	4,496,907	694,880	434,637	260,243	26,752	15,671	11,081
24-Parganas	3,381,337	1,735,000	1,646,337	249,816	168,582	81,234	2,240	1,313	927
Calcutta	846,500	466,303	380,197	304,253	197,167	107,086	8,901	5,740	3,161
Nadia	636,875	326,798	310,077	43,095	18,681	24,414	492	277	215
Murshidabad	1,590,927	804,786	786,141	46,283	21,955	24,328	316	171	145
Malda	839,785	422,807	416,978	15,011	10,305	4,706	277	131	146
West Dinajpur	553,183	294,842	258,341	13,801	5,414	8,387	338	97	241
Jalpalguri	609,349	323,214	286,135	15,377	8,069	7,308	10,970	6,302	4,668
Darjeeling	338,161	174,288	163,873	4,960	3,295	1,665	1,828	993	835
Cooch Behar	521,568	272,740	248,828	2,284	1,169	1,115	1,390	647	743

Division and District where enumerated	Born in											
	Adjacent States			Other parts of India			Beyond India					
	Persons	Males	Females	Persons	Males	Females	Pakistan		Other territories			
11	12	13	14	15	16	Persons	Males	Females	Persons	Males	Females	Persons
1.25 Himalayan West Bengal Division	158,222	101,604	56,618	28,190	19,001	9,189	277,005	153,886	123,119	61,652	36,760	24,892
2.11 West Bengal Plain Division	1,212,397	858,280	354,137	491,924	338,785	152,889	2,347,968	1,293,119	1,054,849	38,447	25,372	13,075
Chandernagore	5,370	2,352	3,018	3,332	2,117	1,215	6,035	3,248	2,787	96	11	85
Sikkim	376	228	148	1,362	1,176	186	41	25	16	3,663	2,737	926
West Bengal	1,365,249	957,512	407,737	516,482	355,619	160,863	2,618,938	1,443,757	1,175,181	100,003	62,121	37,882
Burdwan Division	473,626	283,444	190,182	115,622	70,576	44,946	336,486	185,500	150,986	6,577	4,695	1,862
Burdwan	204,992	125,411	79,581	29,656	17,834	11,822	108,850	58,397	50,453	2,589	1,938	656
Birbhum	30,695	14,556	16,139	2,271	903	1,868	14,887	7,685	7,202	168	181	37
Bankura	18,451	7,817	11,134	1,316	843	478	10,526	5,290	5,236	57	27	30
Midnapur	51,229	28,294	22,935	35,567	20,554	15,013	36,388	19,997	16,391	735	342	308
Hooghly	96,097	56,155	39,942	13,148	6,919	6,229	72,084	37,048	34,986	629	396	233
Howrah	72,162	51,711	20,451	33,564	23,523	10,041	93,801	57,083	36,718	2,399	1,866	538
Presidency Division	891,623	674,668	217,555	400,960	285,043	115,917	2,282,452	1,258,267	1,024,195	93,426	57,426	36,009
24-Parganas	233,800	171,060	62,300	116,541	78,566	37,975	621,227	342,142	279,085	4,788	2,997	1,791
Calcutta	430,320	356,896	78,424	246,751	180,507	66,244	685,672	399,447	286,225	26,280	17,151	9,129
Nadia	18,010	13,207	4,803	4,284	3,830	954	441,874	228,403	213,471	204	240	54
Murshidabad	12,723	7,421	5,302	1,632	1,150	482	63,761	33,895	29,866	117	80	37
Malda	16,770	8,789	7,981	1,522	1,000	522	64,133	33,720	30,413	82	42	40
West Dinajpur	22,218	15,091	7,127	2,040	1,489	551	128,780	66,764	62,016	218	156	57
Jalpalguri	104,193	63,938	40,255	17,905	10,923	6,982	132,358	78,068	59,290	24,386	15,576	8,810
Darjeeling	33,268	19,206	14,062	7,578	5,936	1,042	22,601	14,480	8,121	36,864	20,820	16,044
Cooch Behar	20,761	18,460	2,301	2,707	2,142	565	122,040	60,338	55,708	402	864	38

SUBSIDIARY TABLE I-5

Emigration

State where enumerated	Enumerated in India					
	State			Adjacent States		
	Persons 2	Males 3	Females 4	Persons 5	Males 6	Females 7
WEST BENGAL	20,209	636	16,526	432	9,683	204
States adjacent to West Bengal						
Assam				200	657	97,614
Bihar				23,492	12,108	11,384
Chandernagore				137,421	68,067	69,354
Orissa				5,370	2,352	3,018
Sikkim				33,998	14,859	19,159
Other States beyond West Bengal				376	228	148
Ajmer						
Bilaspur						
Bombay						
Coorg						
Delhi						
Himachal Pradesh						
Hyderabad						
Kutch						
Madhya Bharat						
Madhya Pradesh						
Madras						
Manipur						
Mysore						
PEPSU						
Punjab						
Rajasthan						
Saurashtra						
Travancore-Cochin						
Tripura						
Uttar Pradesh						
Vindhya Pradesh						
CHANDERNAGORE	35,076	20,492	14,584			
States adjacent to Chandernagore						
West Bengal				12,542	5,564	3,978
SIKKIM	132,233	68,644	64,239			
States adjacent to Sikkim						
West Bengal				22,237	15,288	6,999
Other States beyond Sikkim				22,237	15,288	6,999
Bihar						
Bombay						
Hyderabad						
Uttar Pradesh						

State where enumerated	Enumerated in India						Enumerated outside India			* Natural Population		
	Other states			Persons			Males			Females		
	Persons 8	Males 9	Females 10	Persons 11	Males 12	Females 13	Persons 14	Males 15	Females 16			
WEST BENGAL							20,520,752	10,686,425	9,834,327			
States adjacent to West Bengal												
Assam												
Bihar												
Chandernagore												
Orissa												
Sikkim												
Other States beyond West Bengal	110,459	62,379	48,080									
Ajmer	3,047	1,627	1,520									
Bilaspur	3	2	1									
Bombay	13,952	8,818	5,134									
Coorg	5	5										
Delhi	5,075	4,400	1,275									
Himachal Pradesh	26	14	12									
Hyderabad	977	557	420									
Kutch	80	42	38									
Madhya Bharat	1,622	935	687									
Madhya Pradesh	19,522	13,638	5,884									
Madras	3,706	2,020	1,686									
Manipur	62	33	19									
Mysore	1,554	995	559									
PEPSU	625	213	412									
Punjab	3,830	1,723	2,107									
Rajasthan	2,117	1,315	802									
Saurashtra	870	423	447									
Travancore-Cochin	257	173	84									
Tripura	2,977	357	2,620									
Uttar Pradesh	[49,033	[24,916	24,117									
Vindhya Pradesh	529	273	256									
CHANDERNAGORE												
States adjacent to Chandernagore												
West Bengal							47,618	29,058	18,562			
SIKKIM							154,639	83,381	71,258			
States adjacent to Sikkim												
West Bengal												
Other States beyond Sikkim	69	49	20									
Bihar	1	1										
Bombay	1	1										
Hyderabad	10	8	2									
Punjab	48	38	10									
Uttar Pradesh	9	1	8									

* Excludes persons who were born in West Bengal, Chandernagore and Sikkim but remained outside the Union at the time of the Census Count.

SUBSIDIARY TABLE 1.6

Migration between the State and other parts of India

State	Immigration			Emigration			Immigration minus emigration	
	1951	1931	Variation	1951	1931	Variation	1951	1931
	2	3	4	5	6	7	8	9
WEST BENGAL	1,881,731	1,364,728*	+517,003	311,116	155,781*	+155,335	+1,570,615	+1,208,947
CHANDERNAGORE	8,702	..	..	12,542	..	..	-3,840	..
SIKKIM	1,738	2,430	-692	22,356	7,212	+15,144	-20,618	-4,782

* Estimated.

SUBSIDIARY TABLE I.7

Variation in Natural Population

State	1951				1931				Percentage Increase (+) or Decrease (-) in Natural Population
	Recorded Population	Immigrants	Emigrants	* Natural Population (2+4-3)	Recorded Population	Immigrants	Emigrants	Natural Population (6+8-7)	
	2	3	4	5	6	7	8	9	
WEST BENGAL	24,810,308	4,600,672	311,116	20,520,752	17,663,427	1,477,905†	155,781†	16,341,308	+25.6
CHANDERNAGORE	49,909	14,833	12,542	47,618	..	..	..	..	..
SIKKIM	137,725	5,442	22,356	154,639	109,808	15,417	7,212	101,603	+52.2

* Excludes persons who were born in West Bengal, Chandernagore and Sikkim but remained outside the Union at the time of the Census count.

† Estimated.

SUBSIDIARY TABLE 1.8

Livelihood Pattern of General Population

Division and District	Per 10,000 of General Population belonging to Livelihood Classes								General Population
	I	II	III	IV	V	VI	VII	VIII	
	2	3	4	5	6	7	8	9	
1.25 Himalayan West Bengal Division	3,068	2,223	324	42	2,654	538	178	973	2,030,956
2.11 West Bengal Plain Division	3,242	1,108	1,304	62	1,440	970	317	1,557	22,829,261
Chandernagore	12	6	3	51	3,182	2,625	623	3,498	49,909
Sikkim	8,386	756	14	4	82	119	140	499	137,725
West Bengal	3,234	1,201	1,226	60	1,536	932	305	1,506	24,810,308
Burdwan Division	3,353	1,278	1,542	66	1,326	616	243	1,076	11,102,530
Burdwan	3,142	1,475	1,567	78	1,768	591	246	1,133	2,191,667
Birbhum	4,233	1,239	2,607	60	552	308	72	929	1,066,889
Bankura	5,164	1,002	1,947	62	823	365	72	565	1,319,259
Midnapur	5,121	1,641	1,352	62	600	300	182	742	3,359,022
Hooghly	3,198	1,218	1,366	78	1,608	895	232	1,410	1,554,320
Howrah	1,480	564	1,039	57	2,893	1,447	633	1,687	1,611,373
Presidency Division	2,733	1,139	970	56	1,707	1,187	355	1,854	13,707,778
24 Parganas	2,819	1,028	1,437	57	1,883	989	263	1,524	4,609,309
Calcutta	18	1	1	68	2,148	2,067	1,120	3668	2,548,677
Nadia	3,206	949	1,117	72	948	1,000	146	2,562	1,144,924
Murshidabad	4,147	1,063	1,651	54	977	689	93	1,326	1,715,759
Malda	4,217	1,644	1,284	28	946	485	51	1,395	937,580
West Dinajpur	4,796	2,647	1,081	44	279	389	47	767	720,573
Jaipur	2,088	2,613	120	50	3,622	528	194	785	914,538
Darjeeling	2,113	904	178	18	4,039	670	316	1,758	445,260
Cooch Behar	5,087	2,567	698	49	416	480	65	708	671,153

SUBSIDIARY TABLE II-1

Distribution of Population between Villages

Division and District	Population per Village	Number per 1,000 of General Population in Villages	Number per 1,000 Rural Population in villages with a population of :				Total Rural population
			5,000 and over	2,000 to 5,000	500 to 2,000	Under 500	
			4	5	6	7	
1-25 Himalayan West Bengal Division	706	898	99	221	513	167	1,820,150
2-11 West Bengal Plain Division	518	738	47	174	498	281	16,836,895
Chandernagore	..	..	..	..	..	..	..
Sikkim	1,363	980	177	321	435	67	134,981
West Bengal	532	752	51	179	500	270	18,657,045
Burdwan Division	439	555	35	133	488	339	9,494,843
Burdwan	705	852	63	182	558	197	1,867,726
Birbhum	452	935	22	102	508	368	997,896
Bankura	347	928	4	39	459	518	1,224,641
Midnapur	295	925	6	76	430	488	3,106,142
Hooghly	635	778	15	193	552	240	1,209,390
Howrah	1,386	675	138	321	497	44	1,089,053
Presidency Division	632	668	69	231	512	198	9,162,197
24-Parganas	843	704	59	225	575	140	3,243,340
Calcutta	..	..	..	..	..	..	..
Nadia	757	818	96	187	530	187	936,823
Murshidabad	832	921	84	307	457	152	1,580,832
Malda	572	962	40	238	473	249	902,419
West Dinajpur	295	942	..	32	360	608	678,633
Jalpalguri	1,098	928	121	296	513	70	848,393
Darjeeling	580	788	175	155	424	246	350,779
Cooch Behar	518	925	28	155	563	254	686,978

SUBSIDIARY TABLE II-2

Variation and Density of Rural Population

Division and District	Percentage Increase (+) Decrease (-)			Density 1951
	1941-51	1931-41	1921-31	
	2	3	4	
1-25 Himalayan West Bengal Division	+ 4.0	+11.5	+ 4.0	374
2-11 West Bengal Plain Division	+ 9.0	+16.4	+ 6.7	655
Chandernagore	..	..	..	..
Sikkim	+11.1	+10.7	+34.4	..
West Bengal	+ 8.5	+15.9	+ 6.4	610
Burdwan Division	+ 5.4	+15.1	+ 6.2	681
Burdwan	+12.0	+18.3	+ 8.0	700
Birbhum	+ 1.0	+ 6.6	+11.9	577
Bankura	+ 2.3	+14.7	+ 8.9	467
Midnapur	+ 3.4	+12.9	+ 3.5	597
Hooghly	+10.5	+20.2	+ 1.1	1,030
Howrah	+ 2.7	+25.7	+ 3.3	2,004
Presidency Division	+11.9	+16.9	+ 6.6	550
24-Parganas	+15.9	+21.9	+ 7.7	591
Calcutta	..	..	..	..
Nadia	+29.4	+13.8	+ 0.7	633
Murshidabad	+ 4.0	+18.9	+12.5	773
Malda	+10.4	+16.6	+ 4.8	650
West Dinajpur	+17.7	+10.0	+ 6.8	492
Jalpalguri	+ 3.7	+13.6	+ 6.0	359
Darjeeling	+10.2	+15.2	+ 3.7	296
Cooch Behar	+ 1.1	+ 7.2	- 0.4	471

SUBSIDIARY TABLE II.3

Mean Decennial Growth Rates during Three Decades

Rural Population

(The columns of this Table are filled in the same manner as those for Subsidiary Table I.3 and the instructions contained in the flyleaf to Table I.3 apply to this table also with the substitution of the word "Rural" for "General" wherever it occurs. Figures in Columns 5-7 relate to areas treated as rural by the Director of Health Services for the purpose of registration of births and deaths as distinct from Census rural areas.)

Division and District	Mean population of decade			Mean population of decade for area under Registration of births and deaths			Growth of population during decade		
	1941-50	1931-40	1921-30	1941-50	1931-40	1921-30	1941-50	1931-40	1921-30
	1	2	3	4	5	6	7	8	9
1.25 Himalayan West Bengal Division	1,785,154	1,659,684	1,538,863	1,201,583	1,074,523	968,001	+ 69,992	+ 180,948	+ 60,694
2.11 West Bengal Plain Division	16,141,672	14,356,049	12,849,955	16,498,956	14,530,512	12,942,978	+1,390,446	+2,180,800	+831,388
Chandernagore	..	..	..	..	..	..	..	..	..
Sikkim	128,250	115,664	95,764	..	..	..	+ 13,461	+ 11,712	+ 28,067
West Bengal	17,926,826	16,015,733	14,388,818	17,700,537	15,605,035	13,910,980	+1,460,438	+2,361,748	+892,082
Burdwan Division	9,253,051	8,421,621	7,603,915	9,496,384	8,546,227	7,658,585	+ 483,694	+1,179,466	+455,746
Burdwan	1,767,652	1,556,696	1,392,422	1,846,688	1,593,272	1,402,634	+ 200,149	+ 221,763	+106,784
Birbhum	992,937	957,328	877,575	1,012,591	961,502	872,552	+ 9,918	+ 61,301	+ 98,203
Bankura	1,211,152	1,121,072	1,001,766	1,218,476	1,126,364	1,006,910	+ 26,977	+ 153,185	+ 85,427
Midnapur	3,054,371	2,831,554	2,615,150	3,178,914	2,910,216	2,659,486	+ 103,542	+ 342,091	+ 90,718
Hooghly	1,152,105	1,002,741	905,732	1,152,105	1,002,741	905,732	+ 114,570	+ 184,158	+ 9,860
Howrah	1,074,834	952,131	811,270	1,087,610	952,131	811,270	+ 28,438	+ 216,968	+ 64,754
Presidency Division	8,673,775	7,594,212	6,784,930	8,204,154	7,058,808	6,252,394	+ 976,844	+1,182,282	+ 436,336
24-Parganas	3,020,384	2,545,821	2,212,441	3,069,709	2,561,296	2,223,801	+ 445,911	+ 503,216	+163,544
Calcutta	..	..	..	..	..	..	..	..	..
Nadia	830,420	680,032	633,948	836,430	680,032	633,948	+ 212,806	+ 87,969	+ 4,200
Murshidabad	1,550,456	1,399,475	1,207,582	1,553,458	1,406,848	1,216,132	+ 60,751	+ 241,212	+142,573
Malda	859,778	758,945	684,863	890,948	782,378	703,307	+ 85,283	+ 116,382	+ 31,782
West Dinajpur	627,582	550,254	507,206	652,028	553,730	507,206	+ 102,101	+ 62,555	+ 33,543
Jalpaiguri	833,164	769,067	699,720	845,608	769,067	699,867	+ 30,457	+ 97,738	+ 40,955
Darjeeling	834,490	297,179	265,100	355,974	305,456	268,134	+ 32,577	+ 42,046	+ 22,111
Cooch Behar	617,499	593,438	574,042	..	..	..	+ 6,958	+ 41,164	- 2,372

Division and District	Mean decennial growth rate			Registered births during decade			Mean decennial birth rate (Registered)		
	1941-50	1931-40	1921-30	1941-50	1931-40	1921-30	1941-50	1931-40	1921-30
	11	12	13	14	15	16	17	18	19
1.25 Himalayan West Bengal Division	+ 3.9	+10.9	+ 3.9	321,987	352,073	290,394	26.8	32.8	30.0
2.11 West Bengal Plain Division	+ 8.6	+15.2	+ 6.5	3,659,244	4,313,746	3,963,436	22.2	29.7	30.6
Chandernagore	..	..	..	..	..	..	..	..	..
Sikkim	+10.5	+10.1	+29.3	..	..	..	..	..	..
West Bengal	+ 8.1	+14.7	+ 6.2	3,981,231	4,665,819	4,253,830	22.5	29.9	30.6
Burdwan Division	+ 9.2	+14.0	+ 6.0	2,179,663	2,464,486	2,272,575	23.0	23.8	29.7
Burdwan	+11.3	+14.2	+ 7.7	399,786	425,149	407,124	21.6	26.7	29.0
Birbhum	+ 1.0	+ 6.4	+11.2	277,892	343,380	326,151	27.4	35.7	37.4
Bankura	+ 2.2	+13.7	+ 8.5	308,343	358,505	330,316	25.3	31.4	33.7
Midnapur	+ 3.4	+12.1	+ 8.5	755,062	819,973	755,122	23.8	28.2	28.4
Hooghly	+ 9.9	+19.4	+ 1.1	253,817	285,966	239,918	22.0	28.5	26.5
Howrah	+ 2.6	+22.8	+ 8.0	184,763	236,513	204,944	17.0	24.8	25.8
Presidency Division	+11.3	+15.6	+ 6.4	1,801,568	2,201,333	1,981,255	22.0	31.2	31.7
24-Parganas	+14.8	+19.8	+ 7.4	555,173	683,127	555,631	18.1	26.7	25.0
Calcutta	..	..	..	..	..	..	..	..	..
Nadia	+35.6	+12.9	+ 0.7	205,254	260,085	233,844	24.5	38.2	36.9
Murshidabad	+ 3.9	+17.2	+11.8	407,151	523,684	503,208	26.2	37.2	41.4
Malda	+ 9.9	+15.3	+ 4.6	166,769	222,572	226,611	18.7	28.4	32.2
West Dinajpur	+16.3	+ 9.6	+ 6.6	145,234	159,792	171,567	22.3	23.9	33.8
Jalpaiguri	+ 3.7	+12.7	+ 5.9	228,199	242,905	206,205	27.0	31.6	29.5
Darjeeling	+ 9.7	+14.1	+ 8.3	93,788	109,168	84,189	26.3	35.7	31.4
Cooch Behar	+ 1.1	+ 6.9	- 0.4	..	..	..	..	..	..

SUBSIDIARY TABLE II-3—concl'd.

Mean Decennial Growth Rates during Three Decades

Rural Population

Division and District	Registered deaths during decade			Mean decennial death rate (Registered)			Decennial rate of natural increase (Registered)			Migration cum Registration Error		
	1941-50	1931-40	1921-30	1941-50	1931-40	1921-30	1941-50	1931-40	1921-30	1941-50	1931-40	1921-30
	20	21	22	23	24	25	26	27	28	29	30	31
1.25 Himalayan West Bengal Division	288,369	288,390	270,521	24.8	26.8	27.9	+2.0	+6.0	+2.1	+1.9	+4.9	+1.8
2.11 West Bengal Plain Division	3,227,552	3,109,587	3,406,471	19.6	21.4	26.3	+2.6	+8.3	+4.3	+6.0	+6.9	+2.2
Chandernagore	..	..	..	..	..	..	..	..	..	..	..	..
Sikkim	..	..	..	..	..	..	..	..	..	..	..	..
West Bengal	3,525,921	3,397,977	3,676,992	19.9	21.8	26.4	+2.6	+8.1	+4.2	+5.5	+6.6	+2.0
Burdwan Division	1,883,800	1,826,328	1,924,106	19.9	21.4	25.1	+3.1	+7.4	+4.6	+2.1	+6.6	+1.4
Burdwan	853,953	843,361	864,069	19.2	21.6	26.0	+2.4	+5.1	+3.0	+8.9	+9.1	+4.7
Birbhum	275,562	267,504	243,118	27.2	27.8	27.9	+0.2	+7.9	+9.5	+0.8	-1.5	+1.7
Bankura	271,128	254,078	262,796	22.3	22.6	26.1	+3.0	+8.8	+7.6	-0.8	+4.9	+0.9
Midnapur	633,599	596,906	629,536	19.9	20.5	23.7	+3.9	+7.7	+4.7	-0.5	+4.4	-1.2
Hooghly	191,937	219,071	239,217	16.7	21.8	26.4	+5.3	+6.7	+0.1	+4.6	+11.7	+1.0
Howrah	162,821	145,908	185,370	15.0	15.3	22.8	+2.0	+9.5	+2.5	+0.6	+13.3	+5.5
Presidency Division	1,637,121	1,571,149	1,762,886	20.0	22.3	28.0	+2.0	+8.9	+3.7	+9.3	+6.7	+2.7
24-Parganas	468,965	448,618	525,182	15.3	17.5	23.6	+2.8	+9.2	+1.4	+12.0	+10.6	+6.0
Calcutta	..	..	..	..	..	..	..	..	..	..	..	..
Nadia	205,615	195,559	227,600	24.6	28.8	35.9	-0.1	+9.4	+1.0	+25.7	+3.5	-0.3
Murshidabad	880,140	843,080	875,588	24.5	24.4	30.9	+1.7	+12.8	+10.5	+2.2	+4.4	+1.3
Malda	144,743	157,087	189,664	16.2	20.1	27.0	+2.5	+8.3	+5.2	+7.4	+7.0	-0.6
West Dinajpur	139,289	138,440	164,331	21.4	25.0	32.4	+0.9	+3.9	+1.4	+15.4	+5.7	+5.2
Jalpaiguri	211,321	195,669	183,259	25.0	25.4	26.2	+2.0	+6.2	+3.3	+1.7	+6.5	+2.6
Darjeeling	87,048	92,721	87,262	24.5	30.4	32.5	+1.8	+5.3	-1.1	+7.9	+8.8	+9.4
Cooch Behar	..	..	..	..	..	..	..	..	..	..	..	..

SUBSIDIARY TABLE II-4

Livelihood Pattern of Rural Population

Per 10,000 Rural Population belonging to Livelihood Classes

Division and District	Livelihood Classes								Total Rural Population
	I	II	III	IV	V	VI	VII	VIII	
1	2	3	4	5	6	7	8	9	10
1.25 Himalayan West Bengal Division	3,401	2,471	858	38	2,797	276	103	556	1,820,150
2.11 West Bengal Plain Division	4,333	1,477	1,733	58	915	458	97	929	16,836,895
Chandernagore	..	..	..	..	..	..	..	..	..
Sikkim	8,544	771	15	4	61	91	137	377	134,981
West Bengal	4,242	1,574	1,599	56	1,099	440	97	893	18,657,045
Burdwan Division	4,449	1,465	1,763	64	972	408	110	769	9,494,348
Burdwan	3,619	1,664	1,783	75	1,536	374	121	828	1,867,726
Birbhum	4,452	1,293	2,751	57	510	194	34	709	997,896
Bankura	5,504	1,064	2,085	47	691	216	33	410	1,224,641
Midnapur	5,483	1,752	1,427	58	410	239	64	567	3,106,142
Hooghly	4,058	1,540	1,729	80	789	634	155	1,006	1,209,390
Howrah	2,165	819	1,514	72	2,553	1,110	324	1,443	1,089,053
Presidency Division	4,028	1,697	1,429	47	1,229	474	85	1,021	9,162,197
24-Parganas	3,926	1,440	1,998	56	927	602	113	938	3,243,340
Calcutta	..	..	..	..	..	..	..	..	..
Nadia	3,827	1,134	1,335	61	732	607	66	2,133	936,823
Murshidabad	4,449	1,140	1,785	45	911	510	64	1,087	1,580,832
Malda	4,367	1,706	1,280	22	924	392	41	1,268	902,419
West Dinajpur	5,048	2,784	1,086	43	228	218	26	572	678,638
Jalpaiguri	2,240	2,305	123	47	3,787	317	135	541	848,393
Darjeeling	2,629	1,135	225	10	4,775	241	160	825	350,779
Cooch Behar	5,422	2,769	743	41	328	239	28	425	620,978

SUBSIDIARY TABLE III.1

Distribution of population between towns

Division and District	Population per Town	Number in Towns per 1,000 of General Population	Number per 1,000 of Urban Population in Towns with a Population of :				Total Urban Population
			20,000 and over	10,000 to 20,000	5,000 to 10,000	Under 5,000	
			4	5	6	7	
1.25 Himalayan West Bengal Division	17,567	104	784	135	28	53	210,806
2.11 West Bengal Plain Division .	58,178	262	883	98	16	5	5,992,366
Chandernagore	49,909	1,000	1,000	..	..	..	49,909
Sikkim	2,744	20	..	..	..	1,000	2,744
West Bengal	53,976	248	879	98	16	7	6,153,268
Burdwan Division	38,154	145	781	170	35	14	1,607,682
Burdwan	23,139	148	645	277	65	13	323,941
Birbhum	18,799	65	..	874	126	..	68,998
Bankura	18,924	72	775	181	..	94	94,618
Midnapur	22,989	75	692	168	104	36	252,880
Hooghly	31,357	222	876	124	..	..	344,930
Howrah	130,580	324	951	49	..	..	522,320
Presidency Division	71,025	332	914	72	10	4	4,545,581
24-Parganas	41,393	296	860	118	22	..	1,365,969
Calcutta	2,548,677	1,000	1,000	..	..	..	2,548,677
Nadia	29,729	182	850	131	..	19	208,101
Murshidabad	22,488	79	412	588	..	..	134,927
Malda	17,580	38	872	..	..	128	35,161
West Dinajpur	13,980	58	..	801	199	..	41,940
Jalpaiguri	83,072	72	1,000	..	..	..	66,145
Darjeeling	23,620	212	699	301	..	..	94,481
Cooch Behar	8,363	75	662	..	117	221	50,180

SUBSIDIARY TABLE III.1a

Distribution of population between towns

Division and District	Population per Town	Number in Towns per 1,000 of General Population	Number per 1,000 of Urban Population in Towns with a Population of :								Total Urban Population
			100,000 and Over	80,000 to 100,000	60,000 to 80,000	40,000 to 60,000	20,000 to 40,000	10,000 to 20,000	5,000 to 10,000	Under 5,000	
			4	5	6	7	8	9	10	11	
1.25 Himalayan West Bengal Division	17,567	104	..	..	..	196	588	135	28	53	210,806
2.11 West Bengal Plain Division .	58,178	262	802	..	98	103	83	96	16	5	5,992,366
Chandernagore	49,909	1,000	..	..	..	1,000	..	..	..	..	49,909
Sikkim	2,744	20	..	..	..	..	..	..	..	1,000	2,744
West Bengal	53,976	248	588	..	94	98	101	98	16	7	6,153,268
Burdwan Division	38,154	145	350	..	180	94	157	170	35	14	1,607,682
Burdwan	23,139	148	..	..	468	..	177	277	65	13	323,941
Birbhum	18,799	65	..	..	..	..	..	874	126	..	68,998
Bankura	18,924	72	..	..	..	522	253	131	..	94	94,618
Midnapur	22,989	75	512	..	..	180	..	168	104	36	252,880
Hooghly	31,357	222	..	..	215	165	496	124	..	..	344,930
Howrah	130,580	324	880	..	121	..	..	49	..	..	522,320
Presidency Division	71,025	332	670	..	63	99	82	78	10	4	4,545,581
24-Parganas	41,393	296	865	..	210	149	136	118	22	..	1,365,969
Calcutta	2,548,677	1,000	1,000	..	..	..	..	..	..	..	2,548,677
Nadia	29,729	182	..	..	..	715	135	131	..	19	208,101
Murshidabad	22,488	79	..	..	..	412	..	588	..	..	134,927
Malda	17,580	38	..	..	..	..	872	..	..	128	35,161
West Dinajpur	13,980	58	..	..	..	..	..	801	199	..	41,940
Jalpaiguri	83,072	72	..	..	..	624	376	..	..	..	66,145
Darjeeling	23,620	212	..	..	..	..	699	301	..	..	94,481
Cooch Behar	8,363	75	..	..	..	..	662	..	117	221	50,180

SUBSIDIARY TABLE III.2

Variation and Density of Urban Population

Division and District	Percentage			Density 1951
	Increase (+) Decrease (-)			
	1941 to 1951	1931 to 1941	1921 to 1931	
1	2	3	4	5
1.25 Himalayan West Bengal Division	+87.0	+40.1	+32.4	8,171
2.11 West Bengal Plain Division	+31.2	+64.5	+14.3	13,958
Chandernagore	+30.4	+40.4	+7.2	13,389
Sikkim	..	..	..	..
West Bengal	+33.8	+64.1	+15.1	13,633
Burdwan Division	+29.0	+56.5	+20.9	9,037
Burdwan	+45.2	+71.8	+35.7	8,328
Birbhum	+14.8	+189.0	-10.2	4,791
Bankura	+2.9	+36.8	+10.4	3,878
Midnapur	+34.5	+35.7	+43.2	5,109
Hooghly	+21.9	+39.0	+13.5	10,115
Howrah	+21.6	+68.4	+10.8	31,465
Presidency Division	+35.1	+67.1	+12.9	16,820
24-Parganas	+56.6	+46.7	+17.5	9,230
Calcutta	+20.9	+84.9	+10.6	78,858
Nadla	+79.0	+35.4	+7.5	6,914
Murshidabad	+12.0	+31.2	+4.5	5,053
Malda	+29.4	+38.1	+14.4	11,342
West Dinajpur	+503.3	..	..	5,592
Jaipalguri	+138.2	+46.4	+23.0	7,603
Darjeeling	+62.4	+33.8	+51.5	7,381
Cooch Behar	+87.1	+48.8	+4.5	11,670

SUBSIDIARY TABLE III.3

Mean Decennial Growth Rates during Three Decades Urban Population

(The columns of this Table are filled in the same manner as those for Subsidiary Table I'3 and the instructions contained in the flyleaf to Table I'3 apply to this table also with the substitution of the word "Urban" for "General" wherever it occurs. Figures in columns 5-7 relate to areas treated as urban by the Director of Health Services for the purpose of registration of births and deaths as distinct from Census urban areas.)

Division and District	Mean population of decade			Mean population of decade for area under Registration of births and deaths			Growth of population during decade		
	1941-50	1931-40	1921-30	1941-50	1931-40	1921-30	1941-50	1931-40	1921-30
	2	3	4	5	6	7	8	9	10
1.25 Himalayan West Bengal Division	161,780	96,613	70,624	89,353	65,910	49,798	+98,051	+32,234	+19,694
2.11 West Bengal Plain Division	5,279,292	3,670,783	2,599,032	4,877,912	3,463,552	2,479,866	+1,426,149	+1,790,858	+352,653
Chandernagore	44,096	32,773	26,342	..	..	..	+11,625	+11,023	+1,839
Sikkim	1,372	..	..	..	..	..	+2,744	..	..
West Bengal	5,396,976	3,734,628	2,643,314	4,967,264	3,529,468	2,529,465	+1,512,575	+1,812,120	+370,508
Burdwan Division	1,441,898	1,045,758	745,000	1,193,566	921,052	690,330	+331,567	+460,714	+140,801
Burdwan	278,548	176,520	112,813	194,512	139,944	102,601	+100,786	+93,270	+34,144
Birbhum	64,666	40,608	22,064	45,012	36,433	27,087	+8,654	+39,462	-2,374
Bankura	93,297	79,609	64,066	85,974	74,316	58,921	+2,642	+24,734	+6,353
Midnapur	220,404	163,316	117,726	95,920	84,654	73,390	+64,833	+49,463	+41,715
Hooghly	313,920	243,251	191,466	313,920	243,251	191,466	+62,021	+79,316	+24,253
Howrah	476,004	342,454	236,865	463,228	342,454	236,865	+92,631	+174,469	+36,710
Presidency Division	3,955,077	2,683,370	1,893,314	3,763,693	2,608,410	1,839,134	+1,181,008	+1,351,406	+229,707
24-Parganas	1,119,015	733,271	550,261	1,069,690	717,796	538,901	+499,908	+277,580	+88,440
Calcutta	2,328,784	1,624,876	1,086,280	2,323,784	1,624,876	1,086,280	+439,786	+968,029	+109,165
Nadla	162,194	101,072	82,858	156,184	101,072	82,858	+91,815	+30,427	+6,001
Murshidabad	127,688	106,128	89,346	124,687	98,755	81,297	+14,478	+28,641	+3,923
Malda	81,170	23,432	18,444	..	..	..	+7,982	+7,493	+2,484
West Dinajpur	24,446	3,476	..	..	..	..	+34,988	+6,952	..
Jaipalguri	46,956	23,364	16,888	34,512	23,364	16,741	+38,379	+8,804	+4,149
Darjeeling	76,324	50,823	36,091	54,840	42,546	33,058	+36,314	+14,688	+14,776
Cooch Behar	38,501	22,426	17,646	..	..	..	+23,358	+8,792	+769

SUBSIDIARY TABLE III.3—concl'd.

Mean Decennial Growth Rates during Three Decades

Urban Population

Division and District	Mean decennial growth rate			Registered births during decade			Mean decennial birth rate (Registered)		
	1941—50	1931—40	1921—30	1941—50	1931—40	1921—30	1941—50	1931—40	1921—30
	11	12	13	14	15	16	17	18	19
1-25 Himalayan West Bengal Division	+60.6	+33.4	+27.9	16,200	14,699	12,569	18.1	23.3	25.2
2-11 West Bengal Plain Division	+27.0	+48.8	+13.6	649,928	576,167	447,657	13.3	16.6	18.1
Chandernagore	+26.4	+33.6	+7.0	..	..	..	..	..	..
Sikkim	+200.0	..	..	..	..	..	..	..	..
West Bengal	+28.0	+48.5	+14.0	666,123	590,866	460,226	13.4	16.7	18.2
Burdwan Division	+23.0	+44.1	+18.9	161,103	164,523	140,630	13.4	17.9	20.4
Burdwan	+36.8	+52.8	+30.3	22,031	23,591	16,919	11.3	16.9	16.5
Birbhum	+13.4	+97.2	-10.8	687	1,074	620	1.5	2.9	2.8
Bankura	+2.8	+31.1	+9.9	7,281	10,661	12,462	8.5	14.3	21.1
Midnapur	+29.4	+30.3	+35.4	15,984	16,658	14,861	16.7	19.7	20.2
Hooghly	+19.8	+32.6	+12.7	55,046	45,134	34,925	17.5	18.6	18.2
Howrah	+19.5	+50.9	+15.5	60,074	67,410	60,903	13.0	19.7	25.7
Presidency Division	+29.9	+50.3	+12.1	505,025	426,338	319,546	13.4	16.3	17.4
24-Parganas	+44.1	+37.9	+16.1	113,014	104,351	84,422	10.6	14.5	15.7
Calcutta	+18.9	+59.6	+10.0	331,119	272,871	195,761	14.2	16.8	18.0
Nadia	+56.6	+30.1	+7.2	24,207	17,343	10,481	15.5	17.2	12.6
Murshidabad	+11.8	+27.0	+4.4	20,485	17,074	16,313	16.4	17.3	20.1
Malda	+25.6	+32.0	+13.5	..	..	..	..	..	..
West Dinajpur	+143.1	+200.0	..	..	..	..	..	..	..
Jaipalguri	+81.7	+37.7	+24.6	4,163	2,788	2,187	12.1	11.7	13.1
Darjeeling	+47.6	+23.9	+40.9	12,037	11,961	10,392	21.9	28.1	31.4
Cooch Behar	+60.7	+39.2	+4.4	..	..	..	..	..	..

Division and District	Registered deaths during decade			Mean decennial death rate (Registered)			Decennial rate of Natural Increase (Registered)			Migration-cum-Registration Error		
	1941—50	1931—40	1921—30	1941—50	1931—40	1921—30	1941—50	1931—40	1921—30	1941—50	1931—40	1921—30
	20	21	22	23	24	25	26	27	28	29	30	31
1-25 Himalayan West Bengal Division	15,268	10,779	8,809	17.1	16.4	17.7	+1.0	+5.9	+7.5	+59.6	+27.5	+20.4
2-11 West Bengal Plain Division	751,032	588,232	601,435	15.4	17.0	24.3	-2.1	-0.4	-6.2	+29.1	+49.2	+19.8
Chandernagore	..	..	..	..	..	..	..	..	..	..	..	..
Sikkim	..	..	..	..	..	..	..	..	..	..	..	..
West Bengal	766,300	599,011	610,244	15.4	17.0	24.1	-2.0	-0.3	-5.9	+30.0	+43.3	+19.9
Burdwan Division	180,459	144,159	143,442	15.1	15.7	20.8	-1.7	+2.2	-0.4	+24.7	+41.9	+19.3
Burdwan	18,243	18,230	17,918	9.4	13.0	17.5	+1.9	+3.9	-1.0	+34.9	+43.9	+31.3
Birbhum	2,122	1,177	671	4.7	3.2	2.5	-3.2	-0.3	-0.2	+16.6	+97.5	-10.6
Bankura	7,523	9,527	9,509	8.8	12.8	16.1	-0.3	+1.5	+5.0	+3.1	+29.6	+4.9
Midnapur	16,364	14,557	14,474	17.1	17.2	19.7	-0.4	+2.5	+0.5	+29.8	+27.8	+34.9
Hooghly	41,558	31,223	32,175	13.2	12.8	16.8	+4.8	+5.3	+1.4	+15.5	+26.3	+11.3
Howrah	94,649	69,440	68,695	20.4	20.3	29.0	-7.4	-0.6	-3.3	+26.9	+51.5	+18.8
Presidency Division	685,341	454,352	466,302	15.5	17.4	25.4	-2.1	-1.1	-3.0	+32.0	+51.4	+20.1
24-Parganas	102,912	81,116	89,300	9.6	11.3	16.7	+1.0	+3.2	-1.0	+43.1	+34.7	+17.1
Calcutta	427,269	385,982	322,117	18.3	20.7	29.7	-4.1	-3.9	-11.7	+23.0	+63.5	+21.7
Nadia	21,798	12,683	9,260	14.0	12.5	11.2	+1.5	+4.7	+1.4	+55.1	+25.4	+5.3
Murshidabad	18,594	14,292	36,816	14.9	14.5	45.3	+1.5	+2.3	-25.2	+9.8	+24.2	+29.6
Malda	..	..	..	..	..	..	..	..	..	..	..	..
West Dinajpur	..	..	..	..	..	..	..	..	..	..	..	..
Jaipalguri	4,272	1,383	1,634	12.4	8.1	9.8	-0.3	+3.6	+3.3	+32.0	+34.1	+21.3
Darjeeling	10,996	8,896	7,175	20.1	20.9	21.7	+1.8	+7.2	+9.7	+45.8	+21.7	+31.2
Cooch Behar	..	..	..	..	..	..	..	..	..	..	..	..

SUBSIDIARY TABLE III.4

Towns Classified by Population

Class of Town	Towns of each class in 1951	Proportion to total urban population	Percentage Increase(+) / Decrease(-) In class totals		
			1941-1951	1931-1941	1921-1931
1	2	3	4	5	6
WEST BENGAL	114	100.0	+32.6	+64.1	+15.1
I—100,000 and over	7	59.7	+38.6	+90.8	+11.3
II—50,000 to 100,000	14	14.7	+43.8	+217.0	+68.5
III—20,000 to 50,000	27	14.5	+8.5	+29.1	+11.6
IV—10,000 to 20,000	40	9.6	+59.8	-0.3	+22.9
V—5,000 to 10,000	15	1.8	-27.8	-17.0	-0.3
VI—Under 5,000	11	0.7	+107.6	-50.8	+45.6

SUBSIDIARY TABLE III.5

Cities—Chief Figures

City	Population 1951	Density	Percentage Increase(+) / Decrease(-)		
			1941-1951	1931-1941	1921-1931
1	2	3	4	5	6
WEST BENGAL					
Calcutta	2,548,677	78,858	+20.9	+84.9	+10.6
Howrah	438,630	43,537	+14.3	+68.7	+15.1
Bhatpara	134,916	24,530	+15.3	..	..
Tollyganj	149,817	22,700	..	..	..
Garden Reach	109,160	81,918	..	..	..
South Suburbs	104,055	8,494	..	..	..
Khargpur Town	129,636	10,049	..	..	..

SUBSIDIARY TABLE III.6

Number per 1,000 of the General Population and of each Livelihood Class who live in towns

Division and District	General population	Livelihood Classes							
		I	II	III	IV	V	VI	VII	VIII
1	2	3	4	5	6	7	8	9	10
1.25 Himalayan West Bengal Division	104	7	4	9	185	55	541	480	488
2.11 West Bengal Plain Division	283	14	18	19	312	532	652	775	560
Chandernagore	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Sikkim	20	8	..	..	..	286	249	40	260
West Bengal	248	14	15	19	303	462	644	760	554
Burdwan Division	145	12	20	22	167	373	433	616	339
Burdwan	148	18	39	30	175	260	461	582	377
Birbhum	65	16	24	13	108	135	410	558	286
Bankura	72	11	14	30	276	221	452	572	327
Midnapur	75	10	12	24	128	369	263	677	294
Hooghly	222	13	11	15	206	617	449	478	445
Howrah	324	12	19	15	139	404	482	654	483
Presidency Division	332	15	10	15	435	519	733	841	632
24-Parganas	296	20	14	22	313	653	572	697	567
Calcutta	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Nadia	182	23	22	22	305	325	504	629	301
Murshidabad	79	11	11	4	243	141	305	363	245
Malda	88	3	2	1	248	60	221	218	125
West Dinajpur	58	9	9	8	78	233	483	467	299
Jalpaiguri	72	5	4	14	125	30	442	354	361
Darjeeling	212	20	11	6	400	68	721	602	630
Cooch Behar	75	4	2	8	230	272	519	602	444

SUBSIDIARY TABLE III,7

Livelihood Pattern of Urban Population

Division and District	Per 10,000 Urban Population belonging to Livelihood Class								Total urban population
	I	II	III	IV	V	VI	VII	VIII	
1	2	3	4	5	6	7	8	9	10
1.25 Himalayan West Bengal Division	194	85	28	75	1,418	2,805	823	4,572	210,806
2.11 West Bengal Plain Division	175	70	97	73	2,917	2,409	936	3,323	5,992,866
Chandernagore	13	6	3	51	3,182	2,625	623	3,498	49,909
Sikkim	638	..	..	..	1,090	1,483	231	6,508	2,744
West Bengal	177	71	95	74	2,884	2,421	934	3,364	6,153,263
<i>Burdwan Division</i>	<i>331</i>	<i>175</i>	<i>238</i>	<i>77</i>	<i>3,415</i>	<i>1,843</i>	<i>1,035</i>	<i>2,886</i>	<i>1,607,682</i>
Burdwan	389	387	322	92	3,110	1,845	967	2,888	323,941
Birbhum	1,075	457	528	100	1,152	1,956	624	4,108	68,993
Bankura	759	198	811	234	2,548	2,299	577	2,579	94,618
Midnapur	671	269	431	105	2,937	1,051	1,639	2,897	252,880
Hooghly	183	60	93	72	4,457	1,810	498	2,827	344,930
Howrah	53	33	47	24	3,604	2,150	1,276	2,813	522,320
<i>Presidency Division</i>	<i>123</i>	<i>34</i>	<i>44</i>	<i>72</i>	<i>2,669</i>	<i>2,625</i>	<i>399</i>	<i>3,534</i>	<i>4,545,581</i>
24-Parganas	190	49	106	61	4,152	1,907	620	2,915	1,365,969
Calcutta	18	1	1	68	2,148	2,967	1,129	3,668	2,548,677
Nadia	407	116	136	121	1,696	2,772	506	4,246	208,101
Murshidabad	603	154	92	168	1,754	2,672	428	4,129	134,927
Malda	387	69	28	182	1,521	2,858	292	4,663	35,161
West Dinajpur	720	417	149	58	1,117	3,227	374	3,938	41,940
Jalpalguri	140	150	23	87	1,508	3,224	947	3,921	66,145
Darjeeling	195	45	5	25	1,304	2,306	896	5,224	94,481
Cooch Behar	262	73	79	152	1,516	3,193	520	4,205	50,180

SUBSIDIARY TABLE IV.1

Agricultural Classes per 1,000 persons of General Population; number in each class and subclass of 10,000 persons of All Agricultural Classes; and comparison with agricultural holdings by size

Division and District	Agricultural Classes per 1,000 persons of General Population	Number per 10,000 persons of All Agricultural Classes							
		Total			I—Cultivators of land wholly or mainly owned and their dependants	II—Cultivators of land wholly or mainly un-owned and their dependants	III—Cultivating labourers and their dependants	IV—Non-cultivating owners of land; Agricultural rent receivers and their dependants	
		Self-supporting persons	Non-earning dependants	Earning dependants					
1	2	3	4	5	6	7	8	9	
1'25 Himalayan West Bengal Division	566	2,630	7,152	218	5,424	3,929	573	74	
2'11 West Bengal Plain Division	571	2,600	6,965	435	5,673	1,938	2,291	108	
Chandernagore	7	2,083	7,917	..	1,667	889	417	7,627	
Sikkim	918	2,102	4,259	3,639	9,155	825	18	4	
West Bengal	572	2,603	6,980	417	5,652	2,100	2,143	105	
Burdwan Division	674	2,743	6,741	516	5,717	1,897	2,288	93	
Burdwan	626	2,906	6,806	488	5,017	2,356	2,502	125	
Birbhum	814	2,775	6,723	502	5,200	1,523	3,203	74	
Bankura	817	2,649	6,648	708	6,318	1,226	2,382	74	
Midnapur	818	2,702	6,761	537	6,204	2,007	1,654	75	
Hooghly	586	2,807	6,757	436	5,457	2,079	2,331	133	
Howrah	314	2,556	7,199	245	4,715	1,798	3,307	180	
Presidency Division	490	2,446	7,246	308	5,581	2,326	1,981	112	
24-Parganas	534	2,436	7,248	316	5,278	1,924	2,691	107	
Calcutta	9	2,679	7,173	148	2,069	136	126	7,669	
Nadia	534	2,583	7,071	346	5,999	1,775	2,091	135	
Murshidabad	692	2,398	7,286	321	5,996	1,537	2,388	79	
Malda	712	2,122	7,570	308	5,921	2,308	1,732	39	
West Dinajpur	852	2,453	7,163	384	5,631	3,107	1,211	51	
Jalpaiguri	487	2,679	7,025	296	4,286	5,363	247	104	
Darjeeling	321	2,257	7,336	407	6,587	2,817	555	41	
Cooch Behar	835	2,687	7,206	107	6,031	3,074	836	59	

Distribution of 1,000 agricultural holdings by size of holding (in acres)

Division and District	0 to 1-00	1-01 to 2-00	2-01 to 3-00	3-01 to 4-00	4-01 to 5-00	5-01 to 6-00	6-01 to 7-00	7-01 to 8-00	8-01 to 9-00	9-01 to 10-00	10-01 to 15-00	15-01 to 20-00	20-01 to 25-00	25-01 to 33-33	33-34 and upwards
	1'25 Himalayan West Bengal Division	10	11	12	13	14	15	16	17	18	19	20	21	22	23
2'11 West Bengal Plain Division	64	116	128	116	129	58	59	50	34	66	78	41	24	19	20
Chandernagore	..	..	..	..	250	..	250	..	..	250	..	..	..	..	250
Sikkim*	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
West Bengal	158	187	153	123	86	59	51	35	28	30	33	23	12	9	9
Burdwan Division	192	192	154	115	79	60	47	38	29	25	27	16	11	8	7
Burdwan	133	176	139	121	85	75	65	54	37	29	37	22	11	9	7
Birbhum	102	174	157	128	105	73	62	35	28	44	50	22	9	6	5
Bankura	132	185	161	126	94	58	57	47	33	34	26	17	9	9	12
Midnapur	225	184	157	107	78	60	39	36	30	21	22	15	14	9	8
Hooghly	225	245	161	122	69	42	39	20	15	19	25	11	3	2	2
Howrah	369	282	128	84	38	23	20	10	8	10	14	6	3	2	3
Presidency Division	110	178	151	135	96	58	56	33	23	38	54	29	13	10	11
24-Parganas	157	221	161	133	78	50	44	25	21	26	41	21	8	6	8
Calcutta†	163	108	73	119	54	42	63	24	24	59	85	54	34	39	59
Nadia	66	145	161	162	100	73	69	37	29	41	61	31	10	8	7
Murshidabad	133	208	157	134	93	58	53	28	25	30	36	21	11	7	6
Malda	77	174	160	151	92	59	63	32	32	36	62	32	12	9	9
West Dinajpur	61	119	134	133	102	69	72	42	36	46	76	49	22	20	19
Jalpaiguri	42	91	113	72	101	42	44	57	22	110	93	46	30	20	27
Darjeeling	87	147	140	146	115	72	51	47	23	31	82	28	14	8	9
Cooch Behar	73	123	131	133	92	65	72	45	45	45	67	42	23	21	18

* Figures not available.

† The figures under Calcutta relate to a total of 7,272 acres all of which are of course outside the city in the various districts but the owners of which were in the city at the time of the Census count.

SUBSIDIARY TABLE IV.1a.
Distribution of 1,000 Acres According to the size of each agricultural holding

Division and District	Size of agricultural holdings (in acres)														
	0 to 1.00	1.01 to 2.00	2.01 to 3.00	3.01 to 4.00	4.01 to 5.00	5.01 to 6.00	6.01 to 7.00	7.01 to 8.00	8.01 to 9.00	9.01 to 10.00	10.01 to 15.00	15.01 to 20.00	20.01 to 25.00	25.01 to 33.33	33.34 and Upwards
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1.25 Himalayan West Bengal Division	4	24	43	56	80	44	53	51	39	86	134	100	75	76	135
2.11 West Bengal Plain Division	18	62	84	93	80	70	70	56	51	57	85	76	53	51	84
Chandernagore	..	..	..	..	57	..	86	..	..	143	..	..	..	..	714
Sikkim*	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
West Bengal	18	58	79	89	80	67	68	56	50	60	100	79	55	54	89
<i>Burdwan Division</i>	22	66	83	91	81	75	70	64	56	55	73	65	55	52	82
Burdwan	13	53	69	84	77	82	85	80	63	54	94	79	49	51	67
Bhrbhum	10	52	78	90	84	80	81	53	48	83	125	77	39	37	53
Bankura	14	57	83	90	86	66	76	72	57	67	66	59	39	51	117
Midnapur	26	64	91	87	76	73	58	63	59	46	64	62	75	63	90
Hooghly	34	111	122	129	93	71	77	46	38	54	94	56	24	20	81
Howrah	76	175	133	122	70	52	54	32	28	38	73	42	24	25	56
<i>Presidency Division</i>	10	49	70	87	79	59	66	46	43	66	123	93	55	56	98
24-Parganas	18	74	90	105	79	62	65	42	41	55	116	81	40	41	91
Calcutta†	9	17	19	44	25	24	43	19	21	59	112	99	80	120	309
Nadia	6	39	72	100	81	72	81	50	45	69	138	97	40	44	66
Murshidabad	15	68	86	102	92	69	76	46	47	63	98	80	53	45	60
Malda	7	47	72	95	74	58	74	42	48	61	140	101	50	47	84
West Dinajpur	4	25	47	65	64	53	64	44	43	60	132	119	68	81	131
Jalpaiguri	3	16	34	80	104	28	35	52	22	126	140	96	82	70	162
Darjeeling	8	38	61	89	91	69	58	62	34	51	179	86	54	42	78
Cooch Behar	5	20	47	69	59	51	66	48	54	61	120	105	73	89	127

* Figures not available.

† The figures under Calcutta relate to a total of 7,272 acres all of which are of course outside the city in the various districts but the owners of which were in the city at the time of the Census count.

SUBSIDIARY TABLE IV.2

Livelihood Class I (Cultivators of land wholly or mainly owned and their dependants)

Number per 10,000 persons of Livelihood Class I in each subclass ; Secondary Means of Livelihood of 10,000 persons of Livelihood Class I

Division and District	Number per 10,000 of Livelihood Class I			Number per 10,000 Livelihood Class I whose secondary means of livelihood is :					
	Self-supporting persons	Non-earning dependants	Earning dependants	Cultivation of owned land		Cultivation of unowned land		Employment as cultivating labourers	
				Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants
1	2	3	4	5	6	7	8	9	10
1.25 Himalayan West Bengal Division	2,432	7,372	196	..	38	36	71	5	32
2.11 West Bengal Plain Division	2,324	7,290	386	..	39	131	52	107	141
Chandernagore	3,667	6,333	..	..	..	..	..	..	..
Sikkim	2,060	4,136	3,804	..	298	1	294	1	3,146
West Bengal	2,332	7,297	371	..	39	123	54	99	133
Burdwan Division	2,402	7,160	438	..	36	131	51	131	168
Burdwan	2,552	7,109	339	..	68	105	40	89	77
Birbhum	2,485	7,126	389	..	48	122	47	39	98
Bankura	2,242	7,194	564	..	16	116	52	146	285
Midnapur	2,422	7,081	497	..	34	148	57	177	199
Hooghly	2,354	7,319	327	..	27	147	60	88	120
Howrah	2,219	7,512	269	..	18	165	23	133	106
Presidency Division	2,253	7,453	294	..	42	111	57	63	93
24-Parganas	2,227	7,453	320	..	39	116	42	97	133
Calcutta	3,323	6,511	166	..	..	60	6	4	..
Nadia	2,408	7,196	396	..	..	90	163	88	127
Murshidabad	2,193	7,623	284	..	50	164	38	62	63
Malda	1,913	7,813	274	..	52	162	25	59	82
West Dinajpur	2,362	7,328	310	..	75	86	50	22	81
Jalpaiguri	2,597	7,172	231	..	72	36	90	2	18
Darjeeling	2,015	7,576	409	..	1	10	115	4	123
Cooch Behar	2,455	7,428	117	..	28	42	48	7	15

Number per 10,000 Livelihood Class I whose secondary means of livelihood is :

Division and District	Number per 10,000 Livelihood Class I whose secondary means of livelihood is :									
	Rent of agricultural land		Production other than cultivation		Commerce		Transport		Other services and miscellaneous sources	
	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants
	11	12	13	14	15	16	17	18	19	20
1.25 Himalayan West Bengal Division	4	..	35	23	63	13	4	1	55	19
2.11 West Bengal Plain Division	15	3	108	60	122	40	12	5	118	45
Chandernagore	..	..	167	..	..	..	..	..	..	..
Sikkim	..	..	5	3	2	2	..	..	7	62
West Bengal	14	3	101	57	118	38	12	5	113	43
Burdwan Division	17	5	131	73	132	44	14	6	140	55
Burdwan	16	16	106	54	138	42	15	6	130	37
Birbhum	18	2	132	77	132	35	8	3	150	80
Bankura	34	6	129	102	127	50	9	4	123	49
Midnapur	14	2	158	82	121	47	15	10	157	66
Hooghly	9	5	84	39	163	40	21	3	129	33
Howrah	16	1	110	40	131	36	18	5	106	39
Presidency Division	12	1	66	33	101	31	9	3	82	30
24-Parganas	23	2	67	32	124	41	10	2	82	30
Calcutta	11	..	219	21	439	26	81	4	671	109
Nadia	10	2	52	46	123	29	8	1	93	27
Murshidabad	7	..	86	52	112	33	10	3	118	39
Malda	5	1	94	44	77	34	12	6	66	30
West Dinajpur	5	..	59	48	65	22	8	4	48	30
Jalpaiguri	7	1	40	24	56	11	6	1	54	14
Darjeeling	..	..	47	75	41	26	2	3	51	66
Cooch Behar	4	..	30	7	74	19	4	1	57	8

SUBSIDIARY TABLE IV.3

Livelihood Class II (Cultivators of land wholly or mainly unowned and their dependants)

Number per 10,000 persons of Livelihood Class II in each subclass; Secondary Means of Livelihood of 10,000 persons of Livelihood Class II

Division and District	Number per 10,000 of Livelihood Class II			Number per 10,000 of Livelihood Class II whose secondary means of livelihood is :					
	Self-supporting persons	Non-earning dependants	Earning dependants	Cultivation of owned land		Cultivation of unowned land		Employment as cultivating labourers	
				Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants
1	2	3	4	5	6	7	8	9	10
1.25 Himalayan West Bengal Division	2,723	7,010	882	37	14	..	123	14	29
2.11 West Bengal Plain Division	2,470	6,984	543	327	46	..	41	239	273
Chandernagore	625	9,375	..	..	..	..	..	..	..
Sikkim	2,523	5,614	1,853	..	8	..	..	..	1,729
West Bengal	2,509	6,938	503	233	41	..	54	205	236
Burdwan Division	2,610	6,723	667	333	44	..	41	329	340
Burdwan	2,230	7,078	642	249	51	..	41	236	329
Birbhum	2,567	6,748	685	370	19	..	31	68	245
Bankura	2,640	6,447	913	423	35	..	30	337	457
Midnapur	2,798	6,523	674	353	59	..	47	400	341
Hooghly	2,758	6,553	689	298	23	..	53	477	426
Howrah	2,359	7,352	239	400	24	..	14	232	156
Presidency Division	2,417	7,230	353	233	33	..	66	93	142
24-Parganas	2,379	7,270	351	257	27	..	53	167	186
Calcutta	4,175	5,723	97	..	..	..	..	..	..
Nadia	2,269	7,453	273	117	34	..	..	33	57
Murshidabad	2,253	7,300	447	442	43	..	26	102	178
Malda	2,073	7,534	393	627	37	..	46	140	211
West Dinajpur	2,294	7,209	497	224	95	..	44	53	261
Jalpaiguri	2,689	6,956	355	28	14	..	201	7	12
Darjeeling	2,483	7,127	390	4	..	..	39	25	153
Cooch Behar	2,340	7,057	103	53	17	..	46	22	21

Number per 10,000 of Livelihood Class II whose secondary means of livelihood is :

Division and District	Rent on agricultural land		Production other than cultivation		Commerce		Transport		Other services and miscellaneous sources	
	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants
	11	12	13	14	15	16	17	18	19	20
1.25 Himalayan West Bengal Division	..	..	63	61	35	14	7	2	36	14
2.11 West Bengal Plain Division	8	1	35	91	61	29	18	6	95	53
Chandernagore	..	..	35	44	2	31	..	4	..	42
West Bengal	7	1	33	87	57	27	16	6	86	51
Burdwan Division	3	1	114	130	59	31	24	9	109	71
Burdwan	3	3	94	165	47	19	13	4	60	29
Birbhum	2	..	79	176	37	26	23	6	146	181
Bankura	7	1	160	245	49	63	22	10	115	71
Midnapur	3	2	143	103	32	37	24	11	129	74
Hooghly	2	..	61	81	36	22	33	12	121	73
Howrah	7	..	77	39	50	13	24	6	66	32
Presidency Division	9	..	53	47	55	23	9	3	66	30
24-Parganas	25	..	50	29	75	22	10	2	89	31
Calcutta	97	..	259	..	227	65	..	..	356	32
Nadia	12	1	46	33	71	33	6	3	89	59
Murshidabad	6	1	50	79	57	41	16	7	111	73
Malda	2	1	45	36	47	26	13	6	34	30
West Dinajpur	1	..	46	43	49	14	4	1	49	33
Jalpaiguri	1	..	76	91	40	13	10	4	30	14
Darjeeling	..	..	124	110	13	26	7	2	47	55
Cooch Behar	..	..	31	8	38	6	8	..	42	4

SUBSIDIARY TABLE IV.4

Livelihood Class III (Cultivating labourers and their dependants)

Number per 10,000 persons of Livelihood Class III in each subclass ; Secondary Means of Livelihood of 10,000 persons of Livelihood Class III

Division and District	Number per 10,000 of Livelihood Class III			Number per 10,000 of Livelihood Class III whose secondary means of Livelihood is:					
	Self-supporting persons	Non-earning dependants	Earning dependants	Cultivation of owned land		Cultivation of unowned land		Employment as cultivating labourers	
				Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants
1	2	3	4	5	6	7	8	9	10
1.25 Himalayan West Bengal Division.	3,871	6,004	125	32	6	5	23	..	50
2.11 West Bengal Plain Division	3,397	6,130	473	183	23	33	35	..	213
Chandernagore	3,333	6,667	..	..	..	..	..	..	..
Sikkim	4,422	3,970	1,808	..	150	..	..	..	1,106
West Bengal	3,407	6,127	466	179	22	32	34	..	203
Burdwan Division	3,705	5,697	598	166	27	105	42	..	262
Burdwan	4,198	5,148	659	86	16	46	49	..	248
Birbhum	3,348	6,046	606	108	11	15	18	..	179
Bankura	3,721	5,301	978	191	51	127	21	..	521
Midnapur	3,641	5,821	538	221	43	167	66	..	238
Hooghly	3,933	5,594	478	144	15	138	56	..	260
Howrah	3,161	6,643	196	266	14	131	14	..	96
Presidency Division	3,023	6,632	295	197	16	52	25	..	142
24 Parganas	2,884	6,829	287	165	12	62	7	..	177
Calcutta	5,860	4,035	105	35	..	..	..	..	70
Nadia	3,344	6,390	266	203	29	88	105	..	..
Murshidabad	2,995	6,632	323	310	17	31	23	..	96
Malda	2,894	6,796	310	257	16	41	17	..	132
West Dinajpur	3,255	6,800	445	95	29	32	43	..	262
Jalpaiguri	3,992	5,349	159	17	2	1	15	..	33
Darjeeling	4,011	5,500	489	3	6	6	151	..	285
Cooch Behar	3,819	6,126	55	41	7	6	3	..	15

Number per 10,000 of Livelihood Class III whose secondary means of livelihood is :

Division and District	Rent on agricultural land		Production other than cultivation		Commerce		Transport		Other services and miscellaneous sources	
	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants
1.25 Himalayan West Bengal Division.	4	..	51	29	23	7	4	1	38	9
2.11 West Bengal Plain Division	7	1	84	124	39	23	9	3	57	51
Chandernagore	..	..	..	..	..	..	..	..	..	..
Sikkim	..	..	..	..	..	..	..	..	..	352
West Bengal	7	1	84	123	38	23	8	3	57	50
Burdwan Division	4	1	103	169	34	27	11	4	69	66
Burdwan	2	2	123	267	23	23	10	2	65	52
Birbhum	2	..	81	238	24	20	3	2	66	138
Bankura	5	1	162	270	36	55	5	4	66	54
Midnapur	7	1	110	84	54	29	19	8	92	69
Hooghly	3	..	71	81	28	14	10	3	69	43
Howrah	2	..	33	34	24	21	15	4	22	13
Presidency Division	11	2	53	61	43	17	5	2	43	30
24 Parganas	15	..	59	47	53	18	6	2	43	24
Calcutta	..	..	..	35	..	..	..	..	105	..
Nadia	26	21	52	70	34	16	3	1	37	24
Murshidabad	3	..	62	103	33	21	6	1	61	56
Malda	3	2	71	57	35	13	4	4	20	15
West Dinajpur	5	..	42	52	27	10	1	..	39	43
Jalpaiguri	..	..	49	89	25	7	1	..	39	14
Darjeeling	19	..	14	9	26	16	28	4	18	13
Cooch Behar	2	..	58	18	22	5	1	..	41	56

SUBSIDIARY TABLE—IV.5

Livelihood Class IV (Non-cultivating owners of land; Agricultural rent receivers and their dependants)

Number per 10,000 persons of Livelihood Class IV in each subclass; Secondary Means of Livelihood of 10,000 persons of Livelihood Class IV

Division and District	Number per 10,000 of Livelihood Class IV			Number per 10,000 of Livelihood Class IV whose secondary means of livelihood is :					
	Self-supporting persons	Non-earning dependants	Earning dependants	Cultivation of owned land		Cultivation of unowned land		Employment as cultivating labourers	
				Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants
1	2	3	4	5	6	7	8	9	10
1.25 Himalayan West Bengal Division	2,377	7,437	186	80	9	22	66	15	6
2.11 West Bengal Plain Division	2,622	7,141	237	186	27	24	9	28	24
Chandernagore	1,818	8,182	..	119	..	..	..	..	..
Sikkim	1,111	8,704	185	..	..	..	..	..	..
West Bengal	2,610	7,156	234	180	26	24	12	27	23
Burdwan Division	2,757	7,015	228	224	26	28	7	30	22
Burdwan	3,119	6,678	203	310	29	35	2	28	21
Birbhum	2,617	7,192	191	210	33	49	13	55	30
Bankura	3,073	6,686	241	263	15	52	1	51	56
Midnapur	2,792	6,950	258	271	31	32	11	26	24
Hooghly	2,449	7,247	304	115	29	2	14	23	8
Howrah	2,230	7,656	114	77	5	5	2	14	8
Presidency Division	2,467	7,292	241	137	27	19	16	24	24
24-Parganas	2,490	7,316	194	179	32	27	9	20	15
Calcutta	2,427	7,429	144	32	3	2	..	20	..
Nadia	2,649	6,988	303	186	52	30	40	45	128
Murshidabad	2,163	7,381	456	197	27	12	5	13	6
Malda	2,382	7,215	403	279	116	31	12	77	54
West Dinajpur	3,232	6,545	223	108	35	16	3	48	35
Jalpaiguri	2,426	7,305	269	39	7	39	122	2	9
Darjeeling	1,923	7,977	100	33	17	..	..	33	..
Cooch Behar	2,398	7,523	84	145	12	3	..	30	3

Number per 10,000 of Livelihood Class IV whose secondary means of livelihood is :

Division and District	Rent on agricultural land		Production other than cultivation		Commerce		Transport		Other services and miscellaneous sources	
	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants
	11	12	13	14	15	16	17	18	19	20
1.25 Himalayan West Bengal Division	9	38	15	165	46	14	..	134	34
2.11 West Bengal Plain Division	10	68	33	133	45	7	8	203	81
Chandernagore	40	..
Sikkim	370	..	..	..	..	185
West Bengal	10	66	32	135	45	8	8	199	79
Burdwan Division	15	33	39	143	44	9	6	222	69
Burdwan	18	101	58	125	29	6	1	243	49
Birbhum	111	42	204	30	5	8	232	36
Bankura	7	110	75	124	34	11	1	225	51
Midnapur	12	78	32	141	45	15	10	226	93
Hooghly	32	80	25	159	39	8	7	194	105
Howrah	8	21	14	133	31	3	4	170	42
Presidency Division	5	49	25	127	46	6	10	177	33
24-Parganas	5	53	27	103	45	8	4	142	57
Calcutta	4	31	17	87	35	5	2	216	83
Nadia	43	40	196	66	..	2	234	46
Murshidabad	8	82	17	168	64	3	57	171	276
Malda	194	62	93	23	15	12	167	124
West Dinajpur	13	96	25	169	54	3	3	248	54
Jalpaiguri	15	43	23	139	48	20	..	130	43
Darjeeling	251	67	17	..	67	17
Cooch Behar	3	86	9	185	39	6	..	151	181

SUBSIDIARY TABLE IV.6
Active and Semi-active Workers in Cultivation

Division and District	Cultivation				Cultivation of owned land			
	Total	Principal means of livelihood of self-supporting persons	Secondary means of livelihood of self-supporting persons whose principal means of livelihood is other than cultivation	Secondary means of livelihood of earning dependants	Total	Principal means of livelihood of self-supporting persons	Secondary means of livelihood of self-supporting persons whose principal means of livelihood is other than cultivation	Secondary means of livelihood of earning dependants
1	2	3	4	5	6	7	8	9
1.25 Himalayan West Bengal Division	326,105	300,160	6,935	19,070	159,937	151,519	4,696	3,522
2.11 West Bengal Plain Division	3,921,976	3,355,562	175,048	391,366	1,920,425	1,719,986	138,295	62,144
Chandernagore	86	29	53	4	74	22	50	2
Sikkim	71,646	28,507	59	45,080	27,291	23,788	49	3,454
West Bengal	4,248,055	3,655,693	181,930	410,432	2,080,288	1,871,483	143,141	65,664
Burdwan Division	2,399,362	2,032,251	113,514	253,597	1,153,507	1,027,353	89,831	36,323
Burdwan	457,007	393,458	21,432	42,117	201,705	175,741	16,960	9,004
Birbhum	267,571	239,256	7,762	20,553	122,022	112,214	6,490	3,318
Bankura	346,654	283,220	13,501	49,933	166,562	152,754	10,349	3,459
Midnapur	867,696	736,273	32,590	98,833	453,938	416,694	23,471	13,773
Hooghly	298,696	252,758	16,265	29,673	134,720	117,013	13,867	3,840
Howrah	161,738	127,286	21,964	12,488	74,560	52,937	18,694	2,929
Presidency Division	1,848,693	1,623,442	68,416	156,835	926,781	844,130	53,310	29,341
24-Parganas	679,426	598,019	27,351	59,056	319,927	289,383	21,573	8,971
Calcutta	2,731	1,857	659	215	2,196	1,561	506	129
Nadla	182,336	155,809	5,919	20,608	94,787	88,393	3,951	2,443
Murshidabad	322,086	281,941	17,311	22,834	176,706	156,001	14,574	6,131
Malda	167,251	141,097	8,924	17,230	85,862	75,653	6,835	3,374
West Dinajpur	168,698	149,559	1,317	17,822	87,366	81,620	975	4,771
Jalpaiguri	131,585	118,238	3,998	9,349	54,416	49,587	3,002	1,827
Darjeeling	39,136	32,124	2,105	4,907	20,512	18,954	1,229	329
Cooch Behar	155,444	149,798	832	4,814	85,009	82,978	665	1,366

Division and District	Cultivation of unowned land				Employment as cultivating labourers			
	Total	Principal means of livelihood of self-supporting persons	Secondary means of livelihood of self-supporting persons whose principal means of livelihood is other than cultivation	Secondary means of livelihood of earning dependants	Total	Principal means of livelihood of self-supporting persons	Secondary means of livelihood of self-supporting persons whose principal means of livelihood is other than cultivation	Secondary means of livelihood of earning dependants
	10	11	12	13	14	15	16	17
1.25 Himalayan West Bengal Division	135,701	123,174	1,783	10,744	30,527	25,467	256	4,804
2.11 West Bengal Plain Division	716,603	624,673	19,148	72,782	1,234,948	1,010,903	17,605	256,440
Chandernagore	6	2	3	1	6	5		1
Sikkim	6,043	2,631	10	3,402	38,312	88		38,224
West Bengal	852,298	747,845	20,928	83,525	1,315,469	1,036,365	17,861	261,243
Burdwan Division	422,848	370,456	12,389	40,003	823,007	634,442	11,294	177,271
Burdwan	83,172	73,719	2,640	6,813	172,136	143,998	1,832	26,300
Birbhum	37,900	33,942	562	3,396	107,649	93,100	710	13,839
Bankura	41,570	34,894	1,252	5,424	138,522	95,572	1,900	41,050
Midnapur	175,285	154,219	4,336	16,730	238,473	165,360	4,783	68,330
Hooghly	59,301	52,235	1,489	5,577	104,675	83,510	909	20,256
Howrah	25,620	21,447	2,110	2,063	61,558	52,902	1,160	7,496
Presidency Division	429,450	377,389	8,539	43,522	492,463	401,923	6,567	83,973
24-Parganas	125,028	112,644	2,951	9,433	234,471	190,992	2,827	40,652
Calcutta	225	129	66	30	310	167	87	56
Nadla	38,173	24,645	1,370	12,158	40,376	42,771	598	6,007
Murshidabad	47,006	41,077	1,337	4,592	98,374	84,863	1,400	12,111
Malda	36,358	31,905	828	3,565	115,031	35,479	1,261	10,291
West Dinajpur	46,959	43,755	204	3,000	34,373	24,184	138	10,051
Jalpaiguri	71,916	64,259	879	6,778	5,253	4,392	117	744
Darjeeling	12,272	9,990	796	1,486	6,352	3,180	80	3,092
Cooch Behar	51,513	48,925	108	2,480	18,922	17,895	50	968

SUBSIDIARY TABLE IV.7

Progress of Cultivation During Three decades

Division and District	Average net area sown (A1) in acres				Average area sown more than once (A2) in acres			
	1951	1941	1931	1921	1951	1941	1931	1921
	2	3	4	5	6	7	8	9
1.25 Himalayan West Bengal Division	859,900	789,400	764,000	894,900	65,800	48,700	69,100	89,700
2.11 West Bengal Plain Division	10,065,100	6,813,200	6,641,900	7,228,900	1,265,100	866,800	678,300	900,800
Chandernagore*	..	..	..	..	..	..	..	..
Sikkim*	..	..	..	..	..	..	..	..
West Bengal	10,925,000	7,602,600	7,405,900	8,123,800	1,330,700	913,500	747,400	1,000,500
Burdwan Division	5,528,800	3,799,000	4,008,100	4,216,300	389,000	249,200	202,000	405,300
Burdwan	1,091,200	556,500	759,700	684,000	66,800	55,800	80,000	220,000
Birbhum	749,300	625,600	612,100	768,200	71,300	58,900	14,500	15,000
Bankura	792,000	611,000	661,800	487,600	75,200	33,900	22,200	42,400
Midnapur	2,138,200	1,628,100	1,610,000	1,825,600	125,500	6,500	92,400	76,900
Hooghly	518,000	279,400	255,700	312,400	86,300	73,900	22,900	21,000
Howrah	240,100	98,400	109,800	138,500	23,900	20,200	20,000	30,000
Presidency Division	5,396,200	3,803,600	3,397,800	3,907,500	941,700	664,300	545,400	595,200
24-Parganas	1,507,000	932,900	847,400	1,059,500	118,800	131,000	117,200	112,800
Calcutta†	..	..	..	..	..	..	..	..
Nadia	696,100	477,200	310,000	345,406	226,900	163,400	190,800	118,500
Murshidabad	1,005,400	822,800	565,600	550,500	294,700	275,500	107,300	190,800
Malda	693,000	336,500	450,400	506,800	176,900	47,700	60,300	69,700
West Dinajpur	634,800	444,800	460,400	490,400	58,800	..	700	3,700
Jalpaiguri	636,500	602,900	604,700	733,000	39,600	29,800	52,200	89,500
Darjeeling	223,400	186,500	159,300	161,000	26,000	16,900	16,900	10,200
Cooch Behar*	..	..	..	..	..	..	..	..

Division and District	Average net area irrigated (A3) in Acres				Average area irrigated more than once (A4) in acres			
	1951	1941	1931	1921	1951	1941	1931	1921
	10	11	12	13	14	15	16	17
1.25 Himalayan West Bengal Division	169,953	172,151	149,619	353,727	20	..	3,955	58,169
2.11 West Bengal Plain Division	1,818,356	1,555,850	1,057,439	1,368,224	57,624	28,509	102,231	53,811
Chandernagore*	..	..	..	..	..	..	..	..
Sikkim*	..	..	..	..	..	..	..	..
West Bengal	1,988,309	1,728,031	1,207,058	1,721,951	57,644	28,509	106,186	111,980
Burdwan Division	1,627,838	1,321,412	805,474	1,079,683	55,698	28,292	35,885	32,460
Burdwan	815,752	299,877	151,163	371,073	7,371	33	24,182	32,460
Birbhum	381,259	286,363	152,901	271,100	17,819	7,328	..	..
Bankura	407,070	370,145	207,780	93,178	8,270	15,818	..	..
Midnapur	434,310	293,710	188,107	215,686	7,612	1,818	6,245	..
Hooghly	83,778	66,245	102,808	128,646	17,945	2,295	4,073	..
Howrah	5,669	5,572	2,715	..	1,681	1,000	1,385	..
Presidency Division	360,471	406,589	401,584	642,268	1,946	217	70,301	79,520
24-Parganas	15,441	..	49,486	1,000	956	..	..	..
Calcutta†	..	..	..	..	..	..	..	..
Nadia	2,482	254	231	1,002	..	216	..	..
Murshidabad	162,681	161,838	148,272	135,592	966	1	66,346	21,351
Malda	5,885	72,346	53,976	100,947	..	..	..	..
West Dinajpur	4,029	..	..	..	4	..	..	..
Jalpaiguri	118,466	118,211	112,400	307,977	20	..	..	58,169
Darjeeling	56,487	53,940	37,219	45,750	..	..	3,955	..
Cooch Behar*	..	..	..	..	..	..	..	..

Note—The above figures cannot be taken as correctly appraising the progress of cultivation in view of the fact that the organisation of collection of agricultural statistics as it existed before 1944-45 could not have given dependable figures and were known to have been under estimating the crop position. This fact was disclosed by the results of random sample survey as well as the figures arrived at by complete enumeration in the year 1944-45. The sharp rise in 1951 is due to the revision of estimates in the light of data collected in 1944-45 and the results of sample survey carried out since then. The figures of 1921, '31 and '41 have been recomputed to secure comparability with those of 1951. All figures have been supplied by the Department of Agriculture, West Bengal.

* Figures not available.

† Not an agricultural district.

SUBSIDIARY TABLE IV.8

Components of Cultivated Area per capital during Three Decades

EXPLANATION

Values for (USC), (UDC), (ISC) and (IDC) are derived from the area figures of Subsidiary Table IV.7—Progress of cultivation during three decades—and the Census Population (P) of the Census year in question (and expressed in cents) according to the formula :

$$(i) \text{ (USC)} = \frac{A(1) + A(4) - A(2) - A(3)}{P} \times 100 \text{ cents}$$

$$(ii) \text{ (UDC)} = \frac{A(2) - A(4)}{P} \times 100 \text{ cents}$$

$$(iii) \text{ (ISC)} = \frac{A(3) - A(4)}{P} \times 100 \text{ cents}$$

$$(iv) \text{ (IDC)} = \frac{A(4)}{P} \times 100 \text{ cents}$$

All figures have been supplied by the Department of Agriculture, West Bengal.

The following statement shows the population of West Bengal (excluding Cooch Behar) in 1951, 1941, 1931 and 1921 :

	1951	1941	1931	1921
WEST BENGAL	24,139,150	21,196,453	17,072,541	15,808,348
Burdwan Division	11,102,530	10,287,369	8,647,189	8,050,642
Burdwan	2,191,667	1,690,732	1,575,699	1,434,771
Birbhum	1,066,889	1,048,317	947,554	851,725
Bankura	1,319,259	1,289,640	1,111,721	1,019,941
Midnapur	3,359,022	3,190,647	2,799,093	2,666,660
Hooghly	1,554,320	1,377,729	1,114,255	1,080,142
Howrah	1,611,373	1,490,304	1,098,867	997,403
Presidency Division	12,036,620	10,909,084	8,425,352	7,757,706
24-Paraganas	4,609,309	3,669,490	2,888,694	2,636,710
Calcutta	2,548,677	2,108,891	1,140,862	1,031,697
Nadia	1,144,924	840,308	721,907	711,706
Murshidabad	1,715,759	1,640,530	1,370,677	1,224,181
Malda	997,580	844,315	720,440	686,174
West Dinajpur	720,573	583,484	523,977	490,434
Jalpaiguri	914,538	845,702	739,160	694,056
Darjeeling	445,260	376,369	319,635	282,748
Cooch Behar . . . . .	..	..	..	..
1.25 Himalayan West Bengal Division	1,859,798	1,222,071	1,058,795	976,804
2.11 West Bengal Plain Division	22,779,352	19,974,382	16,013,746	14,831,544

SUBSIDIARY TABLE IV.8

Components of Cultivated Area per capita during Three Decades

Division and District	Unirrigated single-crop cultivation per capita				Unirrigated double-crop cultivation per capita			
	(U.S.C.) (in cents)				(U.D.C.) (in cents)			
	1951	1941	1931	1921	1951	1941	1931	1921
1	2	3	4	5	6	7	8	9
1.25 Himalayan West Bengal Division	45.9	46.7	51.9	51.2	4.8	3.8	6.2	4.3
2.11 West Bengal Plain Division	30.9	23.1	31.3	33.8	5.3	4.2	3.6	5.7
Chandernagore*	..	..	..	..	..	..	..	..
Sikkim*	..	..	..	..	..	..	..	..
West Bengal	31.7	23.5	32.6	34.9	5.3	4.2	3.8	5.6
Burdwan Division	32.1	21.9	35.1	34.3	3.0	2.1	1.9	4.6
Burdwan	33.1	10.6	38.3	8.7	2.3	2.9	0.4	13.1
Birbhum	29.6	27.4	46.9	56.6	5.0	4.9	1.5	1.8
Bankura	23.7	17.3	33.3	34.5	5.5	1.4	2.0	4.2
Midnapur	47.2	41.7	47.7	57.5	3.5	0.1	3.1	2.9
Hooghly	26.8	10.3	12.0	15.1	1.2	5.2	1.7	1.9
Howrah	13.2	4.9	8.0	10.9	1.4	1.3	1.7	3.0
Presidency Division	31.4	25.1	29.9	35.4	7.2	6.1	5.6	6.6
24 Parganas	29.8	21.9	23.6	35.9	2.6	3.6	4.1	4.3
Calcutta†	..	..	..	..	..	..	..	..
Nadia	40.8	37.3	16.5	31.7	19.8	19.4	26.4	16.7
Murshidabad	32.0	23.5	27.5	16.0	17.1	16.8	3.0	13.3
Malda	54.4	25.6	46.7	57.7	13.9	5.6	8.4	10.2
West Dinajpur	79.4	76.2	87.7	99.2	8.2	..	0.1	0.8
Jalpaiguri	52.9	53.8	50.5	56.7	4.3	3.5	7.1	4.5
Darjeeling	31.6	30.7	34.1	37.5	5.8	4.5	4.0	3.6
Cooch Behar*	..	..	..	..	..	..	..	..

Division and District	Irrigated single-crop cultivation per capita				Irrigated double-crop cultivation per capita			
	(I.S.C.) (in cents)				(I.D.C.) (in cents)			
	1951	1941	1931	1921	1951	1941	1931	1921
10	11	12	13	14	15	16	17	
1.25 Himalayan West Bengal Division	12.5	14.1	13.8	30.3	0.0	..	0.4	6.0
2.11 West Bengal Plain Division	7.7	7.6	6.0	8.9	0.3	0.1	0.6	0.4
Chandernagore*	..	..	..	..	..	..	..	..
Sikkim*	..	..	..	..	..	..	..	..
West Bengal	8.0	8.0	6.4	10.2	0.2	0.1	0.6	0.7
Burdwan Division	14.2	12.6	8.9	13.0	0.5	0.3	0.4	0.4
Burdwan	14.1	15.8	8.1	23.6	0.3	0.0	1.5	2.3
Birbhum	34.1	26.6	16.1	31.8	1.7	0.7	..	..
Bankura	30.6	27.5	18.7	9.1	0.2	1.2	..	..
Midnapur	12.7	9.1	6.5	8.1	0.2	0.1	0.2	..
Hooghly	4.2	4.6	8.9	11.9	1.2	0.2	0.4	..
Howrah	0.2	0.3	0.1	..	0.1	0.1	0.1	..
Presidency Division	2.3	3.7	3.9	7.3	0.0	0.0	0.3	1.0
24 Parganas	0.3	..	1.7	0.04	0.0	..	..	..
Calcutta†	..	..	..	..	..	..	..	..
Nadia	0.2	0.0	0.03	0.1	..	0.0	..	..
Murshidabad	9.4	9.9	6.0	13.4	0.1	0.0	4.3	1.7
Malda	0.6	8.6	7.5	14.7	..	..	..	..
West Dinajpur	0.6	..	..	..	0.0	..	..	..
Jalpaiguri	13.4	14.0	15.2	36.0	0.0	..	..	8.4
Darjeeling	12.7	14.3	10.4	16.2	..	..	1.2	..
Cooch Behar*	..	..	..	..	..	..	..	..

*Figures not available. †Not an agricultural district.

SUBSIDIARY TABLE IV.9

Land Area per capita (1951) ; and Trend of cultivation per capita during Three Decades

NOTE :—

$$\text{Total land area (in acres)} \times 100$$

$$\text{Column 2—Total Land Area per capita} = \frac{\text{Total land area (in acres)} \times 100}{P}$$

$$\text{Column 3—Cultivated and cultivable area per capita} = \frac{\text{Total cultivated and cultivable area (in acres)}}{P} \times 100$$

Columns 4—7—A (Area of cultivation per capita) is the sum of the four figures in Table III.8, i. e., (USC) + (UDC) + (ISC) + (IDC) in each year.

All figures have been furnished by the Department of Agriculture, West Bengal.

Division and District	Land Area per capita (1951)		Area of cultivation per capita (in cents)			
	Total Land Area per capita	Area cultivated and cultivable per capita	1951	1941	1931	1921
	(in cents)	(in cents)	4	5	6	7
1.25 Himalayan West Bengal Division	163.0	93.6	63.2	64.6	72.3	91.8
2.11 West Bengal Plain Division	75.7	63.5	44.2	34.0	41.5	48.8
Chandernagore*	..	..	..	..	..	..
Sikkim*	..	..	..	..	..	..
West Bengal	79.4†	58.5	45.2	35.8	43.4	51.4
Burdwan Division	74.3	66.1	49.8	36.9	46.3	53.3
Burdwan	72.1	64.6	49.8	29.3	48.3	47.7
Birbhum	94.1	90.9	70.3	59.6	64.5	90.2
Bankura	117.3	102.1	60.0	47.4	59.5	47.8
Midnapur	93.8	80.1	63.6	51.0	57.5	68.5
Hooghly	45.2	40.8	33.4	20.3	23.0	23.9
Howrah	20.2	17.3	14.0	6.6	9.9	13.9
Presidency Division	37.3	64.6	41.4	34.9	40.2	50.3
24-Parganas	68.5	41.1	32.7	25.5	29.4	40.2
Calcutta†	..	..	..	..	..	..
Nadia	79.9	76.7	60.8	56.7	43.9	48.5
Murshidabad	70.7	67.0	58.6	50.2	41.3	44.9
Malda	89.1	85.9	73.9	39.8	62.6	82.6
West Dinajpur	121.6	107.9	88.2	76.2	87.8	100.0
Jalpaiguri	159.1	106.3	69.6	71.3	91.3	105.6
Darjeling	171.0	67.4	50.1	49.6	49.7	57.3
Cooch Behar*	..	..	..	..	..	..

* Figures not available; † Not an agricultural district; ‡ Calculated on area given by Surveyor General, India.

SUBSIDIARY TABLE V.1

Non-Agricultural Classes per 1,000 persons of General Population ; number in each class and sub-class per 10,000 persons of All Non-Agricultural Classes ; and number of Employers, Employees and Independent Workers per 10,000 selfsupporting persons of All Non-Agricultural Classes

Division and District	Total Non-Agricultural Classes	Non-Agricultural Classes per 1,000 persons of General Population	Number per 10,000 persons of All Non-Agricultural Classes			
			Total			Y-- Production other than cultivation
			Selfsupporting persons	Non-earning dependants	Earning dependants	
1	2	3	4	5	6	7
1.25 Himalayan West Bengal Division	882,150	434	4,747	5,002	251	6,111
2.11 West Bengal Plain Division	9,782,546	429	3,803	6,020	177	3,361
Chandernagore	49,549	993	3,471	6,490	39	3,205
Sikkim	11,581	84	5,803	4,000	197	971
West Bengal	10,615,147	428	3,883	5,933	184	3,590
<i>Burdwan Division</i>	3,620,520	326	3,861	5,927	212	4,065
Burdwan	819,332	374	4,557	5,265	178	4,781
Bibrhum	198,607	136	3,965	5,579	456	2,965
Bankura	240,884	183	3,555	6,061	384	4,510
Midnapur	612,819	182	3,437	6,240	323	3,289
Hooghly	643,399	414	3,760	6,096	144	3,873
Howrah	1,105,479	686	3,686	6,181	133	4,218
<i>Presidency Division</i>	6,994,627	510	3,895	6,936	169	3,344
24-Parganas	2,147,524	406	3,586	6,294	120	4,041
Calcutta	2,525,981	991	4,380	5,508	112	2,167
Nadia	533,136	466	2,744	7,029	227	2,037
Murshidabad	529,286	308	3,100	6,557	283	3,168
Malda	269,723	288	2,862	6,657	481	3,239
West Dinajpur	106,827	148	3,597	6,215	188	1,885
Jalpalguri	469,044	513	5,397	4,424	179	5,063
Darjeeling	302,424	679	4,119	5,452	429	5,946
Cooch Behar	110,682	165	3,710	6,221	69	2,525

Division and District	Number per 10,000 persons of All Non-Agricultural Classes			Number per 10,000 selfsupporting persons of All Non-Agricultural Classes			
	VIII--Other services and miscellaneous sources			Employers	Employees	Independent Workers	Others
	VI--Commerce	VII--Transport	VIII--Other services and miscellaneous sources				
	8	9	10	11	12	13	14
1.25 Himalayan West Bengal Division	1,240	409	2,240	88	7,910	1,900	102
2.11 West Bengal Plain Division	2,284	740	3,635	255	5,922	3,526	297
Chandernagore	2,644	627	3,524	130	6,272	2,977	621
Sikkim	1,414	1,668	5,947	...	4,332	5,145	23
West Bengal	2,177	713	3,520	239	6,122	3,363	278
<i>Burdwan Division</i>	1,889	747	3,299	192	6,027	3,525	256
Burdwan	1,582	657	3,030	174	7,087	2,535	204
Bibrhum	1,656	388	4,991	537	3,920	5,257	286
Bankura	1,999	396	3,095	434	3,399	5,762	405
Midnapur	1,646	999	4,066	134	4,584	4,852	430
Hooghly	2,163	559	3,405	120	6,198	3,435	247
Howrah	2,109	923	2,750	165	6,658	2,925	182
<i>Presidency Division</i>	2,327	695	3,634	263	6,171	3,280	286
24-Parganas	2,123	505	3,271	132	6,601	3,067	200
Calcutta	2,993	1,139	3,701	470	6,323	2,966	236
Nadia	2,148	314	5,601	118	3,185	5,020	1,677
Murshidabad	2,232	301	4,299	137	3,186	6,418	259
Malda	1,685	175	4,851	141	2,982	6,595	282
West Dinajpur	2,623	315	5,177	157	4,862	4,646	335
Jalpalguri	1,029	377	1,531	105	8,431	1,403	61
Darjeeling	1,000	465	2,589	22	3,165	1,732	81
Cooch Behar	2,790	392	4,293	182	3,930	6,476	412

SUBSIDIARY TABLE V.1a

Non-Agricultural Classes per 1,000 persons of Rural Population ; number in each class and subclass per 10,000 persons of All Non-Agricultural Classes ; and number of Employers, Employees and Independent Workers per 10,000 selfsupporting persons of All Non-Agricultural Classes

Division and District	Total Non-Agricultural Classes Rural	Number per 10,000 persons of All Non-Agricultural Classes								Number per 10,000 self supporting persons of All Non-Agricultural Classes			
		Non-Agricultural Classes per 1,000 persons of Rural population	Total			V Production other than cultivation	VI Commerce	VII Transport	VIII Other services and miscellaneous sources	Employ-ers	Employ-ees	Inde-pendent Workers	Others
			Self-supporting persons	Non-earning dependants	Earning dependants								
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.25 Himalayan West Bengal Division	678,332	373	5,133	4,546	271	7,496	719	276	1,490	70	8,421	1,416	83
2.11 West Bengal Plain Division	4,038,568	840	3,473	6,258	369	3,813	1,311	403	3,374	137	4,611	4,397	415
Chandernagore	..	..	..	..	..	..	..	..	..	..	..	..	..
Sikkim	8,992	67	6,235	3,574	151	916	1,368	2,659	5,659	..	4,021	5,562	17
West Bengal	4,717,940	253	3,712	6,019	269	4,243	1,742	334	3,531	132	5,372	4,132	364
Burdwan Division	2,144,737	226	3,423	5,563	269	4,204	1,897	414	3,295	162	5,217	4,229	373
Burdwan	533,915	226	4,959	4,816	225	5,373	1,308	422	2,297	130	7,132	2,325	213
Birbhum	144,512	145	4,154	5,313	531	3,524	1,342	216	4,298	333	3,265	5,341	361
Bankura	165,211	135	3,206	5,717	477	5,119	1,593	243	3,685	449	3,291	5,373	472
Midnapur	397,264	129	3,529	6,097	313	3,208	1,879	498	4,229	119	3,579	5,765	546
Hooghly	312,538	258	3,324	6,445	211	3,854	2,454	609	3,292	134	4,279	5,459	323
Howrah	691,347	543	3,165	6,662	173	4,791	2,044	563	2,657	111	5,743	3,225	221
Presidency Division	2,573,153	281	3,815	6,715	270	4,376	1,633	397	3,635	195	5,452	4,627	416
24-Parganas	836,968	258	3,114	6,723	158	3,593	2,333	439	3,635	133	4,454	5,121	242
Calcutta	..	..	..	..	..	..	..	..	..	..	..	..	..
Nadia	341,273	364	2,767	6,917	316	2,143	1,665	132	6,895	73	2,741	4,913	2,263
Murshidabad	408,084	258	3,226	6,455	319	3,529	2,012	249	4,219	135	2,958	6,416	271
Maldia	236,904	263	2,859	6,621	529	3,513	1,495	156	4,331	159	2,741	6,799	390
West Dinajpur	70,522	104	3,313	5,929	253	2,191	2,055	254	5,599	119	4,722	4,577	411
Jalpalguri	406,542	478	5,699	4,114	196	7,923	664	232	1,131	95	8,753	1,087	35
Darjeeling	210,499	609	4,365	5,162	473	7,368	491	296	1,375	14	9,114	617	55
Cooch Behar	63,341	192	4,121	5,799	89	3,211	2,345	273	4,171	51	2,914	6,429	686

SUBSIDIARY TABLE V.1b

Non-Agricultural Classes per 1,000 persons of Urban Population ; number in each class and subclass per 10,000 persons of All Non-Agricultural Classes ; and number of Employers, Employees and Independent Workers per 10,000 selfsupporting persons of All Non-Agricultural Classes

Division and District	Total Non-Agricultural Classes Urban	Number per 10,000 persons of All Non-Agricultural Classes								Number per 10,000 selfsupporting persons of All Non-Agricultural Classes			
		Non-Agricultural Classes per 1,000 persons of Urban population	Total			V Production other than cultivation	VI Commerce	VII Transport	VIII Other services and miscellaneous sources	Employ-ers	Employ-ees	Inde-pendent Workers	Others
			Self-supporting persons	Non-earning dependants	Earning dependants								
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.25 Himalayan West Bengal Division	202,763	862	2,453	6,364	193	1,474	2,917	855	4,754	177	5,219	4,312	192
2.11 West Bengal Plain Division	5,743,983	959	4,816	8,552	113	3,644	2,513	976	3,467	321	6,714	2,759	215
Chandernagore	49,549	933	3,471	6,499	39	3,295	2,644	627	3,524	130	6,272	2,977	621
Sikkim	2,569	916	4,293	5,439	213	1,144	1,534	300	6,952	..	7,223	2,323	45
West Bengal	5,897,207	918	4,829	8,865	115	2,983	2,526	975	3,511	318	6,476	2,736	211
Burdwan Division	1,475,733	913	3,993	5,963	129	2,729	2,066	1,723	3,144	226	7,093	2,549	193
Burdwan	285,417	861	3,204	6,197	89	3,539	2,094	1,096	3,273	322	6,773	2,559	121
Birbhum	54,095	734	3,453	6,291	256	1,469	2,495	796	5,249	1,193	3,775	4,999	82
Bankura	75,673	800	3,097	6,313	150	3,179	2,374	722	3,225	392	3,247	5,441	259
Midnapur	213,555	862	3,175	6,522	303	3,446	1,233	1,923	3,398	153	6,473	2,955	139
Hooghly	330,261	959	4,171	5,743	81	4,646	1,288	519	2,947	119	7,793	1,913	154
Howrah	614,132	964	4,295	6,627	83	3,661	2,124	1,297	2,553	211	7,246	2,285	163
Presidency Division	4,421,474	973	4,658	8,373	170	2,744	2,439	924	3,633	345	6,544	2,877	274
24-Parganas	1,318,538	959	3,227	6,918	95	4,327	1,933	645	3,699	132	7,465	2,816	167
Calcutta	2,525,981	991	4,389	5,598	112	3,167	2,993	1,139	3,791	179	6,328	2,968	216
Nadia	191,861	922	2,708	7,210	67	1,339	3,097	549	4,005	190	3,992	5,316	612
Murshidabad	121,202	898	2,937	6,899	164	1,953	2,974	477	4,596	146	4,627	5,612	315
Maldia	32,319	833	2,825	6,922	193	1,639	3,022	313	4,945	82	4,563	5,139	216
West Dinajpur	36,305	866	3,167	6,779	63	1,299	3,723	433	4,549	299	5,199	4,255	156
Jalpalguri	63,592	960	3,529	6,408	66	1,579	3,359	967	4,624	214	4,405	4,653	223
Darjeeling	91,925	973	3,553	6,117	339	1,349	2,379	921	5,169	44	5,495	4,195	135
Cooch Behar	47,341	943	3,159	6,787	54	1,406	3,334	562	4,453	409	5,793	3,213	73

SUBSIDIARY TABLE V.2

Livelihood Class V (Production other than cultivation)

Number per 10,000 persons of Livelihood Class V in each subclass; number per 10,000 selfsupporting persons of Livelihood Class V who are employers, employees and independent workers; Secondary Means of Livelihood of 10,000 persons of Livelihood Class V

Division and District	Total Livelihood Class V	Number per 10,000 of Livelihood Class V			Number per 10,000 selfsupporting persons of Livelihood Class V			
		Self-supporting persons	Non-earning dependants	Earning dependants	Employers	Employees	Independent workers	
1	2	3	4	5	6	7	8	
1.25 Himalayan West Bengal Division	T	539,041	5,284	4,451	285	27	9,147	828
	R	508,149	5,066	4,104	275	14	8,977	634
	U	29,892	198	347	10	13	170	193
2.11 West Bengal Plain Division	T	3,288,139	4,221	5,579	200	195	9,698	3,107
	R	1,539,901	1,840	2,711	139	58	2,188	2,141
	U	1,748,238	2,381	2,868	68	142	4,533	966
Chandernagore	U	15,880	3,883	6,077	40	52	3,584	1,364
Sikkim	T	1,123	4,390	4,871	739	..	5,233	4,767
	R	824	3,428	3,250	659	..	4,199	3,611
	U	299	962	1,621	80	..	1,034	1,156
West Bengal	T	3,811,300	4,370	5,417	213	167	7,108	2,725
	R	2,049,050	2,304	2,919	163	47	3,333	1,892
	U	1,762,250	2,066	2,498	60	120	3,775	833
Burdwan Division	T	1,472,058	4,393	5,374	233	111	6,791	3,098
	R	923,075	2,717	3,376	178	55	3,567	2,562
	U	548,983	1,676	1,998	55	56	3,224	536
Burdwan	T	387,612	5,518	4,298	184	78	7,746	2,176
Birbhum	T	58,876	4,287	5,183	580	449	2,528	7,023
Bankura	T	108,629	3,767	5,784	499	148	2,436	7,416
Midnapur	T	201,539	3,398	6,171	431	149	3,230	6,621
Hooghly	T	249,162	4,488	5,386	126	95	7,558	2,347
Howrah	T	466,240	3,997	5,868	140	93	3,075	1,832
Presidency Division	T	2,339,242	4,356	5,445	199	202	7,310	2,453
	R	1,125,975	2,045	2,632	137	41	3,186	1,467
	U	1,213,267	2,311	2,813	62	161	4,124	1,021
24-Parganas	T	867,839	4,165	5,707	128	94	8,011	1,895
Calcutta	U	547,262	4,437	5,433	130	865	6,888	2,547
Nadla	T	108,577	3,744	6,104	162	225	2,680	7,095
Murshidabad	T	167,685	3,430	6,220	350	161	2,315	7,524
Malda	T	88,703	2,748	6,686	566	290	486	9,224
West Dinajpur	T	20,135	4,182	5,575	243	148	3,748	6,104
Jalpaiguri	T	331,274	5,852	3,944	204	23	570	9,407
Darjeeling	T	179,824	4,443	5,091	466	6	9,395	599
Cooch Behar	T	27,943	3,571	6,357	72	284	2,108	7,609

SUBSIDIARY TABLE V.2—contd.

Livelihood Class V (Production other than cultivation)

Number per 10,000 persons of Livelihood Class V in each subclass; number per 10,000 self-supporting persons of Livelihood Class V who are employers, employees and independent workers; Secondary Means of Livelihood of 10,000 persons of Livelihood Class V

Number per 10,000 of Livelihood Class V whose secondary means of livelihood is :

Division and District	Cultivation of owned land		Cultivation of unowned land		Employment as cultivating labourers		Rent on agricultural land	
	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants
	9	10	11	12	13	14	15	16
1.25 Himalayan West Bengal Division T	63	8	27	4	3	18	1	4
2.11 West Bengal Plain Division T	158	18	21	9	23	28	5	2
Chandernagore U	16	1	1	1	..	1	3	..
Sikkim T	27	..	..	9	..	419	..	..
West Bengal T	145	16	23	9	21	25	4	2
<i>Burdwan Division</i> T	238	27	34	16	35	44	8	4
Burdwan T	160	22	35	13	24	24	4	10
Birbhum T	423	30	42	46	62	111	6	13
Bankura T	443	24	61	45	118	136	12	1
Midnapur T	399	66	66	21	92	106	5	1
Hooghly T	178	15	20	3	14	8	9	1
Howrah T	193	21	20	13	9	25	10	1
<i>Presidency Division</i> T	87	8	14	4	11	13	2	1
24-Parganas T	96	10	10	3	11	11	2	..
Calcutta U	1	..	..	..	..	..	1	1
Nadia T	82	7	16	8	16	20	7	2
Murshidabad T	318	35	25	11	32	25	4	..
Malda T	244	19	28	17	83	52	6	3
West Dinajpur T	119	23	31	3	31	43	2	..
Jalpaiguri T	78	3	24	3	3	2	1	6
Darjeeling T	38	4	36	5	3	49	..	..
Cooch Behar T	44	7	10	6	6	5	4	..

SUBSIDIARY TABLE V.2—conold.

Livelihood Class V (Production other than cultivation)

Number per 10,000 persons of Livelihood Class V in each subclass; number per 10,000 self-supporting persons of Livelihood Class V who are employers, employees and independent workers; Secondary Means of Livelihood of 10,000 persons of Livelihood Class V

Number per 10,000 of Livelihood Class V whose secondary means of livelihood is :

Division and District	Production other than cultivation		Commerce		Transport		Other services and miscellaneous sources	
	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants
	17	18	19	20	21	22	23	24
1-25 Himalayan West Bengal Division . . . T	36	220	21	20	3	1	16	15
2-11 West Bengal Plain Division . . . T	29	87	21	20	3	3	46	34
Chandernagore U	8	18	18	6	..	..	43	13
Sikkim T	27	80	..	..	..	..	..	231
West Bengal T	30	106	21	20	3	3	41	39
Burdwan Division T	31	91	23	22	4	4	38	26
Burdwan T	31	84	20	11	2	4	27	18
Birbhum T	85	279	28	36	..	..	59	65
Bankura T	79	232	39	29	4	2	92	81
Midnapur T	44	109	43	66	11	13	64	48
Hooghly T	21	62	20	15	1	1	31	22
Howrah T	15	49	14	14	3	2	24	16
Presidency Division T	29	114	20	19	2	2	43	36
24-Parganas T	17	73	17	13	1	2	33	16
Calcutta U	13	24	15	24	4	5	65	75
Nadia T	24	82	23	20	3	2	24	13
Murshidabad T	52	211	22	26	2	2	45	40
Malda T	156	294	60	31	9	10	208	140
West Dinajpur T	33	182	26	17	2	1	40	24
Jalpaiguri T	42	154	20	29	2	..	20	9
Darjeeling T	27	369	21	7	1	3	6	29
Cooch Behar T	15	37	16	6	4	1	22	9

SUBSIDIARY TABLE V.3

Livelihood Class VI (Commerce)

Number per 10,000 persons of Livelihood Class VI in each subclass ; number per 10,000 selfsupporting persons of Livelihood Class VI who are employers, employees and independent workers ; Secondary Means of Livelihood of 10,000 persons of Livelihood Class VI

Division and District		Total Livelihood Class VI	Number per 10,000 of Livelihood Class VI			Number per 10,000 selfsupporting persons of Livelihood Class VI		
			Self-supporting persons	Non-earning dependants	Earning dependants	Employers	Employees	Independent workers
1		2	3	4	5	6	7	8
1.25 Himalayan West Bengal Division	T	109,361	3,379	6,499	122	299	1,977	7,724
	R	50,223	1,708	2,810	78	124	704	4,221
	U	59,139	1,673	3,689	46	175	1,273	3,503
2.11 West Bengal Plain Division	T	2,215,049	3,352	6,499	149	689	3,235	6,076
	R	771,583	1,070	2,334	79	117	561	2,515
	U	1,443,466	2,282	4,165	70	572	2,674	3,561
Chandernagore	U	13,101	3,531	6,435	34	350	3,403	6,247
Sikkim	T	1,635	3,945	5,976	79	..	853	19,147
	R	1,228	2,807	4,667	36	..	574	6,542
	U	407	1,138	1,309	43	..	279	2,605
West Bengal	T	2,311,309	3,352	6,500	148	673	3,173	6,154
	R	821,805	1,108	2,370	79	118	571	2,611
	U	1,489,504	2,246	4,130	69	555	2,602	3,543
Burdwan Division	T	683,819	3,243	6,564	193	629	2,641	6,730
	R	387,494	1,822	3,702	143	276	1,208	4,141
	U	296,325	1,421	2,862	50	353	1,433	2,589
Burdwan	T	129,603	3,574	6,229	197	795	2,643	6,562
Birbhum	T	32,897	3,232	6,459	309	1,570	1,902	6,528
Bankura	T	48,151	3,033	6,095	272	1,495	1,634	6,871
Midnapur	T	100,849	3,460	6,254	286	302	1,734	7,964
Hooghly	T	139,156	2,895	6,960	145	366	2,488	7,146
Howrah	T	233,164	3,219	6,686	145	519	3,445	6,036
Presidency Division	T	1,627,490	3,398	6,472	130	690	3,337	5,923
	R	434,311	808	1,810	53	55	318	1,998
	U	1,193,179	2,592	4,662	77	635	3,069	3,925
24-Parganas	T	455,816	3,053	6,821	126	356	2,574	7,070
Calcutta	U	756,168	3,868	6,025	107	1,020	4,512	4,468
Nadia	T	114,522	2,669	7,200	131	196	1,332	8,472
Murshidabad	T	118,143	2,756	7,005	239	302	1,378	8,320
Malda	T	45,456	2,710	7,014	276	262	1,296	8,442
West Dinajpur	T	28,024	3,201	6,681	118	436	2,300	7,264
Jalpaiguri	T	48,248	3,525	6,857	119	367	1,848	7,785
Darjeeling	T	30,238	3,166	6,454	180	131	1,897	7,982
Cooch Behar	T	30,575	3,163	6,767	71	366	2,235	7,340

SUBSIDIARY TABLE V.3—contd.

Livelihood Class VI (Commerce)

Number per 10,000 persons of Livelihood Class VI in each subclass ; number per 10,000 selfsupporting persons of Livelihood Class VI who are employers, employees and independent workers ; Secondary Means of Livelihood of 10,000 persons of Livelihood Class VI

Number per 10,000 of Livelihood Class VI whose secondary means of livelihood is :

Division and District	Cultivation of owned land		Cultivation of unowned land		Employment as cultivating labourers		Rent on agricultural land	
	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants
	9	10	11	12	13	14	15	16
1-25 Himalayan West Bengal Division . . . T	37	8	10	5	3	3	7	..
2-11 West Bengal Plain Division . . . T	164	16	17	7	15	13	11	1
Chandernagore U	3	..	..	..	..	..	3	..
Sikkim T	37	..	..	..	..	..	..	..
West Bengal T	159	15	17	7	15	13	11	1
Burdwan Division T	338	36	31	13	25	24	24	2
Burdwan T	359	40	33	17	24	22	20	4
Birbhum T	480	49	26	10	19	24	13	2
Bankura T	465	29	38	40	34	42	44	1
Midnapur T	491	30	75	17	75	57	15	4
Hooghly T	347	59	20	7	12	9	23	2
Howrah T	203	23	18	8	12	15	22	1
Presidency Division T	84	6	10	4	10	8	6	1
24-Parganas T	134	8	19	5	22	16	7	1
Calcutta U	3	..	..	..	..	..	1	..
Nadia T	125	13	20	5	11	6	14	1
Murshidabad T	281	20	26	19	27	20	13	2
Malda T	397	32	22	9	37	42	9	..
West Dinajpur T	131	8	17	2	11	22	6	1
Jaipalguri T	32	5	6	1	5	1	6	..
Darjeeling T	28	12	17	5	..	5	10	..
Cooch Behar T	54	7	9	9	1	4	7	1

SUBSIDIARY TABLE V.3—concl.

Livelihood Class VI (Commerce)

Number per 10,000 persons of Livelihood Class VI in each subclass ; number per 10,000 self-supporting persons of Livelihood Class VI who are employers, employees and independent workers ; Secondary Means of Livelihood of 10,000 persons of Livelihood Class VI

Number per 10,000 of Livelihood Class VI whose secondary means of livelihood is :

Division and District	Production other than cultivation		Commerce		Transport		Other services and miscellaneous sources	
	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants
	17	18	19	20	21	22	23	24
1-25 Himalayan West Bengal Division T	12	23	49	48	5	8	28	33
3-11 West Bengal Plain Division T	19	28	42	49	5	4	47	33
Chandernagore U	11	5	25	21	4	..	31	8
Sikkim T	6	37	24	6	12	6	..	30
West Bengal T	19	28	42	49	5	4	46	33
<i>Burdwan Division</i> T	23	38	31	53	6	6	47	27
Burdwan T	27	35	16	46	10	4	79	29
Birbhum T	32	60	56	62	6	63	25	39
Bankura T	54	68	34	67	6	4	34	21
Midnapur T	30	37	46	91	11	6	52	44
Hooghly T	16	17	34	36	3	1	50	14
Howrah T	13	24	28	46	3	3	31	25
<i>Presidency Division</i> T	17	23	47	48	5	3	45	37
24-Parganas T	14	22	27	47	3	2	43	23
Calcutta U	15	14	61	42	6	3	55	48
Nadia T	18	23	34	49	4	3	32	31
Murshidabad T	36	75	27	66	6	3	27	32
Malda T	45	62	88	103	7	3	31	27
West Dinajpur T	39	25	62	44	6	1	48	14
Jalpaiguri T	16	17	70	66	7	2	34	26
Darjeeling T	9	40	26	42	4	5	22	71
Cooch Behar T	11	12	40	28	3	2	24	7

SUBSIDIARY TABLE V.4

Livelihood Class VII (Transport)

Number per 10,000 persons of Livelihood Class VII in each subclass ; number per 10,000 selfsupporting persons of Livelihood Class VII who are employers, employees and independent workers ; Secondary Means of Livelihood of 10,000 persons of Livelihood Class VII

Division and District	Total Livelihood Class VII	Number per 10,000 of Livelihood Class VII			Number per 10,000 self supporting persons of Livelihood Class VII			
		Self-supporting persons	Non-earning dependants	Earning dependants	Employers	Employees	Independent workers	
1.	2.	3.	4.	5.	6.	7.	8.	
1-25 Himalayan West Bengal Division	T	36,109	4,035	5,909	156	46	7,917	2,037
	R	18,766	2,139	2,961	97	27	4,562	711
	U	17,343	1,896	2,948	59	19	3,355	1,326
2-11 West Bengal Plain Division	T	723,296	4,322	5,557	121	98	7,193	2,709
	R	162,510	738	1,462	43	19	1,212	475
	U	560,786	3,584	4,095	73	79	5,981	2,234
Chandernagore	U	3,108	3,636	6,313	51	257	6,814	2,929
Sikkim	T	1,928	9,523	420	57	..	131	9,869
	R	1,851	9,898	166	36	..	109	9,760
	U	77	125	254	21	..	22	109
West Bengal	T	756,297	4,311	5,566	123	95	7,226	2,679
	R	161,276	807	1,539	50	20	1,366	457
	U	575,021	3,504	4,027	73	75	5,860	2,192
Burdwan Division	T	270,330	3,285	5,959	156	81	7,945	1,974
	R	103,898	1,298	2,461	35	33	3,436	343
	U	166,432	2,587	3,498	71	48	2,469	1,126
Burdwan	T	53,852	3,638	6,247	115	76	8,894	1,090
Birbhum	T	7,714	3,162	6,534	304	156	3,184	1,060
Bankura	T	9,549	3,069	6,607	324	577	5,247	4,176
Midnapur	T	61,250	3,448	6,261	291	50	3,190	1,760
Hooghly	T	35,949	3,870	6,034	96	91	6,921	2,989
Howrah	T	102,016	4,413	5,494	83	59	7,923	2,018
Presidency Division	T	485,967	4,549	5,347	104	102	6,385	3,013
	R	77,378	635	1,027	31	14	847	315
	U	408,589	4,014	4,320	73	88	6,038	2,698
24-Parganas	T	121,402	3,542	6,348	110	122	7,728	2,150
Calcutta	U	287,681	5,239	4,080	81	100	6,649	3,251
Nadia	T	16,748	3,138	6,760	102	53	6,112	3,835
Murshidabad	T	15,937	2,667	7,061	272	155	4,831	5,014
Malda	T	4,727	3,366	6,258	378	239	4,217	5,544
West Dinajpur	T	3,863	4,939	4,969	92	138	7,658	2,204
Jalpaiguri	T	17,705	4,428	5,500	72	55	3,029	1,916
Darjeeling	T	14,064	3,850	6,357	293	30	3,666	1,286
Cooch Behar	T	4,340	4,647	5,297	56	50	5,687	4,263

SUBSIDIARY TABLE V.4—contd.

Livelihood Class VII (Transport)

Number per 10,000 persons of Livelihood Class VII in each subclass ; number per 10,000 selfsupporting persons of Livelihood Class VII who are employers, employees and independent workers ; Secondary Means of Livelihood of 10,000 persons of Livelihood Class VII

Division and District	Number per 10,000 of Livelihood Class VII whose Secondary Means of Livelihood is :							
	Cultivation of owned land		Cultivation of unowned land		Employment as cultivating labourers		Rent on agricultural land	
	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants
	9	10	11	12	13	14	15	16
1-25 Himalayan West Bengal Division . . . T	34	15	8	1	1	4	1	..
8-11 West Bengal Plain Division . . . T	69	8	12	4	12	12	7	1
Chandernagore U	6	3	3	..	..	..	3	..
Sikkim T	5	..	..	..	..	21	..	..
West Bengal T	68	8	12	4	12	12	6	1
<i>Burdwan Division</i> T	133	14	25	10	21	24	13	2
Burdwan T	130	16	31	5	8	15	6	3
Birbhum T	314	27	36	13	23	22	14	27
Bankura T	259	8	64	67	30	81	20	1
Midnapur T	184	20	35	16	56	48	23	1
Hoooghly T	139	24	15	1	7	10	17	3
Howrah T	78	6	14	6	12	15	8	..
<i>Presidency Division</i> T	32	5	5	1	7	3	3	1
24-Parganas T	72	9	9	2	20	10	5	2
Calcutta U	1	..	..	..	..	..	1	1
Nadia T	61	5	4	5	2	8	8	1
Murshidabad T	195	15	32	14	26	36	5	..
Malda T	180	44	32	15	34	53	..	..
West Dinajpur T	42	15	27	3	21	33	..	..
Jalpaiguri T	86	2	7	..	1	1	1	..
Darjeeling T	27	35	6	..	1	9	..	..
Cooch Behar T	48	5	18	7	2	..	5	..

SUBSIDIARY TABLE V.4—concl'd.

Livelihood Class VII (Transport)

Number per 10,000 persons of Livelihood Class VII in each subclass; number per 10,000 selfsupporting persons of Livelihood Class VII who are employers, employees and independent workers; Secondary Means of Livelihood of 10,000 persons of Livelihood Class VII

Division and District	Number per 10,000 of Livelihood Class VII whose Secondary Means of Livelihood is :							
	Production other than cultivation		Commerce		Transport		Other services and miscellaneous sources	
	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants
	17	18	19	20	21	22	23	24
1:25 Himalayan West Bengal Division T	7	37	12	12	5	18	17	69
2:11 West Bengal Plain Division T	14	24	18	21	7	15	32	35
Chandernagore U	..	..	16	13	..	..	32	35
Sikkim T	..	21	..	..	..	5	..	10
West Bengal T	14	25	18	20	7	15	31	37
<i>Burdwan Division</i> T	11	25	16	23	7	22	28	37
Burdwan T	6	24	12	8	5	21	11	23
Birbhum T	21	60	14	51	4	8	12	97
Bankura T	21	30	16	25	5	25	14	37
Alidnapur T	29	41	29	61	12	30	63	74
Hooghly T	8	13	11	11	6	6	24	27
Howrah T	12	12	11	10	5	24	19	20
<i>Presidency Division</i> T	13	24	19	19	7	18	33	37
24-Parganas T	13	25	15	20	9	16	33	27
Calcutta U	13	17	21	20	7	5	38	37
Nadia T	22	25	19	11	11	36	15	11
Murshidabad T	16	111	9	8	6	51	18	37
Malda T	28	76	53	51	8	28	34	112
West Dinajpur T	39	12	27	3	12	24	12	3
Nalpalguri T	11	47	12	12	2	3	14	8
Darjeeling T	5	25	13	16	5	43	22	166
Cooch Behar T	..	35	7	5	16	2	18	2

SUBSIDIARY TABLE V.5

Livelihood Class VIII (Other services and miscellaneous sources)

Number per 10,000 persons of Livelihood Class VIII in each subclass ; Number per 10,000 self-supporting persons of Livelihood Class VIII who are employers, employees and independent workers ; Secondary Means of Livelihood of 10,000 persons of Livelihood Class VIII

Division and District		Total Livelihood Class VIII	Number per 10,000 of Livelihood Class VIII			Number per 10,000 self-supporting persons of Livelihood Class VIII			
			Self-supporting persons	Non-earning dependants	Earning dependants	Employers	Employees	Independent workers	Others
1		2	3	4	5	6	7	8	9
1:25 Himalayan West Bengal Division	T	197,839	4,228	5,528	246	209	6,334	2,948	509
	R	101,245	2,494	2,508	121	188	3,600	1,787	247
	U	96,594	1,732	3,020	125	21	2,734	1,161	162
2:11 West Bengal Plain Division	T	3,556,062	3,592	6,224	184	108	6,328	2,698	866
	R	1,564,564	1,425	2,850	125	30	2,088	1,373	477
	U	1,991,498	2,167	3,374	59	78	4,240	1,325	389
Chandernagore	U	17,460	3,022	6,937	41	2	5,969	2,007	2,022
Sikkim	T	6,875	5,433	4,391	176	..	7,775	2,182	40
	R	5,089	4,291	2,987	124	..	5,898	1,973	27
	U	1,786	1,142	1,404	52	..	1,880	209	13
West Bengal	T	3,736,241	3,628	6,184	188	115	6,330	2,716	839
	R	1,665,809	1,488	2,845	125	40	2,188	1,403	471
	U	2,070,432	2,140	3,339	63	75	4,142	1,313	368
Burdwan Division	T	1,194,313	3,552	6,239	209	115	6,157	2,385	343
	R	730,320	2,189	3,764	162	76	3,545	1,925	616
	U	463,993	1,363	2,475	47	39	2,612	960	227
Burdwan	T	248,260	3,768	6,060	172	108	7,416	1,663	313
Birbhum	T	99,120	4,079	5,477	444	343	5,062	4,038	557
Bankura	T	74,555	3,644	6,059	297	278	5,801	2,845	1,276
Midnapur	T	249,187	3,458	6,285	257	75	5,930	2,942	1,053
Hooghly	T	219,132	3,463	6,365	172	32	6,030	3,152	786
Howrah	T	304,059	3,324	6,549	127	83	5,868	3,317	732
Residency Division	T	2,541,923	3,664	6,157	179	114	6,409	2,639	332
	R	835,489	1,159	2,413	108	24	1,570	1,166	405
	U	1,606,434	2,505	3,744	71	90	4,839	1,473	433
24-Parganas	T	702,467	3,224	6,069	107	58	6,312	2,650	680
Calcutta	U	984,870	4,497	5,388	115	166	7,152	2,082	620
Nadia	T	298,289	2,381	7,321	298	26	4,069	2,390	3,515
Murshidabad	T	227,521	3,204	6,637	259	45	4,583	4,778	594
Maldas	T	180,837	2,974	6,529	497	6	5,029	4,407	558
West Dinajpur	T	55,305	3,502	6,288	210	34	6,293	3,009	664
Jalpalguri	T	71,817	4,797	5,078	125	454	6,232	2,817	447
Darjeeling	T	78,208	3,802	5,733	405	31	6,922	2,708	339
Cooch Behar	T	147,524	4,062	5,872	66	49	5,521	3,554	876

SUBSIDIARY TABLE V.5—contd.

Livelihood Class VIII (Other services and miscellaneous sources)

Number per 10,000 persons of Livelihood Class VIII in each subclass; number per 10,000 self-supporting persons of Livelihood Class VIII who are employers, employees and independent workers; Secondary Means of Livelihood of 10,000 persons of Livelihood Class VIII

Division and District	Number per 10,000 of Livelihood Class VIII whose Secondary Means of Livelihood is :							
	Cultivation of owned land		Cultivation of unowned land		Employment as cultivating labourers		Rent on Agricultural Land	
	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants	Self-supporting persons	Earning dependants
	10	11	12	13	14	15	16	17
1-25 Himalayan West Bengal Division T	46	10	9	5	3	10	3	..
2-11 West Bengal Plain Division T	119	13	21	24	15	18	8	1
Chandernagore U	10	..	..	..	..	..	1	..
Sikkim T	57	3	15	15	..	15	..	..
West Bengal T	116	13	20	23	14	18	8	1
<i>Burdwan Division</i> T	223	23	37	13	30	30	14	1
Burdwan T	196	26	26	10	20	22	16	2
Birbhum T	206	19	17	7	23	45	4	..
Bankura T	381	18	41	26	51	58	31	4
Midnapur T	353	36	79	21	72	58	10	..
Hooghly T	181	20	30	10	15	16	17	2
Howrah T	135	16	21	10	10	10	15	2
<i>Presidency Division</i> T	65	9	13	27	7	13	5	1
24-Patnanas T	82	6	15	7	8	14	6	1
Calcutta U	2	..	..	..	..	..	2	1
Nadia T	47	30	32	158	9	11	8	1
Murshidabad T	239	19	24	8	22	24	17	1
Malda T	207	17	35	112	24	77	4	..
West Dinajpur T	58	10	15	9	4	28	7	1
Jalpaiguri T	24	2	5	8	..	2	1	..
Darjeeling T	54	19	11	2	3	22	1	..
Cooch Behar T	65	6	9	4	6	4	10	1

SUBSIDIARY TABLE V.5—concl.

Livelihood Class VIII (Other services and miscellaneous sources)

Number per 10,000 persons of Livelihood Class VIII in each subclass; Number per 10,000 self-supporting persons of Livelihood Class VIII who are employers, employees and independent workers; Secondary Means of Livelihood of 10,000 persons of Livelihood Class VIII

Division and District	Number per 10,000 of Livelihood Class VIII whose Secondary Means of Livelihood is :							
	Production (other than cultivation)		Commerce		Transport		Other services and miscellaneous sources	
	Self- supporting persons	Earning dependants	Self- supporting persons	Earning dependants	Self- supporting persons	Earning dependants	Self- supporting persons	Earning dependants
	18	19	20	21	22	23	24	25
1.25 Himalayan West Bengal Division T	14	23	23	26	2	3	43	162
2.11 West Bengal Plain Division T	25	37	24	20	4	4	53	66
Chandernagore U	3	4	10	3	1	..	55	29
Sikkim T	1	26	..	3	1	6	13	109
West Bengal T	24	37	24	20	4	4	53	72
<i>Burdwan Division</i> T	31	45	20	13	4	4	59	75
Burdwan T	45	52	22	15	5	4	36	40
Birbhum T	35	124	11	20	2	4	61	224
Bankura T	61	88	27	24	2	4	47	75
Midnapur T	34	37	26	17	7	7	77	80
Hooghly T	20	29	15	19	2	3	71	75
Howrah T	17	20	18	17	3	4	58	49
<i>Presidency Division</i> T	21	34	27	22	4	4	50	70
24 Parganas T	11	20	13	13	2	2	44	45
Calcutta U	13	20	35	25	9	8	66	61
Nadia T	16	32	18	22	3	1	23	43
Murshidabad T	27	81	32	23	2	2	44	100
Malda T	104	128	23	29	1	2	45	132
West Dinajpur T	19	44	21	28	1	..	37	90
Jalpaiguri T	15	24	37	50	2	2	50	26
Darjeeling T	9	41	21	17	1	6	23	353
Cooch Behar T	19	13	25	7	3	1	63	30

SUBSIDIARY TABLE V-6

Comparison of the Classification of the Population by Livelihood Classes at the 1951 and 1931 Censuses

Livelihood Classes	Classification of Population							
	1951 Census				1931 Census			
	Number per 10,000 of general population				Number per 10,000 of general population			
	Total Classified population	Self-supporting persons	Non-earning dependants	Earning dependants	Total Classified population	Earners	Working dependants	
1	2	3	4	5	6	7	8	
West Bengal								
I	3,234	754	2,360	120	850	850	..	
II	1,201	301	840	60	205	205	..	
III	1,226	418	751	57	764	727	37	
IV	60	16	43	1	436	134	2	
V	1,536	671	832	33	643	624	19	
VI	932	312	606	14	236	232	4	
VII	805	131	170	4	91	90	1	
VIII	1,506	546	931	29	479	339	149	
TOTAL	10,000	3,149	6,533	318	3,404	3,192	212	
1.25 Himalayan West Bengal Division								
I	3,068	746	2,262	60	896	896	..	
II	2,223	607	1,558	58	333	333	..	
III	324	125	195	4	529	487	42	
IV	42	10	31	1	95	95	..	
V	2,654	1,397	1,181	76	1,353	1,336	17	
VI	538	182	350	6	151	149	2	
VII	178	72	103	3	38	35	3	
VIII	973	411	538	24	196	193	3	
TOTAL	10,000	3,550	6,218	232	3,591	3,524	67	
2.11 West Bengal Plain Division								
I	3,242	753	2,364	125	844	844	..	
II	1,108	274	774	60	192	192	..	
III	1,304	443	799	62	787	751	36	
IV	62	16	44	2	140	133	2	
V	1,440	608	803	29	568	550	18	
VI	970	325	631	14	244	240	4	
VII	317	137	178	4	96	95	1	
VIII	1,557	560	999	28	508	344	164	
TOTAL	10,000	3,116	6,560	324	3,379	3,154	225	
Sikkim								
I	8,386	1,727	3,468	3,191	1,648	1,648	..	
II	756	191	424	141	4,447	4,447	..	
III	14	6	6	2	28	25	3	
IV	4	1	3	..	8	3	..	
V	82	36	40	6	392	303	81	
VI	119	47	71	1	59	59	..	
VII	140	133	6	1	6	6	..	
VIII	409	271	219	9	183	100	83	
TOTAL	10,000	2,412	4,237	3,351	6,766	6,696	170	
Chandernagore								
I	12	4	8	..	..	..	..
II	6	..	6	..	..	..	..
III	3	1	2	..	..	..	..
IV	..	..	..	..	..	..	..
V	51	9	42	..	..	..	..
VI	3,182	1,236	1,938	13	..	..	..
VII	2,625	927	1,699	9	..	..	..
VIII	623	227	393	3	..	..	..
TOTAL	10,000	3,461	6,500	39	..	..	..

SUBSIDIARY TABLE V-6—concl.

Comparison of the Classification of the Population by Livelihood Classes at the 1951 and 1931 Censuses

Livelihood Classes							Active and Semi-active Workers					
							1951 Census			1931 Census		
							Self supporting persons 9	Secondary of self-supporting persons 10	Secondary of earning dependants 11	Principal earners 12	Subsidiary of principal earners 13	Working dependants 14
West Bengal												
I	.	.	.	.	.	.	1,871,683	282,121	65,084	1,561,195	68,723	..
II	.	.	.	.	.	.	747,845	144,751	63,525	542,569	19,647	..
III	.	.	.	.	.	.	1,094,365	158,826	261,243	1,254,424	110,069	65,821
IV	.	.	.	.	.	.	88,917	23,241	5,428	237,386	62,191	3,357
V	.	.	.	.	.	.	1,465,075	157,246	179,791	1,102,563	78,555	32,611
VI	.	.	.	.	.	.	774,810	153,246	74,326	440,922	60,165	7,056
VII	.	.	.	.	.	.	924,854	21,313	11,351	158,258	10,934	1,197
VIII	.	.	.	.	.	.	1,333,305	154,866	115,533	582,673	96,179	262,221
						TOTAL	7,816,750	1,125,829	787,390	5,623,770	504,416	373,303
LES Himalayan West Bengal Division												
I	.	.	.	.	.	.	151,519	6,799	3,522	147,745	2,651	..
II	.	.	.	.	.	.	123,174	4,201	10,744	54,873	2,346	..
III	.	.	.	.	.	.	25,467	1,224	4,204	88,394	2,400	6,893
IV	.	.	.	.	.	.	2,023	475	265	15,611	4,445	63
V	.	.	.	.	.	.	281,725	7,776	17,133	230,897	4,110	2,791
VI	.	.	.	.	.	.	34,360	8,050	3,730	24,555	3,880	357
VII	.	.	.	.	.	.	14,563	845	415	5,836	534	474
VIII	.	.	.	.	.	.	63,325	7,303	6,511	31,600	5,189	436
						TOTAL	729,951	30,664	47,124	651,325	25,265	11,013
2.11 West Bengal Plain Division												
I	.	.	.	.	.	.	1,719,896	275,351	62,144	1,353,459	64,072	..
II	.	.	.	.	.	.	624,673	100,723	72,752	305,603	17,651	..
III	.	.	.	.	.	.	1,010,483	157,023	256,440	1,504,080	107,669	58,428
IV	.	.	.	.	.	.	34,940	22,776	4,763	24,575	57,746	3,295
V	.	.	.	.	.	.	1,388,117	109,054	133,610	682,166	74,445	29,820
VI	.	.	.	.	.	.	742,492	145,251	79,672	355,267	50,865	6,720
VII	.	.	.	.	.	.	312,610	20,474	10,506	152,990	10,400	683
VIII	.	.	.	.	.	.	1,277,346	177,700	160,114	550,764	90,950	262,355
						TOTAL	7,113,673	1,089,341	740,461	5,053,445	479,231	362,290
Shikim												
I	.	.	.	.	.	.	23,789	49	2,454	13,094	432	..
II	.	.	.	.	.	.	2,671	21	2,022	45,223	-1,582	..
III	.	.	.	.	.	.	83	8	25,234	279	6	34
IV	.	.	.	.	.	.	6	..	..	56	2	..
V	.	.	.	.	.	.	493	100	116	2,283	1,190	923
VI	.	.	.	.	.	.	645	23	64	647	63	1
VII	.	.	.	.	.	.	1,836	4	15	66	27	..
VIII	.	.	.	.	.	.	3,735	92	875	1,000	924	926
						TOTAL	33,222	302	40,140	71,344	4,151	1,663
Chandernagore												
I	.	.	.	.	.	.	22	50	2	..	..	..
II	.	.	.	.	.	.	2	3	1	..	..	..
III	.	.	.	.	.	.	6	..	1	..	..	..
IV	.	.	.	.	.	.	46	10	..	..	..	..
V	.	.	.	.	.	.	6,167	34	42	..	..	..
VI	.	.	.	.	.	.	4,626	65	66	..	..	..
VII	.	.	.	.	.	.	1,130	7	..	..	..	..
VIII	.	.	.	.	.	.	5,276	217	63	..	..	..
						TOTAL	17,274	406	195	..	..	..

SUBSIDIARY TABLE V-7

Territorial distribution of 10,000 selfsupporting persons of all Industries and Services in the State (by Divisions)

Division and District	All Industries and Services		0—Primary industries not elsewhere specified	1—Mining and Quarrying	2—Processing and Manufacture: Food-stuffs, Textiles, Leather and Products thereof	3—Processing and Manufacture: Chemicals and Products thereof	4—Processing and Manufacture: Not elsewhere specified	5—Construction and utilities	6—Commerce	7—Transport, Storage, and Communications	8—Health, Education and Public Administration	9—Services not elsewhere specified
	Total	Proportion	3	4	5	6	7	8	9	10	11	12
1.25 Himalayan West Bengal Division	T 414,519 R 345,861 U 68,658	10,000 8,344 1,656	6,181 6,142 39	15 11 4	281 185 96	94 56 38	274 195 79	306 176 130	891 450 441	377 194 183	462 255 207	1,119 680 439
2.11 West Bengal Plain Division	T 3,609,957 R 1,341,439 U 2,268,518	10,000 8,716 6,284	253 204 49	333 305 28	1,873 688 1,185	693 188 505	693 299 401	322 129 253	2,057 657 1,400	936 164 773	745 242 503	2,035 848 1,187
Chandernagore	U 16,132	10,000	43	11	2,685	239	797	145	2,368	738	671	1,754
Sikkim	T 6,894 R 5,586 U 1,098	10,000 8,360 1,640	296 285 11	.. .. ..	221 139 82	83 22 11	187 129 58	225 84 201	964 686 278	2,769 2,707 62	1,143 620 523	4,102 3,688 414
West Bengal	T 4,008,344 R 1,687,800 U 2,321,044	10,000 4,208 5,792	867 819 48	301 275 26	1,705 638 1,067	633 175 458	650 283 367	375 134 241	1,933 638 1,295	879 167 712	716 244 472	1,941 834 1,107
Burdwan Division	T 1,362,017 R 794,891 U 567,126	10,000 5,336 4,164	301 250 51	369 304 65	2,029 1,041 988	373 374 499	677 468 209	362 222 140	1,628 915 713	320 283 637	624 379 245	1,317 1,101 716
Burdwan	T 365,734	10,000	284	3,126	771	1,259	408	330	1,267	574	544	1,437
Birbhum	T 76,491	10,000	585	148	1,345	219	508	691	1,390	337	799	3,483
Bankura	T 82,168	10,000	914	132	2,249	576	1,111	267	1,777	413	1,003	1,558
Midnapur	T 201,580	10,000	397	66	1,451	601	382	498	1,731	1,114	1,008	2,257
Hooghly	T 235,939	10,000	156	11	3,468	348	762	349	1,707	633	535	2,036
Howrah	T 400,110	10,000	172	6	2,611	1,157	713	288	1,876	1,184	444	1,549
Presidency Division	T 2,646,327 R 892,409 U 1,753,918	10,000 3,372 6,628	1,158 1,112 46	9 3 6	1,538 431 1,107	509 72 437	636 189 447	322 89 293	2,090 496 1,594	909 103 801	764 176 588	2,005 697 1,308
24-Parganas	T 754,646	10,000	206	9	3,189	741	644	331	1,844	636	665	1,735
Calcutta	U 1,080,349	10,000	33	7	858	633	717	437	2,767	1,506	916	2,186
Nadla	T 121,755	10,000	711	1	1,349	238	1,040	309	2,511	487	1,197	2,157
Murshidabad	T 162,905	10,000	768	15	2,022	143	582	598	1,999	296	663	2,909
Malda	T 75,020	10,000	1,238	3	1,180	120	707	191	1,642	242	562	4,115
West Dinajpur	T 37,133	10,000	185	3	1,016	125	939	334	2,416	489	1,115	3,378
Jalpalguri	T 251,601	10,000	7,205	9	170	76	245	214	676	326	325	754
Darjeeling	T 123,549	10,000	5,922	31	197	101	217	535	824	421	496	1,256
Cooch Behar	T 39,369	10,000	448	3	1,257	131	636	166	2,480	562	1,222	3,015

SUBSIDIARY TABLE V-8

Territorial distribution of 10,000 selfsupporting persons in the State, engaged in Primary Industries not elsewhere specified (by Subdivisions)

Division and District	Division-0		0.1 Stock Raising	0.2 Rearing of small animals and insects	0.3 Plantation Industries	0.4 Forestry, Collection of and Products not elsewhere specified	0.5 Hunting (including trapping and Game Propagation)	0.6 Fishing	
	Total	Proportion							
1	2	2a	3	4	5	6	7	8	
1.25 Himalayan West Bengal Division	T	256,207	6,181	56	2	9,703	175	1	63
	R	254,587	6,142	50	..	9,683	163	1	59
	U	1,620	39	6	2	40	12	..	4
2.11 West Bengal Plain Division	T	91,264	253	2,552	812	912	510	84	5,130
	R	73,761	204	1,983	744	625	319	41	4,371
	U	17,503	49	569	68	287	191	43	759
Chandernagore	U	68	42	1,471	..	..	588	..	7,941
Sikkim	T	198	296	3,838	..	..	6,162	..	..
	R	191	285	3,838	..	..	5,808	..	..
	U	7	11	..	..	..	354	..	..
West Bengal	T	347,403	867	711	215	7,396	263	22	1,393
	R	328,348	819	558	196	7,281	204	11	1,192
	U	19,055	48	153	19	105	59	11	201
Burdwan Division	T	40,929	301	3,394	188	1,205	574	103	4,536
	R	33,955	250	2,921	112	952	332	14	3,916
	U	6,974	51	473	76	253	192	89	620
Burdwan	T	10,373	284	4,942	325	267	405	32	4,029
Birbhum	T	4,472	585	4,882	9	322	364	610	3,813
Bankura	T	7,512	914	4,874	137	622	1,078	84	3,205
Midnapur	T	8,014	397	2,346	257	1,429	927	46	4,995
Hooghly	T	3,683	156	1,727	109	1,802	242	14	6,106
Howrah	T	6,875	172	588	113	3,253	183	16	5,847
Presidency Division	T	306,474	1,158	353	219	8,223	222	11	972
	R	294,393	1,112	242	207	8,138	180	10	828
	U	12,081	46	111	12	85	42	1	144
24-Parganas	T	15,551	206	1,213	127	778	822	51	7,009
Calcutta	U	3,570	33	4,479	420	2,115	1,356	14	1,636
Nadia	T	8,661	711	1,619	47	801	104	..	7,429
Murshidabad	T	12,512	768	3,061	244	176	323	189	6,007
Malda	T	9,286	1,238	667	6,404	466	22	80	2,411
West Dinajpur	T	687	185	844	73	1,077	393	..	7,613
Jalpaiguri	T	181,282	7,205	38	..	9,823	108	..	81
Darjeeling	T	73,164	5,922	74	3	9,575	342	..	6
Cooch Behar	T	1,761	448	1,062	176	2,839	193	..	5,730

SUBSIDIARY TABLE V-9

Territorial distribution of 10,000 self-supporting persons in the State, engaged in Mining and Quarrying (by Subdivisions)

Division and District	Division-1		1.0 Non-metallic mining and quarrying not otherwise classified	1.1 Coal Mining	1.2 Iron-ore mining	1.3 Metal mining except Iron Ore mining	1.4 Crude Petroleum and Natural Gas	1.5 Stone-quarrying, clay and sand pits	1.6 Mica	1.7 Salt, Saltpetre and saline substances	
	Total	Proportion									
1	2	2a	3	4	5	6	7	8	9	10	
1.25 Himalayan West Bengal Division	T	608	15	..	6,866	1,280	1,410	..	464	..	..
	R	480	11	..	6,833	17	..	..	282	..	..
	U	178	4	..	33	1,243	1,410	..	182	..	..
2.11 West Bengal Plain Division	T	120,100	333	124	9,461	24	43	99	207	19	23
	R	109,939	305	4	8,946	16	9	8	153	5	13
	U	10,161	28	120	515	8	34	91	54	14	10
Chandernagore	U	17	11	..	2,358	..	..	588	7,059	..	..
Sikkim	T	..	..	..	..	..	..	..	..	..	..
	R	..	..	..	..	..	..	..	..	..	..
	U	..	..	..	..	..	..	..	..	..	..
West Bengal	T	120,886	301	123	9,449	31	49	99	207	19	23
	R	110,369	275	4	8,937	16	9	8	154	5	13
	U	10,517	26	119	512	15	40	91	53	14	10
Burdwan Division	T	118,327	369	121	9,577	24	34	43	171	17	13
	R	109,666	304	4	9,077	16	3	1	136	6	12
	U	8,771	65	117	500	8	31	42	35	11	1
Burdwan	T	114,338	3,126	120	9,757	18	..	..	104	1	..
Birbhum	T	1,098	143	320	3,193	18	1,007	915	3,394	1,153	..
Bankura	T	1,083	132	46	7,756	..	102	..	1,976	120	..
Midnapur	T	1,331	66	45	3,377	398	1,097	2,352	1,165	22	1,044
Hooghly	T	248	11	605	605	968	3,266	40	2,984	1,532	..
Howrah	T	234	6	43	1,667	85	2,564	3,846	1,154	43	598
Presidency Division	T	2,359	9	333	3,031	360	793	2,900	2,026	153	504
	R	213	3	21	1,912	4	68	362	1,047	4	38
	U	1,546	6	212	1,119	356	725	2,538	979	149	466
24-Parganas	T	689	9	232	508	..	835	7,663	552	131	29
Calcutta	U	779	7	372	3,029	116	295	1,990	2,465	384	1,399
Nadia	T	14	1	714	7,857	..	..	..	1,429	..	..
Murshidabad	T	240	15	167	453	..	542	..	3,791	42	..
Malda	T	21	3	2,881	2,857	..	..	470	476	..	3,810
West Dinajpur	T	13	5	..	1,539	..	3,846	..	4,615	..	..
Jalpaiguri	T	212	9	..	1,604	3,595	4,009	..	802	..	..
Darjeeling	T	380	11	..	10,000	..	..	..	..	..	..
Cooch Behar	T	11	3	..	..	..	..	..	10,000	..	..

SUBSIDIARY TABLE V-10

Territorial distribution of 10,000 selfsupporting persons in the State, engaged in Processing and Manufacture—Foodstuffs, Textiles, Leather and Products thereof (by Subdivisions)

Division and District	Division-2		2.0 Food Industries otherwise unclassified	2.1 Grains and pulses	2.2 Vegetable oil and dairy products	2.3 Sugar Industries	2.4 Beverages	2.5 Tobacco	2.6 Cotton Textiles	2.7 Wearing apparel (except footwear) and made-up textile goods	2.8 Textile Industries otherwise unclassified	2.9 Leather, leather products and footwear
	Total	Proportion										
1	2	2a	3	4	5	6	7	8	9	10	11	12
1.25 Himalayan West Bengal Division	T	11,649	281	288	3,681	468	53	24	881	550	2,744	1,061
	R	7,655	185	118	3,238	279	6	4	354	483	1,422	636
	U	3,984	96	170	443	187	47	20	527	87	1,322	425
2.11 West Bengal Plain Division	T	676,041	1,873	225	1,585	184	38	68	697	1,126	902	4,594
	R	248,229	688	67	1,308	65	31	13	346	549	348	816
	U	427,812	1,185	158	277	119	7	55	351	577	554	3,778
Chandernagore	U	4,331	2,685	162	136	21	-	81	152	392	270	8,617
Sikkim	T	148	221	135	..	541	..	..	..	..	6,892	540
	R	93	139	65	..	473	..	..	..	..	4,932	811
	U	55	82	67	..	68	..	..	..	..	1,960	540
West Bengal	T	683,359	1,705	227	1,630	190	39	67	703	1,121	937	4,494
	R	256,884	638	68	1,349	69	31	13	348	551	369	808
	U	427,475	1,067	159	281	121	8	54	355	570	568	3,686
Burdwan Division	T	276,360	2,029	139	2,144	156	46	76	550	1,404	567	4,715
	R	141,748	1,041	76	1,692	81	42	20	343	910	381	1,266
	U	134,612	988	63	252	75	4	56	207	494	186	3,429
Burdwan	T	28,218	771	197	5,491	332	104	130	1,390	1,110	793	84
Birbhum	T	14,111	1,845	160	6,573	98	27	161	636	1,752	258	232
Bankura	U	18,479	2,249	100	4,455	471	84	56	1,135	2,922	314	187
Midnapur	T	29,259	1,451	462	4,088	183	77	321	1,096	2,250	805	417
Hooghly	T	81,833	3,468	37	946	49	6	21	187	1,809	192	6,662
Howrah	T	104,460	2,611	118	631	138	49	27	339	613	819	7,051
Presidency Division	T	406,999	1,538	286	1,281	214	33	61	808	929	1,189	4,344
	R	114,136	431	63	980	61	23	8	352	308	360	443
	U	292,863	1,107	223	301	153	10	53	456	621	829	3,661
24-Parganas	T	240,066	3,189	115	749	76	5	39	438	977	835	6,376
Calcutta	U	92,692	858	735	545	448	20	134	1,213	290	2,182	2,326
Nadla	T	16,419	1,349	574	2,660	310	285	61	1,283	3,103	1,251	199
Murshidabad	T	32,943	2,022	146	4,549	262	156	37	2,031	1,244	473	775
Malda	T	8,858	1,180	143	4,102	720	6	15	823	1,663	1,049	325
West Dinajpur	T	3,772	1,016	501	4,777	416	6	66	1,379	308	856	1,021
Jalpaiguri	T	4,267	170	359	3,522	424	14	9	647	727	3,072	150
Darjeeling	T	2,435	197	251	1,224	1,092	4	70	579	197	4,378	624
Cooch Behar	T	4,947	1,257	246	5,027	194	111	14	1,231	572	1,658	156

SUBSIDIARY TABLE V-11

Territorial distribution of 10,000 selfsupporting persons in the State, engaged in Processing and Manufacture—Metals, Chemicals and Products thereof (by Subdivisions)

Division and District	Division—3		3.0 Manu- facture of metal products, otherwise unclassi- fied	3.1 Iron and Steel (Basic manu- facture)	3.2 Non- Ferrous Metals (Basic manu- facture)	3.3 Transport equipment	3.4 Electrical machinery, apparatus, appliances and supplies	3.5 Machinery (other than electrical machinery) including Engineer- ing Work- shops	3.6 Basic Industrial Chemicals, Fertilizers and Power Alcohol	3.7 Medical and Pharmace- utical Prepara- tions	3.8 Manu- facture of chemical products otherwise unclassi- fied	
	Total	Proportion										
1	2	2a	3	4	5	6	7	8	9	10	11	
1.25 Himalayan West Bengal Division	T	3,911	94	4,237	56	..	4,403	105	279	10	23	332
	R	2,321	56	3,053	23	..	2,529	67	161	10	..	92
	U	1,590	38	1,184	33	..	1,874	38	118	..	23	790
2.11 West Bengal Plain Division	T	250,261	693	3,154	1,160	148	2,162	811	1,575	91	293	586
	R	67,724	188	1,259	342	12	362	239	303	34	8	99
	U	182,537	505	1,895	818	136	1,800	522	1,272	57	285	487
Chandernagore	U	466	239	1,845	2,146	86	3,734	300	494	..	259	1,137
Sikkim	T	22	33	7,727	..	..	2,273	..	..	..	..	..
	R	15	22	6,363	..	..	455	..	..	..	..	..
	U	7	11	1,364	..	..	1,818	..	..	..	..	..
West Bengal	T	253,708	633	3,173	1,160	146	2,194	801	1,557	90	289	590
	R	70,045	175	1,289	338	12	396	236	301	34	7	99
	U	183,661	458	1,884	822	134	1,798	515	1,256	56	282	491
Burdwan Division	T	118,932	873	2,376	1,728	201	2,335	546	1,377	99	21	317
	R	50,947	374	1,910	655	8	476	474	515	65	5	175
	U	67,985	499	966	1,073	193	1,859	72	1,362	34	16	142
Burdwan	T	46,040	1,259	3,450	2,691	485	1,901	1,099	183	193	2	51
Birbhum	T	1,678	219	7,771	375	78	244	185	286	262	78	721
Bankura	T	4,728	576	8,012	709	..	924	30	264	25	8	28
Midnapur	T	12,114	601	2,283	147	22	6,953	47	102	83	24	339
Hooghly	T	8,094	343	3,336	831	80	1,951	276	2,915	169	170	263
Howrah	T	46,278	1,157	1,677	1,495	10	1,845	240	4,069	53	11	600
Presidency Division	T	134,774	509	3,435	659	97	2,070	1,025	1,275	32	626	331
	R	19,098	72	741	57	14	325	119	113	6	10	32
	U	115,676	437	2,694	602	83	1,745	906	1,162	26	516	799
24-Parganas	T	55,870	741	3,339	867	115	2,308	756	1,369	70	328	843
Calcutta	U	68,382	633	3,050	565	89	1,806	1,388	1,373	99	165	865
Nadia	T	2,000	238	7,752	55	7	1,428	217	69	45	31	396
Murshidabad	T	2,337	148	7,873	462	..	1,288	26	21	47	9	274
Malda	T	901	120	7,969	..	89	1,731	11	67	22	22	89
West Dinajpur	T	464	125	6,875	733	362	1,142	..	88	108	22	172
Jalpaiguri	T	1,915	76	4,914	47	..	3,906	94	162	..	..	877
Darjeeling	T	1,243	101	3,371	..	..	6,484	8	16	..	..	121
Cooch Behar	T	753	101	3,044	173	..	2,231	292	1,009	53	146	2,152

SUBSIDIARY TABLE V-12

Territorial distribution of 10,000 selfsupporting persons in the State, engaged in Processing and Manufacture—Not elsewhere specified (by Subdivisions)

Division and District	Division—4.		4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	
	Total	Proportion	Manufacturing Industries otherwise unclassified	Products of petroleum and coal	Bricks, tiles and other structural clay products	Cement, pipes and other cement products	Non-metallic mineral products	Rubber Products	Wood and wood-products other than furniture and fixtures	Furniture and Fixtures	Paper and Paper Products	Printing and Allied Industries	
1	2	2a	3	4	5	6	7	8	9	10	11	12	
1.25 Himalayan West Bengal Division	T	11,855	274	1,458	4	949	..	547	7	6,574	80	29	352
	R	8,095	195	934	4	770	..	486	4	4,840	26	29	25
	U	3,260	79	524	..	179	..	51	3	1,734	54	..	327
2.11 West Bengal Plain Division	T	250,451	693	2,198	63	1,676	30	1,133	370	2,817	143	517	1,053
	R	105,507	293	701	18	1,137	1	543	16	1,578	27	107	88
	U	144,944	401	1,497	45	539	29	591	354	1,239	116	410	967
Chandernagore	U	1,285	797	1,783	137	3,343	54	965	653	1,899	47	241	226
Sikkim	T	125	187	2,080	..	..	..	..	..	7,360	..	..	580
	R	86	129	1,380	..	..	..	..	..	5,820	..	..	..
	U	39	58	720	..	..	..	..	..	1,540	..	..	580
West Bengal	T	260,521	650	2,168	60	1,633	29	1,108	353	2,985	141	497	1,026
	R	113,603	283	715	17	1,126	1	543	16	1,723	27	104	84
	U	146,919	367	1,453	43	507	28	565	337	1,262	114	393	942
Burdwan Division	T	22,177	677	1,692	17	3,194	45	1,274	473	3,532	115	273	325
	R	63,693	468	1,010	4	1,675	1	893	35	2,856	42	242	155
	U	23,479	209	682	13	519	44	381	438	676	73	31	330
Burdwan	T	14,905	408	969	10	3,220	189	1,098	9	2,843	126	1,311	225
Birbhum	T	3,884	508	1,161	23	821	23	1,303	10	6,450	8	8	193
Bankura	T	9,124	1,111	2,438	..	491	..	1,703	1	4,974	56	267	70
Midnapur	T	17,771	882	2,100	35	1,209	34	1,718	33	4,270	318	11	272
Hooghly	T	17,970	762	1,987	3	2,097	9	819	1,969	1,835	16	90	325
Howrah	T	28,523	713	1,495	21	2,496	16	1,236	263	3,844	78	46	705
Presidency Division	T	168,344	636	2,428	34	1,326	20	1,018	287	2,685	155	620	1,377
	R	49,904	189	554	25	826	1	351	6	1,110	19	28	44
	U	118,440	447	1,874	59	500	19	667	281	1,575	136	593	1,333
24-Parganas	T	48,628	644	2,473	107	2,176	38	1,235	131	1,660	69	1,531	360
Calcutta	U	77,431	717	2,703	83	54	20	893	539	2,397	263	379	2,659
Nadia	T	12,658	1,040	1,793	..	4,930	..	1,053	8	2,066	24	11	115
Murshidabad	T	9,481	582	2,205	223	1,553	..	1,276	..	4,597	17	1	123
Malda	T	5,306	707	2,672	..	2,392	2	1,236	..	3,502	109	..	87
West Dinajpur	T	3,435	939	1,383	3	3,604	3	1,022	14	3,736	126	..	109
Jalpalguri	T	6,174	245	1,315	6	1,553	..	224	3	6,664	55	..	175
Darjeeling	T	2,676	217	1,648	..	284	..	183	..	7,573	4	..	303
Cooch Behar	T	2,505	636	1,609	4	156	..	1,732	24	5,277	224	132	342

SUBSIDIARY TABLE V-13

Territorial distribution of 10,000 selfsupporting persons in the State, engaged in Construction and Utilities (by Subdivisions)

Division and District		Division-5		5-0	5-1	5-2	5-3	5-4	5-5	5-6	5-7
		Total	Proportion	Construction and maintenance of works—otherwise unclassified	Construction and maintenance—Buildings	Construction and maintenance—Roads, Bridges, and other Transport works	Construction and maintenance—Telegraph and telephone lines	Construction and maintenance—Irrigation and other agricultural works	Services—Electric power and gas supply	Services—Domestic and Industrial water supply	Sanitary works and Services—including Scavengers
1		2	2a	3	4	5	6	7	8	9	10
1.25 Himalayan West Bengal Division	T	12,718	306	910	5,875	1,971	44	82	177	208	788
	R	7,326	176	382	3,885	1,130	9	39	41	32	241
	U	5,392	130	528	1,990	841	35	43	136	171	487
2.11 West Bengal Plain Division	T	137,827	382	777	4,822	407	111	657	1,241	239	1,746
	R	46,465	129	498	1,546	257	44	561	225	52	188
	U	91,362	253	279	3,276	150	67	96	1,016	187	1,558
Chandernagore	U	235	145	213	2,128	43	..	..	2,340	42	5,234
Sikkim	T	191	285	681	838	5,969	..	..	314	52	2,148
	R	56	84	681	681	524	..	..	105	..	942
	U	135	201	..	157	5,445	..	..	209	52	1,204
West Bengal	T	150,310	375	790	4,914	540	107	608	1,149	237	1,655
	R	53,791	134	489	1,746	331	42	517	210	51	183
	U	96,519	241	301	3,168	209	65	91	939	186	1,462
Burdwan Division	T	49,247	362	1,357	4,923	615	175	743	1,049	170	968
	R	30,196	222	1,125	2,924	484	118	548	527	109	292
	U	19,051	140	232	1,999	131	57	195	522	61	676
Burdwan	T	12,080	330	2,282	3,084	1,158	22	580	1,157	21	1,096
Birbhum	T	5,285	601	180	3,345	293	114	4,390	1,326	36	307
Bankura	T	2,192	267	762	3,513	766	1,902	1,186	529	46	1,846
Midnapur	T	9,925	493	724	5,662	930	244	319	1,141	476	504
Hooghly	T	8,222	340	2,800	5,303	164	2	50	409	191	991
Howrah	T	11,543	288	486	6,304	216	98	28	1,287	133	1,448
Presidency Division	T	101,063	382	613	4,910	503	73	544	1,197	269	1,991
	R	23,595	89	179	1,172	256	4	503	55	22	143
	U	77,468	293	334	3,738	247	69	41	1,142	247	1,848
24-Parganas	T	24,944	331	831	5,150	422	144	56	1,451	500	1,437
Calcutta	U	47,210	437	185	4,578	151	62	52	1,715	234	3,028
Nadia	T	3,765	309	207	6,773	303	8	40	236	74	2,274
Murshidabad	T	9,748	598	295	3,900	297	22	5,095	51	76	204
Malda	T	1,436	191	1,511	7,263	202	56	91	97	70	710
West Dinajpur	T	1,242	334	3,744	1,940	3,076	8	97	8	8	1,119
Jaipauri	T	5,372	214	938	7,755	802	2	192	153	65	93
Darjeeling	T	6,613	535	700	4,806	3,033	83	..	192	70	1,116
Cooch Behar	T	733	186	2,592	1,760	955	..	..	218	2,415	2,060

SUBSIDIARY TABLE V-14

Territorial distribution of 10,000 self-supporting persons in the State, engaged in Commerce (by Subdivisions)

Division and District	Division—6		6-0 Retail trade otherwise unclassi- fied	6-1 Retail trade in foodstuffs (including beverages and narcotics)	6-2 Retail trade in fuel (in- cluding petrol)	6-3 Retail trade in textile and leather goods	6-4 Wholesale trade in foodstuffs	6-5 Wholesale trade in commodi- ties other than foodstuffs	6-6 Real Estates	6-7 Insurance	6-8 Money- lending, banking and other financial business	
	Total	Proportion										
1	2	2a	3	4	5	6	7	8	9	10	11	
1.25 Himalayan West Bengal Division	T	36,950	891	2,863	4,485	273	875	280	758	85	80	301
	R	18,687	450	1,474	2,437	130	484	144	290	14	3	84
	U	18,263	441	1,389	2,048	143	411	136	468	71	77	207
2.11 West Bengal Plain Division	T	742,492	2,057	2,628	4,171	287	712	250	1,327	47	115	468
	R	237,076	657	770	1,814	84	194	94	167	10	15	45
	U	505,416	1,400	1,858	2,357	203	518	156	1,160	37	100	418
Chandernagore	U	4,626	2,868	2,828	4,292	270	348	151	1,221	4	114	772
Sikkim	T	645	964	481	5,736	..	2,217	124	1,271	..	..	171
	R	459	686	328	4,403	..	1,085	62	1,225	..	..	16
	U	186	278	155	1,333	..	1,132	62	48	..	..	155
West Bengal	T	774,816	1,933	2,638	4,186	286	728	258	1,301	49	113	453
	R	255,733	633	808	1,855	86	208	97	174	11	14	47
	U	519,083	1,295	1,830	2,331	200	514	155	1,127	38	99	406
Burdwan Division	T	221,781	1,628	2,666	4,755	390	650	334	820	59	69	263
	R	124,619	916	1,452	2,925	179	346	245	331	23	39	83
	U	97,162	713	1,208	1,830	211	304	89	489	31	39	180
Burdwan	T	46,326	1,267	2,777	4,891	311	615	580	545	73	69	149
Birbhum	T	10,633	1,390	3,507	3,610	805	754	587	393	206	11	127
Bankura	T	14,604	1,777	3,324	3,298	773	480	1,197	482	151	216	79
Midnapur	T	84,887	1,731	2,390	5,641	383	651	243	536	28	18	110
Hooghly	T	40,281	1,707	2,930	4,980	272	697	174	404	30	79	434
Howrah	T	75,050	1,876	2,320	4,585	370	665	107	1,471	41	73	368
Presidency Division	T	553,035	2,090	2,629	3,957	245	751	220	1,493	45	131	529
	R	131,114	496	549	1,425	50	152	38	111	4	8	33
	U	421,921	1,594	2,080	2,532	195	599	182	1,382	41	123	496
24-Paraganas	T	139,177	1,844	2,959	5,005	246	597	109	643	84	88	269
Calcutta	U	292,486	2,707	2,581	2,831	224	815	254	2,305	25	186	779
Nadia	T	30,569	2,511	2,517	6,023	167	599	122	315	29	33	195
Murshidabad	T	32,565	1,999	1,859	5,911	515	615	289	550	45	41	175
Malda	T	12,318	1,642	1,787	6,391	142	950	179	337	9	34	171
West Dinajpur	T	8,970	2,416	2,417	4,775	217	1,250	721	259	62	21	278
Jalpaiguri	T	17,007	676	3,514	4,068	308	801	86	839	25	106	255
Darjeeling	T	10,179	824	2,371	5,463	260	606	303	554	173	6	259
Cooch Behar	T	9,764	2,480	2,244	4,192	230	1,382	595	828	91	112	426

SUBSIDIARY TABLE V-15

Territorial distribution of 10,000 selfsupporting persons in the State, engaged in Transport, Storage and Communications (by Subdivisions)

Division and District	Division-7 Total Proportion		Transport and communications otherwise unclassified and incidental services	Transport by Road	Transport by Water	Transport by Air	Railway Transport	Storage and Warehousing	Postal Services	Telegraph Services	Telephone Services	Wireless Services	
	1	2											2a	3	4	5	6	7	8	9	10	11	12
1.25 West Bengal Division	T	15,822	377	399	4,121	127	135	4,543	14	509	69	68	17
	R	8,082	194	44	2,226	95	67	2,511	1	184	11	5	2
	U	7,582	183	355	1,895	32	68	3,032	13	325	58	61	15
3.11 West Bengal Plain Division	T	337,957	936	198	4,009	2,293	138	2,614	18	458	160	107	17
	R	59,082	164	46	542	296	34	660	5	121	25	15	4
	U	278,865	772	150	3,467	1,997	104	1,954	13	337	125	92	13
Chandernagore	U	1,191	738	25	5,231	1,167	42	3,023	..	470	17	25	..
Sikkim	T	1,854	2,769	..	9,903	..	..	..	92	5	..	..
	R	1,812	2,707	..	9,774	..	..	..	92	5	..	..
	U	42	62	..	129	..	..	..	..	..	..	..
West Bengal	T	352,383	879	208	4,010	2,201	138	2,698	18	460	147	105	17
	R	67,131	167	48	619	283	36	744	5	124	25	14	4
	U	285,257	712	160	3,391	1,913	102	1,954	13	336	122	91	13
Burdwan Division	T	111,729	320	204	3,460	1,019	61	4,655	23	476	77	70	15
	R	33,593	233	102	1,061	441	44	1,491	11	213	33	33	10
	U	73,136	537	102	2,399	578	17	3,164	12	198	39	32	5
Burdwan	T	20,981	574	275	2,848	154	74	5,986	36	408	29	190	..
Birbhum	T	2,581	337	554	2,852	209	790	5,045	15	515	8	8	4
Bankura	T	3,306	413	589	4,473	1,405	165	1,999	..	512	510	35	312
Midnapur	T	22,462	1,114	179	1,767	662	14	6,780	13	504	42	30	9
Hooghly	T	14,933	633	181	4,577	954	34	3,591	1	561	86	30	5
Howrah	T	47,376	1,184	144	4,143	1,615	38	3,562	32	321	84	54	7
Presidency Division	T	240,659	909	207	4,265	2,749	174	1,789	16	480	130	122	13
	R	23,533	103	21	413	217	32	398	2	80	19	3	2
	U	212,121	301	186	3,852	2,532	142	1,391	14	400	161	119	16
24-Parganas	T	48,009	636	267	3,722	1,862	380	2,726	14	567	278	143	41
Calcutta	U	162,656	1,506	152	4,466	3,371	112	1,165	17	417	163	126	11
Nadia	T	5,925	487	83	3,686	1,107	209	3,784	10	810	155	139	17
Murshidabad	T	4,813	296	984	3,657	1,557	394	2,229	8	886	257	13	15
Malda	T	1,812	242	50	3,355	3,628	33	1,716	..	1,181	6	28	5
West Dinajpur	T	1,817	489	429	6,247	710	88	1,668	33	732	44	33	10
Jaipalguri	T	8,201	326	677	4,107	141	26	4,608	..	368	46	17	10
Darjeeling	T	5,206	421	110	3,367	8	323	5,238	38	665	88	144	19
Goosh Behar	T	2,215	582	54	5,950	357	81	2,664	4	664	122	63	41

SUBSIDIARY TABLE V-16

Territorial distribution of 10,000 selfsupporting persons in the State, engaged in Health, Education and Public Administration (by Subdivisions)

Division and District		Division—8		8-1 Medical and other Health Services	8-2 Educational Services and Research	8-4 Police (other than village watchmen)	8-5 Village officers and servants including village watchmen	8-6 Employees of Municipa- lities and Local Boards (but not including persons classifiable under any other division or subdivi- sion)	8-7 Employees of State Governments (but not including persons classifiable under any other division or subdivi- sion)	8-3, 8-8, 8-9 Employees of the Union Government (but not including persons classifiable under any other division or subdivision); and Employees of non-Indian Governments									
		Total	Proportion								2	2a	3	4	5	6	7	8	9
		1																	
1.25 Himalayan West Bengal Division	T	19,133	462	1,950	2,215	1,265	404	617	1,862	1,687									
	R	10,500	255	1,235	1,527	497	343	145	565	1,267									
	U	8,573	207	715	688	828	61	472	1,297	420									
2.11 West Bengal Plain Division	T	220,064	745	1,937	2,281	1,163	284	873	2,286	1,124									
	R	97,506	242	811	1,072	210	239	99	500	250									
	U	181,558	503	1,176	1,211	953	45	774	1,726	864									
Chandernagore	U	1,063	671	1,330	2,741	1,551	..	1,145	1,783	1,450									
Sikkim	T	785	1,143	692	275	1,542	470	340	4,523	2,157									
	R	416	620	157	40	444	52	340	2,262	2,181									
	U	359	523	536	235	1,098	418	..	2,261	28									
West Bengal	T	227,114	716	1,937	2,277	1,163	293	855	2,260	1,160									
	R	95,066	244	843	1,107	226	246	102	563	323									
	U	182,048	472	1,144	1,170	943	47	753	1,697	832									
Burdwan Division	T	85,000	624	2,125	2,789	880	553	661	2,061	873									
	R	51,531	379	1,501	2,073	315	501	219	995	547									
	U	33,469	245	627	711	565	67	462	1,066	326									
Burdwan	T	19,907	544	1,589	2,101	995	595	899	2,347	1,474									
Birbham	T	6,114	799	1,964	2,793	633	893	110	1,433	2,164									
Bankura	T	8,243	1,003	2,653	2,672	559	986	148	2,856	91									
Midnapur	T	29,324	1,008	2,135	3,452	736	776	222	2,262	417									
Hooghly	T	12,632	535	2,035	3,041	935	277	933	2,339	540									
Howrah	T	17,780	444	2,599	2,672	1,112	296	1,226	1,219	876									
Presidence Division	T	292,114	764	1,927	2,062	1,259	169	928	2,344	1,281									
	R	46,508	176	566	693	189	140	53	419	236									
	U	155,606	588	1,361	1,364	1,160	29	875	1,925	1,045									
24-Parganas	T	50,162	665	2,083	2,501	1,239	228	697	2,274	963									
Calcutta	U	99,007	916	1,744	1,715	1,338	14	1,293	2,300	1,596									
Nadia	T	14,579	1,197	2,109	2,622	1,047	200	335	3,582	705									
Mumhdabad	T	10,879	663	2,513	2,642	963	558	513	2,596	315									
Malda	T	4,215	562	1,979	2,802	1,561	515	455	2,164	524									
West Dmajpur	T	4,139	1,115	2,608	2,191	2,286	469	82	1,623	1,336									
Jalpaiguri	T	8,190	325	2,321	2,479	1,113	651	531	1,142	1,733									
Darjeeling	T	6,132	496	1,412	1,882	1,345	153	749	1,848	2,611									
Cooch Behar	T	4,811	1,222	2,002	2,193	1,422	252	596	3,105	430									

SUBSIDIARY TABLE V-17

Territorial distribution of 10,000 selfsupporting persons in the State, engaged in Services not elsewhere specified (by Subdivisions)

Division and District		Division-0		9.0 Services otherwise unclassi- fied	9.1 Domestic services (but not including services rendered by mem- bers of family households to one another)	9.2 Barbers and Beauty Shops	9.3 Laundries and laundry services	9.4 Hotels, Restaurants and Eating houses	9.5 Recreation Services	9.6 Legal and business services	9.7 Arts, Letters and Journa- lism	9.8 Religions, Charitable and Welfare Services
		Total	Proportion									
1		2	2a	3	4	5	6	7	8	9	10	11
1.25 Himalayan West Bengal Division	T	46,371	1,119	4,754	3,395	410	159	306	283	187	46	460
	R	28,191	680	2,961	2,152	232	78	114	130	58	10	294
	U	18,180	439	1,793	1,243	128	81	192	153	129	36	166
2.11 West Bengal Plain Division	T	734,500	2,035	3,862	3,570	404	365	505	346	391	94	463
	R	308,140	848	2,121	1,279	186	92	70	76	72	22	250
	U	428,360	1,187	1,741	2,291	218	273	435	270	319	72	213
Chandernagore	U	2,830	1,754	4,198	3,117	329	456	367	693	226	49	565
Sikkim	T	2,746	4,102	4,614	4,359	91	18	568	7	40	37	266
	R	2,469	3,688	4,614	3,547	73	18	513	..	40	..	186
	U	277	414	..	812	18	..	55	7	..	37	80
West Bengal	T	778,041	1,941	3,914	3,561	405	353	494	341	379	91	462
	R	334,331	834	2,179	1,336	193	92	73	79	71	21	253
	U	443,710	1,107	1,735	2,225	212	261	421	262	308	70	209
Burdwan Division	T	247,535	1,817	4,175	3,274	504	382	344	315	330	72	604
	R	150,021	1,101	2,325	2,185	355	204	165	156	142	45	494
	U	97,514	716	1,850	1,089	149	178	189	159	188	27	110
Burdwan	T	52,566	1,437	4,079	3,686	569	289	318	177	334	77	471
Birbhum	T	26,640	3,483	6,855	2,380	153	70	41	119	94	38	244
Bankura	T	12,802	1,558	1,180	5,325	777	305	384	424	498	170	937
Midnapur	T	45,493	2,257	1,672	4,688	744	571	364	440	495	45	981
Hooghly	T	48,043	2,036	5,532	2,470	323	280	278	324	225	41	527
Howrah	T	61,991	1,549	4,507	2,463	510	550	523	397	354	107	584
Presidency Division	T	530,506	2,005	3,792	3,695	358	339	564	353	402	100	397
	R	184,310	697	2,110	939	177	39	35	43	39	10	141
	U	346,196	1,308	1,682	2,756	241	300	529	310	363	90	256
24-Parganas	T	130,941	1,735	5,074	2,455	378	349	423	363	399	85	474
Calcutta	U	236,136	2,186	1,706	4,949	344	472	935	477	579	151	387
Nadia	T	26,265	2,157	5,764	2,172	464	176	222	230	275	22	685
Murshidabad	T	47,382	2,009	6,284	2,826	309	139	24	96	82	31	209
Malda	T	30,867	4,115	6,256	2,998	262	98	33	49	93	47	164
West Dinajpur	T	12,544	3,378	6,537	2,311	432	89	94	140	142	40	215
Jalpaiguri	T	18,081	754	5,093	3,227	416	181	136	369	261	42	275
Darjeeling	T	15,521	1,256	4,228	4,042	280	190	625	120	83	61	371
Cooch Behar	T	11,869	3,015	4,897	2,817	570	84	161	360	206	35	870

SUBSIDIARY TABLE VI-1

Persons per 1,000 houses and houses per 100 square miles and comparison with past censuses

Division and District 1	General population—Persons per 1,000 houses				Rural population—Persons per 1,000 houses			
	1951	1941	1931	1921	1951	1941	1931	1921
	2	3	4	5	6	7	8	9
1.25 Himalayan West Bengal Division	4,832	4,681	4,670	4,745	4,571	4,680	4,695	4,768
2.11 West Bengal Plain Division	4,632	5,016	4,687	4,591	4,714	4,964	4,722	4,624
Chandernagore	5,028	..	..	..	..	..	..	..
Sikkim	5,642	5,224	4,052	5,530	5,692	5,224	4,052	5,520
West Bengal	4,681	4,984	4,685	4,605	4,700	4,934	4,720	4,639
Burdwan Division	4,542	4,954	4,456	4,329	4,549	4,950	4,526	4,364
Burdwan	4,558	4,882	4,077	4,006	4,494	4,908	4,104	4,002
Birbhum	4,451	4,722	4,452	4,189	4,438	4,691	4,447	4,191
Bankura	4,538	5,043	4,704	4,458	4,593	4,994	4,705	4,475
Midnapur	4,669	5,092	4,687	4,605	4,649	5,070	4,723	4,681
Hooghly	4,379	4,586	4,164	3,957	4,382	4,780	4,310	4,056
Howrah	4,490	5,238	4,575	4,589	4,617	5,079	4,872	4,675
Presidency Division	4,706	5,011	4,929	4,908	4,867	4,916	4,956	4,992
24-Parganas	4,857	4,877	4,875	5,022	5,065	4,875	5,228	5,450
Calcutta	4,206	5,606	5,732	5,295	..	..	..	..
Nadia	4,895	5,099	4,422	4,423	4,751	5,124	4,439	4,464
Murshidabad	4,873	5,047	4,768	4,508	4,885	5,017	4,781	4,509
Malda	5,121	5,785	5,391	5,337	5,105	5,795	5,432	5,360
West Dinajpur	4,802	5,366	5,235	5,460	4,768	5,361	5,235	5,460
Jalpaiguri	4,681	4,401	4,472	4,593	4,508	4,352	4,453	4,595
Darjeeling	4,768	4,582	4,490	4,349	4,721	4,834	4,632	4,396
Cooch Behar	4,614	5,112	5,058	5,171	4,578	5,109	5,075	5,194

Division and District	Urban population—Persons per 1,000 houses				Houses per 100 square miles			
	1951	1941	1931	1921	1951	1941	1931	1921
	10	11	12	13	14	15	16	17
1.25 Himalayan West Bengal Division	5,228	4,387	4,329	4,237	8,955	8,162	7,215	6,754
2.11 West Bengal Plain Division	4,416	5,202	4,523	4,430	18,846	15,227	13,065	12,352
Chandernagore	5,028	..	..	..	266,139	..	..	..
Sikkim	3,948	..	..	..	889	848	987	538
West Bengal	4,435	5,179	4,514	4,425	17,256	14,114	12,144	11,471
Burdwan Division	4,498	4,978	3,873	3,981	17,316	14,710	13,747	13,173
Burdwan	4,963	4,691	3,792	4,064	17,774	14,317	14,286	13,239
Birbhum	4,053	5,304	4,698	4,134	13,751	12,736	12,211	11,605
Bankura	3,931	5,774	4,699	4,210	10,984	9,662	8,928	8,643
Midnapur	4,936	5,470	4,085	4,004	13,694	11,929	11,369	11,024
Hooghly	4,365	3,962	3,617	3,525	29,376	24,862	22,142	22,539
Howrah	4,247	5,678	3,808	4,306	64,074	50,793	42,880	38,807
Presidency Division	4,413	5,259	4,835	4,620	17,206	13,617	10,807	10,052
24-Parganas	4,426	4,683	3,868	3,772	16,826	13,912	10,506	9,310
Calcutta	4,206	5,606	5,732	5,295	1,875,080	1,163,855	615,804	602,824
Nadia	5,807	4,951	4,299	4,122	15,499	10,921	10,820	10,663
Murshidabad	5,856	5,460	4,585	4,493	16,994	15,686	13,875	13,107
Malda	5,553	5,508	4,249	4,568	13,254	10,465	9,601	9,237
West Dinajpur	5,414	5,760	..	..	10,831	7,846	7,224	6,483
Jalpaiguri	5,791	6,806	5,363	4,512	8,408	8,093	6,900	6,365
Darjeeling	4,951	3,585	3,759	3,978	7,734	6,847	5,984	5,419
Cooch Behar	5,111	5,178	4,592	4,490	10,999	9,478	8,832	8,663

SUBSIDIARY TABLE VI-2

Number of households per 1,000 houses and distribution by size of 1,000 Sample Households of Rural and Urban Population

Division and District	Rural												
	Households per 1,000 houses	Household population				Small 3 members or less		Medium 4-6 members		Large 7-9 members		Very large 10 member or more	
		Persons	Males	Females	Number	Persons	Number	Persons	Number	Persons	Number	Persons	Number
1	2	3	4	5	6	7	8	9	10	11	12	13	
1.25 Himalayan West Bengal Division	946	4,904	2,631	2,273	283	684	507	2,447	167	1,288	43	505	
2.11 West Bengal Plain Division	965	5,050	2,586	2,464	300	711	469	2,312	176	1,360	55	687	
Chandernagore	..	..	..	..	..	..	..	..	..	..	..	..
Sikkim	1,000	5,520	2,880	2,640	200	400	440	2,040	280	2,240	80	840	
West Bengal	964	5,036	2,590	2,446	299	708	472	2,325	175	1,351	54	652	
Burdwan Division	971	4,890	2,508	2,382	343	774	435	2,143	166	1,296	56	677	
Burdwan	988	4,552	2,313	2,039	437	910	383	1,816	129	995	51	631	
Birbhum	994	4,428	2,247	2,181	436	1,029	387	1,913	136	1,033	41	453	
Bankura	974	4,807	2,380	2,427	416	839	361	1,920	168	1,369	55	679	
Midnapur	974	4,746	2,428	2,318	367	842	432	2,082	142	1,080	59	742	
Hooghly	952	5,816	2,975	2,840	139	370	551	2,747	242	1,908	68	790	
Howrah	928	5,734	2,953	2,781	167	476	632	2,674	245	1,927	56	657	
Presidency Division	966	5,199	2,682	2,517	249	634	515	2,529	184	1,413	62	683	
24-Parganas	978	5,782	2,968	2,814	148	415	553	2,764	232	1,760	67	823	
Calcutta	..	..	..	..	..	..	..	..	..	..	..	..
Nadia	900	4,639	2,450	2,189	351	963	487	2,367	141	1,052	21	257	
Murshidabad	996	4,777	2,398	2,379	353	797	435	2,119	164	1,274	48	587	
Malda	987	5,300	2,669	2,721	215	587	541	2,739	192	1,477	52	587	
West Dinajpur	910	4,887	2,532	2,355	269	716	560	2,660	114	858	57	653	
Jalpaiguri	986	4,975	2,706	2,269	269	622	492	2,363	194	1,478	45	512	
Darjeeling	993	5,290	2,841	2,449	232	493	522	2,507	174	1,333	72	957	
Cooch Behar	865	4,579	2,397	2,182	332	889	524	2,547	119	897	24	246	

Division and District	Urban												
	Households per 1,000 houses	Household population				Small 3 members or less		Medium 4-6 members		Large 7-9 members		Very large 10 members or more	
		Persons	Males	Females	Number	Persons	Number	Persons	Number	Persons	Number	Persons	
													Persons
14	15	16	17	18	19	20	21	22	23	24	25		
1.25 Himalayan West Bengal Division	909	6,041	3,306	2,735	163	347	449	2,184	265	2,020	123	1,490	
2.11 West Bengal Plain Division	771	5,864	3,120	2,744	191	509	509	2,512	201	1,581	99	1,262	
Chandernagore	946	5,200	2,800	2,400	300	900	300	1,400	400	2,900	..	..
Sikkim	1,000	1,000	1,000	..	1,000	1,000	..	..	..	..	..	..
West Bengal	774	5,877	3,130	2,747	189	499	508	2,503	202	1,588	101	1,282	
Burdwan Division	948	6,000	3,252	2,748	263	700	428	2,146	202	1,673	109	1,476	
Burdwan	980	5,949	3,759	2,190	253	481	405	1,924	177	1,329	165	2,215	
Birbhum	934	5,111	2,778	2,333	278	778	611	2,944	111	1,989	..	..
Bankura	965	6,200	2,800	3,400	500	1,700	250	1,000	200	2,000	50	1,500	
Midnapur	902	8,848	4,515	4,333	273	848	273	2,091	212	2,333	242	3,576	
Hooghly	947	5,035	2,733	2,302	279	732	523	2,628	151	1,163	47	512	
Howrah	949	6,041	3,091	2,950	215	603	413	2,033	264	2,083	108	1,322	
Presidency Division	713	5,824	3,073	2,746	157	413	544	2,662	202	1,550	97	1,199	
24-Parganas	900	5,431	2,804	2,627	142	395	662	3,232	138	1,071	58	733	
Calcutta	579	6,194	3,316	2,878	158	417	461	2,269	249	1,904	132	1,604	
Nadia	905	4,897	2,590	2,307	205	538	616	2,872	128	949	51	538	
Murshidabad	954	6,812	3,344	2,968	187	406	469	2,375	219	1,656	125	1,875	
Malda	923	5,375	2,875	2,500	..	..	875	4,375	125	1,000	..	..
West Dinajpur	903	5,100	2,500	2,600	400	1,000	200	1,200	400	2,900	..	..
Jalpaiguri	877	7,154	4,000	3,154	77	77	461	2,308	231	1,769	231	3,000	
Darjeeling	996	5,046	2,818	2,227	273	591	409	1,909	273	2,091	45	454	
Cooch Behar	777	6,571	3,428	3,143	71	214	500	2,500	286	2,143	143	1,714	

SUBSIDIARY TABLE VI-3

Family Composition of 1,000 households of the General Population

Division and District	Sample household population			Heads of households and their wives		Sons of heads of households	Daughters of heads of households	Other male relations to heads of households	Other female relations to heads of households	Unrelated	
	Persons	Males	Females	Males	Females					Males	Females
	2	3	4	5	6					7	8	9	10	11	12
1.25 Himalayan West Bengal Division	5,029	2,706	2,323	946	831	1,186	829	510	632	54	31
2.11 West Bengal Plain Division	5,245	2,714	2,531	939	870	1,151	825	577	819	47	17
Chandernagore	5,200	2,800	2,400	1,000	1,000	1,600	1,100	200	300	..	..
Sikkim	5,348	2,808	2,538	847	808	1,500	923	423	769	38	38
West Bengal	5,227	2,713	2,514	940	867	1,154	825	572	804	47	18
Burdwan Division	5,048	2,614	2,434	924	841	1,055	744	552	833	52	16
Burdwan	4,609	2,546	2,068	874	782	902	607	648	662	122	12
Birbhum	4,475	2,283	2,192	866	820	904	632	479	632	34	8
Bankura	4,901	2,408	2,493	908	803	969	735	517	945	14	10
Midnapur	4,932	2,532	2,410	936	838	1,027	673	484	859	75	40
Hooghly	5,632	2,918	2,714	978	894	1,371	984	561	836	8	..
Howrah	5,839	3,000	2,839	972	918	1,387	887	641	1,034	..	..
Presidency Division	5,389	2,803	2,586	953	891	1,218	899	539	777	43	19
24-Parganas	5,669	2,915	2,754	975	939	1,332	947	608	868	..	..
Calcutta	6,194	3,316	2,878	969	863	1,163	1,049	908	881	136	85
Nadia	4,683	2,474	2,209	926	843	1,100	735	448	631	..	..
Murshidabad	4,904	2,477	2,427	876	865	1,073	787	484	789	44	16
Malda	5,389	2,678	2,711	994	939	1,256	1,061	406	705	22	6
West Dinajpur	4,901	2,530	2,371	987	907	1,185	755	358	709	..	..
Jalpalguri	5,107	2,785	2,322	930	794	1,149	906	636	539	70	38
Darjeeling	5,231	2,835	2,396	923	780	1,450	934	363	605	99	77
Cooch Behar	4,779	2,500	2,279	986	922	1,100	643	414	714	..	..

SUBSIDIARY TABLE VI-4

Females per 1,000 males (General, Rural and Urban Population); and comparison with previous censuses

Division and District	General population				Rural population				Urban population			
	1951	1941	1931	1921	1951	1941	1931	1921	1951	1941	1931	1921
	2	3	4	5	6	7	8	9	10	11	12	13
1.25 Himalayan West Bengal Division	843	860	859	871	860	874	870	830	706	668	667	675
2.11 West Bengal Plain Division	860	844	887	903	946	952	970	981	656	553	572	585
Chandernagore	769	798	766	778	..	..	..	..	769	798	766	778
Sikkim	907	820	867	970	812	920	967	970	686	..	..	..
West Bengal	859	845	885	900	937	944	959	969	657	554	573	585
Burdwan Division	914	913	942	963	951	957	978	996	725	647	656	667
Burdwan	888	898	934	965	909	926	958	979	777	678	694	738
Birbhum	974	999	1,005	1,004	934	1,008	1,010	1,009	351	861	798	825
Bankura	981	978	996	1,002	984	984	1,000	1,006	946	904	927	956
Midnapur	955	955	975	991	961	966	985	997	835	798	803	829
Hooghly	886	865	882	924	955	944	956	998	679	613	610	624
Howrah	810	788	834	864	925	921	948	990	810	523	537	520
Presidency Division	817	789	833	843	923	929	933	940	634	521	542	556
24-Parganas	844	822	847	863	924	912	933	933	678	583	578	579
Calcutta	570	452	465	435	..	..	..	..	570	452	465	455
Nadia	937	945	951	956	940	941	947	946	927	973	961	1,085
Murshidabad	973	900	1,005	1,006	978	996	1,011	1,012	923	919	926	945
Malda	966	933	939	991	971	988	995	996	853	827	814	802
West Dinajpur	877	911	918	924	884	915	918	924	771	533	..	..
Jalpalguri	825	836	830	856	838	846	838	862	679	594	531	616
Darjeeling	803	833	879	806	905	912	905	911	721	736	728	777
Cooch Behar	855	879	880	877	867	893	896	838	713	608	621	575

SUBSIDIARY TABLE VI.5

Females per 1,000 males in Agricultural Classes and Subclasses

Division and District	All Agricultural Classes				I—Cultivators of land wholly or mainly owned and their dependants			
	Total	Self-supporting persons	Non-earning dependants	Earning dependants	Total	Self-supporting persons	Non-earning dependants	Earning dependants
	2	3	4	5	6	7	8	9
1.25 Himalayan West Bengal Division	877	101	1,569	394	911	117	1,535	314
2.11 West Bengal Plain Division	980	135	1,765	489	978	124	1,711	297
Chandernagore	1,023	48	1,639	..	1,143	..	5,333	..
Sikkim	958	103	1,066	2,167	959	106	978	2,305
West Bengal	953	132	1,747	485	973	123	1,696	298
<i>Burdwan Division</i>	971	176	1,773	639	982	149	1,716	373
Burdwan	969	183	1,818	754	923	157	1,602	296
Birbhum	985	143	1,870	884	1,029	206	1,742	437
Bankura	987	187	1,724	950	996	127	1,683	657
Midnapur	968	204	1,731	481	982	156	1,744	346
Hooghly	964	165	1,805	605	996	109	1,796	216
Howrah	950	71	1,851	128	1,008	107	1,748	107
<i>Presidency Division</i>	933	81	1,716	263	962	94	1,674	181
24-Parganas	944	63	1,814	144	984	73	1,781	119
Calcutta	618	118	963	155	345	57	577	40
Nadia	910	72	1,798	152	940	74	1,816	109
Murshidabad	971	104	1,735	339	994	134	1,641	211
Malda	938	90	1,639	431	1,013	91	1,599	321
West Dinajpur	902	75	1,639	466	897	77	1,595	219
Jalpaiguri	871	126	1,554	376	903	171	1,523	189
Darjeeling	923	200	1,355	1,000	938	198	1,311	1,032
Cooch Behar	869	63	1,648	102	908	72	1,613	71

Division and District	II—Cultivators of land wholly or mainly unowned and their dependants				III—Cultivating labourers and their dependants				IV—Non-cultivating owners of land, Agricultural rent receivers and their dependants			
	Total	Self-supporting persons	Non-earning dependants	Earning dependants	Total	Self-supporting persons	Non-earning dependants	Earning dependants	Total	Self-supporting persons	Non-earning dependants	Earning dependants
	10	11	12	13	14	15	16	17	18	19	20	21
1.25 Himalayan West Bengal Division	848	75	1,597	467	770	124	1,807	820	913	261	1,347	163
2.11 West Bengal Plain Division	980	109	1,810	620	897	165	1,910	911	890	323	1,472	543
Chandernagore	1,687	..	2,000	..	500	..	1,000	..	977	70	1,435	..
Sikkim	943	115	2,232	623	951	467	1,633	1,667	1,000	2,000	958	..
West Bengal	959	103	1,776	607	894	164	1,908	910	888	320	1,464	520
<i>Burdwan Division</i>	1,010	152	1,873	306	909	233	1,902	1,216	1,095	416	1,606	637
Burdwan	1,143	107	2,093	1,007	908	255	2,181	1,340	1,136	406	1,861	537
Birbhum	964	56	1,911	1,008	926	103	2,131	1,669	1,096	344	1,674	435
Bankura	941	88	1,859	940	978	335	1,781	1,690	1,883	637	2,091	650
Midnapur	986	244	1,737	680	895	298	1,684	783	919	323	1,383	409
Hooghly	961	131	1,854	895	833	263	1,793	1,287	1,258	523	1,651	2,472
Howrah	984	82	1,944	113	852	43	2,016	180	1,026	410	1,347	253
<i>Presidency Division</i>	915	59	1,698	350	876	69	1,915	405	391	229	1,345	393
24-Parganas	944	62	1,794	153	873	44	1,924	185	916	185	1,474	217
Calcutta	626	8	2,000	..	454	113	1,674	..	715	147	1,068	201
Nadia	957	51	1,736	225	784	68	1,813	311	1,030	330	1,699	52
Murshidabad	951	40	1,773	366	923	77	2,026	656	1,045	371	1,335	1,993
Malda	943	36	1,630	403	962	133	1,833	978	1,043	373	1,451	857
West Dinajpur	932	51	1,675	664	854	105	1,811	1,159	801	315	1,248	223
Jalpaiguri	855	94	1,579	493	681	102	1,623	667	950	238	1,484	170
Darjeeling	902	146	1,473	885	870	421	1,390	1,205	829	211	1,033	1,000
Cooch Behar	823	37	1,654	134	776	89	1,931	515	892	303	1,235	37

SUBSIDIARY TABLE VI.6

Females per 1,000 males in Non-Agricultural Classes and Subclasses

Division and District	Non-Agricultural Classes				V—Production other than cultivation			
	Total	Self-supporting persons	Non-earning dependants	Earning dependants	Total	Self-supporting persons	Non-earning dependants	Earning dependants
1	2	3	4	5	6	7	8	9
1.25 Himalayan West Bengal Division	801	428	1,380	1,086	919	659	1,329	1,216
2.11 West Bengal Plain Division	742	150	1,609	408	728	177	1,697	468
Chandernagore	767	123	1,554	393	722	92	1,741	145
Sikkim	487	115	1,751	2,000	671	105	1,695	2,609
West Bengal	747	173	1,592	461	751	238	1,648	569
<i>Burdwan Division</i>	807	217	1,661	582	782	262	1,702	622
Burdwan	766	307	1,528	946	710	406	1,342	1,066
Birbhum	929	852	1,738	1,130	1,179	697	1,873	1,096
Bankura	957	326	1,737	800	1,033	423	1,846	879
Midnapur	899	264	1,678	476	1,032	355	1,906	486
Hooghly	786	184	1,612	613	698	186	1,645	795
Howrah	753	108	1,744	186	707	84	1,857	165
<i>Presidency Division</i>	717	152	1,553	393	733	224	1,615	533
24-Parganas	741	108	1,614	202	669	116	1,650	216
Calcutta	570	78	1,508	210	534	17	1,658	167
Nadia	971	302	1,533	186	884	223	1,878	242
Murshidabad	978	269	1,766	442	1,088	451	1,843	469
Malda	916	165	1,685	689	1,034	257	1,748	903
West Dinajpur	746	129	1,561	646	832	244	1,852	722
Jalpaiguri	783	490	1,353	704	892	697	1,287	824
Darjeeling	836	399	1,335	1,545	934	610	1,273	1,749
Cooch Behar	785	181	1,586	295	1,164	406	2,145	217

Division and District	VI—Commerce				VII—Transport				VIII—Other services and miscellaneous sources			
	Total	Self-supporting persons	Non-earning dependants	Earning dependants	Total	Self-supporting persons	Non-earning dependants	Earning dependants	Total	Self-supporting persons	Non-earning dependants	Earning dependants
	10	11	12	13	14	15	16	17	18	19	20	21
1.25 Himalayan West Bengal Division	697	71	1,452	369	586	18	1,552	1,360	625	130	1,413	973
2.11 West Bengal Plain Division	741	74	1,593	262	573	23	1,723	352	798	207	1,532	439
Chandernagore	904	44	2,494	123	634	22	1,493	778	740	277	1,064	946
Sikkim	405	40	819	857	94	61	1,613	..	646	160	2,313	1,630
West Bengal	739	74	1,582	266	574	23	1,715	357	788	202	1,530	466
<i>Burdwan Division</i>	804	132	1,587	351	697	49	1,858	525	869	247	1,625	690
Burdwan	719	129	1,458	703	773	77	1,856	502	890	258	1,740	1,007
Birbhum	899	149	1,699	846	782	29	1,791	546	845	273	1,679	1,557
Bankura	958	244	1,687	530	892	91	1,882	797	864	264	1,614	806
Midnapur	860	226	1,672	336	885	72	2,268	696	821	269	1,423	480
Hooghly	838	111	1,546	440	658	41	1,674	741	888	257	1,617	571
Howrah	776	87	1,616	101	560	26	1,703	195	891	197	1,712	311
<i>Presidency Division</i>	712	53	1,580	213	513	11	1,633	289	753	182	1,486	367
24-Parganas	799	68	1,683	151	689	25	1,673	244	809	138	1,557	216
Calcutta	592	16	1,525	185	413	5	1,607	192	629	186	1,389	264
Nadia	918	117	1,651	221	741	26	1,606	117	1,042	496	1,399	171
Murshidabad	993	232	1,709	319	891	20	1,874	265	900	185	1,739	493
Malda	971	182	1,707	458	700	17	1,720	353	834	116	1,634	608
West Dinajpur	737	52	1,557	174	487	38	1,607	550	740	131	1,480	825
Jalpaiguri	662	51	1,478	185	526	21	1,517	1,481	513	84	1,457	361
Darjeeling	671	89	1,312	787	609	16	1,584	1,335	724	171	1,435	1,321
Cooch Behar	783	90	1,557	160	500	13	1,530	1,182	646	154	1,341	423

SUBSIDIARY TABLE VI.7

Marital Status of 1,000 persons of each sex of general population and comparison with previous censuses

Division and District	Males											
	Unmarried				Married				Widowed			
	1951	1941	1931	1921	1951	1941	1931	1921	1951	1941	1931	1921
1	2	3	4	5	6	7	8	9	10	11	12	13
1.25 Himalayan West Bengal, Division	512	512	501	523	437	419	444	418	51	69	55	59
2.11 West Bengal Plain Division	475	473	440	482	486	473	521	472	39	54	39	46
Chandernagore	543	..	..	..	413	..	..	..	44	..	..	..
Sikkim	530	542	516	515	428	428	454	456	42	30	30	29
West Bengal	478	475	446	486	483	470	514	467	39	55	40	47
Burdwan Division	465	481	452	487	498	461	505	462	37	58	43	51
Burdwan	436	459	440	461	532	479	512	482	32	62	48	57
Birbhum	482	480	422	444	471	461	532	497	47	59	46	59
Bankura	492	492	469	508	470	445	485	440	38	48	46	52
Midnapur	430	498	470	519	538	441	481	431	37	61	43	50
Hooghly	516	471	442	471	442	469	513	476	42	60	45	53
Howrah	490	475	429	471	475	481	541	493	35	44	30	36
Presidency Division	489	471	442	485	469	478	519	470	42	51	39	45
24-Parganas	498	458	416	454	463	491	551	506	39	51	33	40
Calcutta	423	414	347	369	536	541	626	596	41	45	27	35
Nadia	524	524	476	526	417	422	481	426	59	54	43	48
Murshidabad	518	515	454	505	441	433	512	451	41	47	34	44
Malda	492	504	454	505	480	452	512	468	28	44	34	37
West Dinajpur	515	485	458	515	449	448	502	440	36	67	40	45
Jalpaiguri	494	507	488	520	451	420	459	419	55	73	53	61
Darjeeling	546	525	518	538	406	418	435	424	45	57	47	43
Cooch Behar	515	487	515	523	437	459	423	413	48	54	62	64

Division and District	Females											
	Unmarried				Married				Widowed			
	1951	1941	1931	1921	1951	1941	1931	1921	1951	1941	1931	1921
	14	15	16	17	18	19	20	21	22	23	24	25
1.25 Himalayan West Bengal Division	419	442	369	389	455	439	471	438	126	119	160	173
2.11 West Bengal Plain Division	356	336	276	292	479	463	510	466	163	201	214	243
Chandernagore	410	..	..	..	406	..	..	..	184	..	..	..
Sikkim	523	528	470	450	410	377	446	471	67	95	84	79
West Bengal	363	342	284	301	477	461	507	484	160	197	209	235
Burdwan Division	347	321	267	271	482	463	500	462	171	216	235	267
Burdwan	324	310	266	260	509	470	498	469	167	220	236	271
Birbhum	321	322	266	265	489	479	525	490	190	199	209	245
Bankura	353	308	258	273	474	456	502	456	168	236	240	271
Midnapur	337	318	260	276	494	459	495	449	169	223	245	275
Hooghly	383	328	259	261	444	451	486	456	173	221	255	283
Howrah	373	349	287	285	455	466	509	479	172	185	204	236
Presidency Division	379	363	300	325	472	460	511	465	149	177	189	210
24-Parganas	365	337	268	292	478	486	539	499	162	177	193	209
Calcutta	427	379	331	302	428	431	488	475	150	190	181	223
Nadia	362	338	254	275	496	442	508	453	142	220	238	272
Murshidabad	353	358	277	293	495	448	509	460	152	194	214	247
Malda	342	369	300	342	519	461	509	450	139	170	191	208
West Dinajpur	384	363	319	375	480	483	529	464	186	154	162	161
Jalpaiguri	431	417	365	401	455	454	500	447	114	129	135	152
Darjeeling	499	497	476	478	428	404	424	424	73	99	100	98
Cooch Behar	342	326	318	329	474	479	460	430	134	195	232	241

SUBSIDIARY TABLE VI.8

Age distribution of 1,000 married persons of each sex (and comparison with 1941 census)

Division and District		Males							
		0-14		15-34		35-54		55 and over	
		1951	1941	1951	1941	1951	1941	1951	1941
1	2	3	4	5	6	7	8	9	
1.25 Himalayan West Bengal Division	6	8	455	433	439	421	100	88	
2.11 West Bengal Plain Division	12	10	480	437	395	407	113	98	
Chandernagore	6	..	411	..	422	..	161	..	
Sikkim	3	18	476	470	337	391	134	121	
West Bengal	11	10	478	437	399	408	113	95	
<i>Burdwan Division</i>	15	9	470	470	391	422	124	99	
Burdwan	7	9	548	491	327	419	118	81	
Birbhum	7	13	463	452	421	423	109	107	
Bankura	36	14	470	450	367	426	127	110	
Midnapur	24	7	434	453	409	428	133	112	
Hooghly	2	6	416	477	440	426	142	91	
Howrah	5	9	485	494	404	402	106	95	
<i>Presidency Division</i>	8	11	436	501	405	396	101	92	
24-Parganas	6	11	474	494	403	393	117	102	
Calcutta	4	10	521	549	406	381	69	60	
Nadia	16	11	512	453	379	427	93	109	
Murshidabad	15	13	484	463	386	408	115	116	
Malda	16	18	492	494	376	379	116	109	
West Dinajpur	5	10	454	472	437	423	104	95	
Jalpaiguri	8	6	460	490	438	432	94	72	
Darjeeling	4	12	464	468	420	395	112	125	
Cooch Behar	5	11	441	444	452	434	102	111	

Division and District		Females							
		0-14		15-34		35-54		55 and over	
		1951	1941	1951	1941	1951	1941	1951	1941
1	2	3	4	5	6	7	8	9	
1.25 Himalayan West Bengal Division	73	46	674	703	223	213	31	33	
2.11 West Bengal Plain Division	81	103	637	664	240	212	42	22	
Chandernagore	23	..	659	..	273	..	46	..	
Sikkim	40	44	477	519	360	336	123	101	
West Bengal	81	99	640	667	238	212	41	22	
<i>Burdwan Division</i>	80	103	632	667	245	209	43	21	
Burdwan	64	93	657	677	239	211	40	19	
Birbhum	72	82	641	650	255	241	32	27	
Bankura	123	143	500	624	296	211	81	22	
Midnapur	92	115	637	664	234	202	37	19	
Hooghly	59	90	660	695	240	193	41	17	
Howrah	62	80	670	691	232	205	36	24	
<i>Presidency Division</i>	81	95	643	666	232	215	39	24	
24-Parganas	84	113	659	667	214	196	43	24	
Calcutta	36	37	675	693	259	242	30	23	
Nadia	51	130	618	590	271	262	60	18	
Murshidabad	102	112	617	646	244	221	37	21	
Malda	133	101	584	669	236	206	42	24	
West Dinajpur	69	94	679	687	226	203	26	16	
Jalpaiguri	55	54	690	734	232	195	23	17	
Darjeeling	10	23	624	627	306	275	60	70	
Cooch Behar	137	144	686	656	156	184	21	16	

SUBSIDIARY TABLE VI.9

Infants per 10,000 persons

Division and District	Infants per 10,000 persons of :												
	General population				Rural population			Urban population		Agricultural Classes		Non-Agricultural Classes	
	1951		1941		Persons	Males	Females	Males	Females	Males	Females	Males	Females
	Persons	Males	Females	Persons										Males	Females
1	2	3	4	5	6	7	8	9	10	11	12	13	
1.25 Himalayan West Bengal Division	262	122	140	245	121	142	128	127	123	140	121	141	
2.11 West Bengal Plain Division	260	135	125	231	133	126	144	119	130	125	143	124	
Chandernagore	274	165	108	..	..	..	165	109	..	..	166	110
Sikkim	138	72	66	140	71	64	111	184	71	64	73	103	
West Bengal	260	134	126	232	131	128	144	119	130	126	142	125	
Burdwan Division	254	136	118	236	128	120	187	110	125	119	160	117	
Burdwan	281	176	105	201	131	99	427	139	134	104	252	107	
Birbhum	193	96	97	250	95	93	123	148	95	93	105	115	
Bankura	341	176	165	212	181	172	115	64	191	176	107	110	
Midnapur	238	118	120	245	115	118	161	143	108	110	170	165	
Hooghly	219	131	118	247	129	126	140	84	112	130	161	99	
Howrah	225	116	109	260	126	116	93	96	125	107	111	111	
Presidency Division	266	133	133	229	136	137	126	123	135	136	130	130	
24-Parganas	250	128	122	237	119	120	156	125	119	119	142	125	
Calcutta	225	103	122	140	..	..	103	122	149	89	103	122
Nadia	304	183	121	252	176	120	215	127	147	105	247	160	
Murshidabad	320	164	166	275	166	157	141	142	166	158	159	152	
Malda	330	155	175	268	156	177	123	101	169	188	115	138	
West Dinajpur	236	122	114	243	118	113	213	139	116	113	172	122	
Jalpaiguri	277	124	153	251	122	163	157	144	131	168	117	148	
Darjeeling	247	121	126	231	120	128	123	120	103	102	130	137	
Cooch Behar	254	120	134	191	121	134	108	125	121	137	111	116	

SUBSIDIARY TABLE VI.10

Young children (aged 1-4) per 10,000 persons

Division and District	Young children per 10,000 persons of :												
	General population				Rural population			Urban population		Agricultural Classes		Non-Agricultural Classes	
	1951		1941		Persons	Males	Females	Males	Females	Males	Females	Males	Females
	Persons	Males	Females	Persons										Males	Females
1	2	3	4	5	6	7	8	9	10	11	12	13	
1.25 Himalayan West Bengal Division	1,002	486	516	1,168	493	521	411	464	517	523	444	506	
2.11 West Bengal Plain Division	901	448	453	999	463	478	399	376	465	484	421	406	
Chandernagore	919	455	464	..	..	..	455	464	345	..	456	467
Sikkim	1,151	543	608	1,218	549	611	258	490	571	633	176	289	
West Bengal	909	451	458	1,009	466	483	399	378	469	487	423	414	
Burdwan Division	855	426	429	924	428	438	416	371	424	445	432	393	
Burdwan	824	426	398	953	406	393	538	426	400	416	478	367	
Birbhum	900	459	441	1,010	454	448	538	329	468	464	418	332	
Bankura	866	428	438	1,031	446	444	185	373	439	488	375	443	
Midnapur	829	397	432	988	387	436	540	383	377	434	493	425	
Hooghly	921	459	462	948	493	484	329	377	502	500	394	404	
Howrah	847	434	413	939	466	449	365	331	489	465	408	386	
Presidency Division	953	473	485	1,033	509	531	392	331	522	538	418	407	
24-Parganas	985	480	505	1,060	491	540	450	403	487	548	471	445	
Calcutta	703	354	349	857	..	..	354	349	342	277	354	349
Nadia	906	467	439	1,128	479	444	407	421	495	435	416	449	
Murshidabad	1,062	519	543	1,162	527	542	427	542	542	558	466	503	
Malda	1,109	564	545	1,254	565	544	519	573	623	549	396	534	
West Dinajpur	1,101	549	552	1,110	546	554	620	495	556	560	484	482	
Jalpaiguri	1,024	486	538	1,149	485	540	504	491	547	557	428	519	
Darjeeling	991	482	509	1,209	499	528	413	428	456	499	495	513	
Cooch Behar	879	488	491	1,144	500	489	303	520	511	502	335	412	

SUBSIDIARY TABLE VI.11

Boys and girls (aged 5-14) per 10,000 persons

Division and District	Boys and girls per 10,000 persons of:											
	General population				Rural population		Urban population		Agricultural Classes		Non-Agricultural Classes	
	1951			1941								
	Persons	Males	Females	Persons	Males	Females	Males	Females	Males	Females	Males	Females
1	2	3	4	5	6	7	8	9	10	11	12	13
1.25 Himalayan West Bengal Division	2,502	1,311	1,191	2,516	1,326	1,197	1,146	1,132	1,412	1,248	1,173	1,115
2.11 West Bengal Plain Division	2,329	1,226	1,103	2,346	1,282	1,161	1,050	915	1,287	1,177	1,134	988
Chandernagore	2,307	1,292	1,015	..	..	..	1,292	1,015	1,724	345	1,239	1,020
Sikkim	2,693	1,369	1,324	2,700	1,374	1,333	1,144	849	1,403	1,331	930	563
West Bengal	2,343	1,233	1,110	2,355	1,286	1,165	1,051	921	1,296	1,183	1,137	999
Burdwan Division	1,346	1,221	1,125	2,363	1,236	1,143	1,123	1,014	1,232	1,155	1,198	1,058
Burdwan	2,108	1,106	1,002	2,315	1,051	989	1,410	1,072	1,000	1,014	1,295	980
Birbhum	2,429	1,308	1,121	2,467	1,317	1,133	1,166	951	1,323	1,171	1,232	890
Bankura	2,710	1,513	1,197	2,462	1,548	1,192	1,053	1,254	1,570	1,164	1,246	1,347
Midnapur	2,309	1,139	1,170	2,404	1,133	1,170	1,213	1,186	1,111	1,185	1,273	1,097
Hooghly	2,369	1,222	1,147	2,276	1,284	1,188	983	986	1,346	1,206	1,032	1,056
Howrah	2,361	1,246	1,115	2,257	1,354	1,222	1,007	880	1,407	1,223	1,166	1,061
Presidency Division	2,340	1,244	1,096	2,343	1,343	1,190	1,020	833	1,372	1,216	1,101	963
24 Parganas	2,433	1,313	1,120	2,404	1,371	1,189	1,150	927	1,373	1,205	1,231	1,004
Calcutta	1,728	922	806	1,698	..	..	922	806	1,108	713	920	807
Nadia	2,336	1,309	1,027	2,495	1,351	1,005	1,110	1,136	1,379	980	1,184	1,112
Murshidabad	2,526	1,322	1,204	2,675	1,330	1,206	1,227	1,174	1,361	1,264	1,229	1,059
Malda	2,546	1,295	1,251	2,614	1,298	1,251	1,204	1,247	1,349	1,264	1,142	1,213
West Dinajpur	2,549	1,327	1,222	2,481	1,331	1,235	1,236	856	1,348	1,263	1,140	848
Jalpalguri	2,461	1,280	1,181	2,516	1,287	1,185	1,150	1,098	1,425	1,288	1,140	1,078
Darjeeling	2,491	1,287	1,204	2,516	1,309	1,227	1,196	1,107	1,378	1,226	1,242	1,194
Cooch Behar	2,568	1,371	1,197	2,426	1,393	1,195	1,021	1,231	1,412	1,223	1,088	1,021

SUBSIDIARY TABLE VI.12

Young men and women (aged 15-34) per 10,000 persons

Division and District	Young men and women per 10,000 persons of:											
	General population				Rural population		Urban population		Agricultural Classes		Non-Agricultural Classes	
	1951			1941								
	Persons	Males	Females	Persons	Males	Females	Males	Females	Males	Females	Males	Females
1	2	3	4	5	6	7	8	9	10	11	12	13
1.25 Himalayan West Bengal Division	3,702	1,967	1,735	3,715	1,909	1,745	2,592	1,629	1,800	1,734	2,193	1,737
2.11 West Bengal Plain Division	3,723	2,052	1,670	3,720	1,831	1,736	2,754	1,463	1,795	1,739	2,445	1,566
Chandernagore	3,611	2,058	1,553	..	..	..	2,058	1,553	1,034	690	2,065	1,558
Sikkim	3,336	1,984	1,372	3,371	1,960	1,359	2,177	1,956	1,823	1,385	3,750	1,133
West Bengal	3,721	2,045	1,676	3,720	1,838	1,737	2,755	1,467	1,796	1,738	2,426	1,580
Burdwan Division	3,667	1,950	1,717	3,637	1,874	1,741	2,428	1,565	1,847	1,749	2,177	1,646
Burdwan	4,060	2,244	1,816	3,740	2,241	1,859	2,260	1,583	2,241	1,927	2,249	1,620
Birbhum	3,567	1,752	1,815	3,393	1,735	1,832	2,011	1,539	1,717	1,830	1,921	1,740
Bankura	3,095	1,619	1,476	3,423	1,575	1,447	2,195	1,362	1,550	1,425	1,943	1,720
Midnapur	3,637	1,851	1,786	3,594	1,867	1,783	1,626	1,816	1,865	1,787	1,782	1,777
Hooghly	3,576	1,888	1,688	3,748	1,774	1,731	2,331	1,517	1,717	1,753	2,151	1,585
Howrah	3,840	2,237	1,603	3,850	1,865	1,688	3,056	1,417	1,808	1,619	2,448	1,596
Presidency Division	3,770	2,132	1,638	3,797	1,798	1,731	2,339	1,427	1,734	1,725	2,574	1,541
24 Parganas	3,659	2,009	1,650	3,715	1,786	1,700	2,638	1,507	1,742	1,702	2,376	1,578
Calcutta	4,486	3,153	1,333	4,798	..	..	3,153	1,333	2,830	1,524	3,156	1,332
Nadia	3,772	1,893	1,879	3,266	1,828	1,911	2,202	1,724	1,727	1,962	2,187	1,731
Murshidabad	3,601	1,770	1,731	3,269	1,761	1,733	1,881	1,710	1,696	1,636	1,948	1,840
Malda	3,403	1,706	1,697	3,414	1,693	1,697	2,105	1,691	1,655	1,695	1,851	1,703
West Dinajpur	3,488	1,785	1,703	3,671	1,763	1,712	2,383	1,453	1,711	1,737	2,446	1,397
Jalpalguri	3,697	1,977	1,720	3,771	1,942	1,732	2,683	1,466	1,749	1,713	2,197	1,727
Darjeeling	3,810	2,023	1,787	3,589	1,867	1,826	2,669	1,622	1,812	1,812	2,125	1,775
Cooch Behar	3,631	1,913	1,718	3,545	1,889	1,711	2,299	1,832	1,838	1,728	2,430	1,646

SUBSIDIARY TABLE VI.13

Middle aged persons (aged 35-54) per 10,000 persons

Middle aged persons per 10,000 persons of :

Division and District	General population		Rural population		Urban population		Agricultural Classes		Non-Agricultural Classes			
	1951			1941								
	Persons	Males	Females	Persons	Males	Females	Males	Females	Males	Females		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.25 Himalayan West Bengal Division	1,979	1,212	767	1,835	1,217	776	1,163	672	1,160	772	1,233	760
2.11 West Bengal Plain Division	2,028	1,168	859	2,060	1,089	903	1,421	716	1,091	901	1,288	792
Chandernagore	2,003	1,155	848	..	..	..	1,155	848	1,724	1,035	1,151	847
Sikkim	1,862	1,037	825	1,761	1,030	826	1,365	775	980	848	1,777	627
West Bengal	2,023	1,172	851	2,047	1,101	891	1,415	714	1,096	892	1,288	789
Burdwan Division	2,056	1,150	906	2,106	1,132	921	1,261	810	1,138	926	1,177	862
Burdwan	1,951	1,042	909	2,195	1,112	910	658	896	1,055	961	1,019	814
Birbhum	2,170	1,139	1,031	2,158	1,126	1,032	1,343	1,008	1,118	1,000	1,241	1,173
Bankura	2,019	1,007	1,012	2,121	995	1,027	1,159	830	1,010	1,027	989	946
Midnapur	2,134	1,243	891	2,067	1,243	886	1,231	974	1,230	885	1,059	921
Hooghly	2,032	1,173	859	2,131	1,077	879	1,543	785	1,053	860	1,357	859
Howrah	2,009	1,205	804	2,006	1,071	867	1,499	668	1,050	829	1,281	793
Presidency Division	1,993	1,192	801	1,991	1,066	857	1,478	674	1,046	851	1,354	745
24-Parganas	1,906	1,124	782	1,947	1,052	824	1,324	668	1,033	822	1,247	729
Calcutta	2,287	1,639	648	2,217	..	..	1,639	648	1,128	841	1,644	646
Nadia	1,944	995	949	2,147	1,011	946	922	960	1,031	994	931	871
Murshidabad	1,898	963	935	1,931	948	940	1,159	869	974	896	939	1,026
Malda	1,907	995	912	1,827	996	917	973	785	964	890	1,084	974
West Dinajpur	2,037	1,184	853	1,962	1,174	862	1,462	625	1,149	860	1,502	794
Jaipalguri	2,031	1,269	762	1,873	1,273	768	1,191	653	1,131	771	1,403	753
Darjeeling	1,857	1,093	764	1,751	1,073	793	1,173	644	1,073	820	1,102	737
Cooch Behar	1,997	1,221	776	2,074	1,228	777	1,109	761	1,207	760	1,316	887

SUBSIDIARY TABLE VI.14

Elderly persons (aged 55 and over) per 10,000 persons

Elderly persons per 10,000 persons of :

Division and District	General population		Rural population		Urban population		Agricultural Classes		Non-Agricultural Classes			
	1951			1941								
	Persons	Males	Females	Persons	Males	Females	Males	Females	Males	Females		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.25 Himalayan West Bengal Division	549	320	229	621	322	228	293	239	327	240	309	215
2.11 West Bengal Plain Division	753	391	362	644	399	390	367	271	401	396	376	310
Chandernagore	895	513	373	..	..	..	513	373	1,724	1,379	504	366
Sikkim	820	398	422	720	395	428	517	184	399	436	372	248
West Bengal	738	385	351	637	391	375	364	269	395	384	370	301
Burdwan Division	811	418	393	674	418	410	415	288	413	417	429	340
Burdwan	767	423	344	596	449	353	278	298	375	367	511	304
Birbhum	737	348	389	717	352	379	292	538	357	361	303	524
Bankura	950	392	558	751	376	577	598	312	385	603	427	346
Midnapur	838	452	386	702	449	398	507	205	449	394	471	343
Hooghly	840	460	380	650	419	401	620	300	410	404	537	344
Howrah	714	366	348	638	389	383	315	272	494	388	308	328
Presidency Division	668	355	313	602	361	336	342	262	373	345	335	278
24-Parganas	759	397	362	637	407	391	370	279	434	406	346	302
Calcutta	668	331	237	490	..	..	331	237	574	421	329	235
Nadia	729	343	386	712	350	370	311	461	345	394	339	373
Murshidabad	689	345	344	688	341	345	390	337	361	333	307	371
Malda	702	339	363	623	338	363	357	371	303	348	441	406
West Dinajpur	581	327	254	533	329	255	282	236	323	255	362	249
Jaipalguri	509	312	197	440	314	197	282	201	315	214	308	181
Darjeeling	603	331	272	704	346	281	271	230	395	324	300	246
Cooch Behar	564	322	242	620	318	238	382	304	318	236	350	282

SUBSIDIARY TABLE VII.1

Progress of Literacy

Number of literate persons among 1,000 Males who were:

Division and State	Aged 5 to 9 on 1-3-51	Aged 5 to 9 on 1-3-41	Aged 5 to 14 on 1-3-51	Aged 5 to 14 on 1-3-41	Aged 5 and upwards on 1-3-51	Aged 5 and upwards on 1-3-41	Aged 15 and upwards on 1-3-51
1	2	3	4	5	6	7	8
1.25 Himalayan West Bengal Division	112	51	189	86	272	170	303
Rural	87	..	154	..	233	..	263
Urban	371	..	524	..	580	..	596
2.11 West Bengal Plain Division	195	143	291	215	375	343	404
Rural	159	..	239	..	302	..	327
Urban	324	..	461	..	544	..	565
West Bengal	188	137	289	207	366	333	395
Rural	152	..	230	..	295	..	320
Urban	325	..	463	..	545	..	566
Chandernagore—Urban	359	..	519	..	598	..	623
Sikkim	12	..	41	12	127	95	162
Rural	7	..	33	..	117	..	151
Urban	289	..	490	..	555	..	573

Number of literate persons among 1,000 Females who were:

Division and State	Aged 5 to 9 on 1-3-51	Aged 5 to 9 on 1-3-41	Aged 5 to 14 on 1-3-51	Aged 5 to 14 on 1-3-41	Aged 5 and upwards on 1-3-51	Aged 5 and upwards on 1-3-41	Aged 15 and upwards on 1-3-51
9	10	11	12	13	14	15	
1.25 Himalayan West Bengal Division	53	23	89	36	84	34	82
Rural	33	..	56	..	53	..	51
Urban	291	..	401	..	381	..	373
2.11 West Bengal Plain Division	103	63	163	98	158	102	156
Rural	64	..	100	..	85	..	79
Urban	252	..	375	..	408	..	420
West Bengal	99	66	158	84	151	98	149
Rural	60	..	96	..	82	..	76
Urban	253	..	375	..	406	..	418
Chandernagore—Urban	309	..	480	..	457	..	448
Sikkim	6	11	16	6	14	4	13
Rural	1	..	11	..	8	..	7
Urban	443	..	447	..	332	..	297

SUBSIDIARY TABLE VII.2

Literacy Standard of Livelihood Classes

Number per 1,000 Males and 1,000 Females of each Livelihood Class, by Literacy and Educational Standard

Educational Standard	Agricultural Classes							
	I Cultivators of land wholly or mainly owned and their dependants		II Cultivators of land wholly or mainly unowned and their dependants		III Cultivating labourers and their dependants		IV Non-cultivating owners of land, Agricultural rent receivers and their dependants	
	Males 2	Females 3	Males 4	Females 5	Males 6	Females 7	Males 8	Females 9
1.25 Himalayan West Bengal Division								
Literate (Able to read and write)	208	24	111	14	11	22	333	200
Middle School	35	4	15	3	1	2	157	46
Matriculate or S.L.C. Higher Secondary	4	1	3	..	..	3	43	4
Intermediate in Arts or Science	1	..	..	..	..	..	10	1
[Degrees or Diplomas]								
Graduate in Arts or Science	..	..	..	..	..	..	5	..
Post Graduate in Arts or Science	..	..	..	..	..	..	..	..
Teaching	..	..	..	..	..	..	1	..
Engineering	..	..	..	..	..	..	..	..
Agriculture	..	..	..	..	..	..	..	..
Veterinary	..	..	..	..	..	..	..	..
Commerce	..	..	..	..	..	..	..	..
Legal	..	..	..	..	..	..	..	..
Medical	..	..	..	..	..	..	1	..
Others	..	..	..	..	..	..	1	..
2.11 West Bengal Plain, Division								
Literate (Able to read and write)	265	258	153	36	90	21	298	273
Middle School	84	13	36	6	16	6	197	65
Matriculate or S.L.C. Higher Secondary	10	1	3	..	2	..	75	11
Intermediate in Arts or Science	2	..	1	..	..	..	27	8
[Degrees or Diplomas]								
Graduate in Arts or Science	1	..	1	..	..	..	15	1
Post Graduate in Arts or Science	..	..	..	..	..	..	2	..
Teaching	1	..	..	..	..	..	2	..
Engineering	..	..	..	..	..	..	1	..
Agriculture	..	..	..	..	..	..	..	..
Veterinary	..	..	..	..	..	..	..	..
Commerce	..	..	..	..	..	..	1	..
Legal	..	..	..	..	..	..	4	..
Medical	1	..	..	..	..	..	2	..
Others	..	..	..	..	..	..	1	..
West Bengal								
Literate (Able to read and write)	260	56	146	33	90	21	300	269
Middle School	80	12	33	6	16	6	194	63
Matriculate or S.L.C. Higher Secondary	9	1	3	..	2	..	73	10
Intermediate in Arts or Science	2	..	1	..	..	..	26	8
[Degrees or Diplomas]								
Graduate in Arts or Science	1	..	1	..	..	..	15	1
Post Graduate in Arts or Science	..	..	..	..	..	..	2	..
Teaching	1	..	..	..	..	..	2	..
Engineering	..	..	..	..	..	..	1	..
Agriculture	..	..	..	..	..	..	..	..
Veterinary	..	..	..	..	..	..	..	..
Commerce	..	..	..	..	..	..	1	..
Legal	..	..	..	..	..	..	4	..
Medical	..	..	..	..	..	..	2	..
Others	..	..	..	..	..	..	1	..

SUBSIDIARY TABLE VII.2—contd.
Literacy Standard of Livelihood Classes

Number per 1,000 Males and 1,000 Females of each Livelihood Class, by Literacy and Educational Standard

*Non-Agricultural Classes

Educational Standard	Persons (including dependants) who derive their principal means of livelihood from							
	V Production other than cultivation		VI Commerce		VII Transport		VIII Other services and miscellaneous sources	
	Males 10	Females 11	Males 12	Females 13	Males 14	Females 15	Males 16	Females 17
1.25 Himalayan West Bengal Division								
Literate (Able to read and write)	162	33	379	227	259	182	243	193
Middle School	20	6	129	45	91	53	76	35
Matriculate or S.L.C. Higher Secondary	6	1	38	6	60	6	48	10
Intermediate in Arts or Science	1	..	9	2	8	1	14	3
[Degrees or Diplomas]								
Graduate in Arts or Science	1	..	4	..	4	..	10	2
Post Graduate in Arts or Science	..	..	1	..	1	..	1	..
Teaching	..	..	1	..	..	..	3	1
Engineering	..	..	..	..	..	..	1	..
Agriculture	..	..	..	..	..	..	..	..
Veterinary	..	..	..	..	..	..	..	..
Commerce	..	..	..	..	..	..	..	..
Legal	..	..	1	..	..	..	3	..
Medical	..	..	1	..	1	..	4	..
Others	..	..	..	..	..	..	1	..
2.11 West Bengal Plain Division								
Literate (Able to read and write)	260	112	314	229	245	231	245	205
Middle School	87	31	141	54	84	77	121	62
Matriculate or S.L.C. Higher Secondary	25	5	50	9	54	14	56	13
Intermediate in Arts or Science	7	1	15	2	15	4	19	4
[Degrees or Diplomas]								
Graduate in Arts or Science	4	..	8	1	8	2	13	2
Post Graduate in Arts or Science	1	..	1	..	2	..	4	..
Teaching	1	..	..	..	1	..	3	1
Engineering	1	..	..	..	1	..	2	..
Agriculture	..	..	..	..	..	..	..	..
Veterinary	..	..	..	..	..	..	..	..
Commerce	1	..	2	..	2	..	3	..
Legal	..	..	1	..	1	..	4	..
Medical	1	..	1	..	1	..	5	..
Others	..	..	..	..	1	..	1	..
West Bengal								
Literate (Able to read and write)	248	99	318	229	246	229	244	204
Middle School	79	27	140	53	84	76	118	61
Matriculate or S.L.C. Higher Secondary	23	4	49	8	55	14	56	13
Intermediate in Arts or Science	6	1	15	2	14	4	18	4
[Degrees or Diplomas]								
Graduate in Arts or Science	3	..	8	1	8	2	13	2
Post Graduate in Arts or Science	1	..	1	..	2	..	3	..
Teaching	1	..	..	..	1	..	3	1
Engineering	1	..	..	..	1	..	1	..
Agriculture	..	..	..	..	..	..	..	..
Veterinary	..	..	..	..	..	..	..	..
Commerce	..	..	2	..	2	..	2	..
Legal	..	..	2	..	1	..	4	..
Medical	1	..	1	..	1	..	5	..
Others	..	..	..	..	1	..	1	..

SUBSIDIARY TABLE VII.2—contd.

Literacy Standard of Livelihood Classes

Number per 1,000 Males and 1,000 Females of each Livelihood Class, by Literacy and Educational Standard

Educational Standard	Agricultural Classes							
	I Cultivators of land wholly or mainly owned and their dependants		II Cultivators of land wholly or mainly unowned and their dependants		III Cultivating labourers and their dependants		IV Non-cultivating owners of land, Agricultural rent receivers and their dependants	
	Males	Females	Males	Females	Males	Females	Males	Females
1	2	3	4	5	6	7	8	9
Chandernagore								
Literate (Able to read and write)	286	688	683	350	100	..	305	400
Middle School	429	62	167	150	..	..	266	200
Matriculate or S.L.C. Higher Secondary	107	..	..	50	..	..	172	96
Intermediate in Arts or Science	23	8
[Degrees or Diplomas]								
Graduate in Arts or Science	39	..
Post Graduate in Arts or Science	8	..
Teaching
Engineering	8	..
Agriculture
Veterinary
Commerce
Legal	8	..
Medical	8	..
Others
Sikkim								
Literate (Able to read and write)	108	8	63	5	39	10	296	519
Middle School	1	..	..	..	..	..	222	74
Matriculate or S.L.C. Higher Secondary	74	..
Intermediate in Arts or Science	37	..
[Degrees or Diplomas]								
Graduate in Arts or Science
Post Graduate in Arts or Science
Teaching
Engineering
Agriculture
Veterinary
Commerce
Legal	74	..
Medical
Others

SUBSIDIARY TABLE VII.2—concl'd.

Literacy Standard of Livelihood Classes

Number per 1,000 Males and 1,000 Females of each Livelihood Class, by Literacy and Educational Standard

Educational Standard	Non-Agricultural Classes							
	Persons (including dependants) who derive their principal means of livelihood from							
	V		VI		VII		VIII	
	Production other than cultivation		Commerce		Transport		Other services and miscellaneous sources	
	Males 10	Females 11	Males 12	Females 13	Males 14	Females 15	Males 16	Females 17
Chandernagore								
Literate (Able to read and write)	111	182	253	206	238	248	456	217
Middle School	47	53	197	59	109	31	199	42
Matriculate or S.L.C. Higher Secondary	42	2	68	13	77	6	63	5
Intermediate in Arts or Science	14	..	81	1	68	2	30	2
[Degrees or Diplomas]								
Graduate in Arts or Science	7	..	5	..	54	..	9	1
Post Graduate in Arts or Science	2	..	1	..	3	..	8	..
Teaching . . . . .	..	..	1	1	9	..	1	..
Engineering . . . . .	..	..	..	..	..	..	1	..
Agriculture . . . . .	..	..	..	..	..	..	..	..
Veterinary . . . . .	..	..	..	..	..	..	..	..
Commerce	1	..	..	..	..	..	..	..
Legal . . . . .	..	..	1	..	1	..	1	..
Medical . . . . .	..	..	..	..	2	..	3	..
Others . . . . .	..	..	..	..	..	..	1	..
Shikim								
Literate (Able to read and write)	195	55	578	127	63	24	344	77
Middle School	16	4	34	11	5	..	34	19
Matriculate or S.L.C. Higher Secondary	9	2	9	..	..	..	22	5
Intermediate in Arts or Science . . . . .	..	..	1	..	..	..	4	1
[Degrees or Diplomas]								
Graduate in Arts or Science . . . . .	..	..	..	..	..	..	1	1
Post Graduate in Arts or Science . . . . .	..	..	..	..	..	..	..	..
Teaching . . . . .	..	..	..	..	..	..	..	1
Engineering . . . . .	..	..	..	..	..	..	..	..
Agriculture	1	..	..	..	..	..	1	..
Veterinary . . . . .	..	..	..	..	..	..	..	..
Commerce . . . . .	..	..	..	..	..	..	..	..
Legal . . . . .	..	..	..	..	..	..	2	..
Medical . . . . .	..	..	..	..	..	..	1	..
Others . . . . .	..	..	..	2	..	..	1	1

SUBSIDIARY TABLE VII.3

Educational Services and Research

State and Natural Division	Managers, clerks and servants of educational and Research Institutions, including Libraries and Museums, etc.		Professors, Lecturers and Teachers other than those employed in Universities, Colleges and Research Institutions		Professors, Lecturers, Teachers and Research workers employed in Universities, Colleges and Research Institutions		Total		Number per lakh of population			
									Professors, Lecturers and Teachers other than those employed in Universities, Colleges and Research Institutions		Professors, Lecturers, Teachers and Research workers employed in Universities, Colleges and Research Institutions	
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
1	2	3	4	5	6	7	8	9	10	11	12	13
1.25 Himalayan West Bengal Division	77	6	1,106	261	2,637	152	3,890	419	54	16	130	7
2.11 West Bengal Plain Division	6,617	680	30,663	3,483	18,390	2,861	64,560	6,873	184	15	81	13
West Bengal	6,694	686	31,769	3,744	21,009	3,012	68,126	7,249	187	15	85	13
Chandernagore	27	1	202	41	25	1	254	43	405	82	50	2
Sikkim	..	..	1	..	10	10	11	10	1	..	7	7

REPRINTS AND SPECIAL NOTES

APPENDIX I

Extract from 'Ain—I—Akbari of Abul Fazi—I Allami, vol. II.' (A Gazetteer and Administrative Manual of Akbar's Empire and Past History of India)

Translated into English—COLONEL H. S. JARRETT and J. N. SARKAR, pp. 129—38

BENGAL SUBAH

Since the conceptions of sovereign rule embrace the universe, I propose to begin with Bengal which is at one extremity of Hindustan and to proceed to Zabulistan¹ and I hope that Turan and Iran and other countries may be added to the count. The country lying to the east will be first described, followed by the north, the south, and the west.

This *Subah* is situated in the second climate.² Its length from Chittagong to *Garhi*³ is four hundred *kos*. Its breadth from the northern range of mountains to the southern frontier of the *Sarkar* of *Mandaran*, is two hundred *kos*, and when the country of Orissa was added to this *Subah*, the additional length was forty-three *kos*⁴ and the breadth twenty-three. It is bounded on the east by the sea, on the north and south by mountains and on the west by the *Subah* of Behar. The tract of country on the east called *Bhati*,⁵ is reckoned a part of this province. It is ruled by Isa Afghan and the *Khutabah* is read and the coin struck in the name of his present Majesty. In this country the mango trees grow to the height of a man or not so high and produce abundant fruit. Adjoining it, is an extensive tract of country inhabited by the Tipperah tribes. The name

of the ruler is *Bijay Manik*. Whosoever obtains the chieftainship, bears the title of *Manik* after his name, and the nobles that of *Narain*. He has a force of two hundred thousand footmen and a thousand elephants. Horses are scarce. To the north is a country called *Kuch*. Its chief commands a thousand horse and a hundred thousand foot. *Kamrup*, commonly called also *Kaonrup* and *Kamta*, is subject to him. The inhabitants are as a race good looking and addicted to the practice of magic. Strange stories are told regarding them. It is said that they build houses, of which the pillars, walls and roofs are made of men. Some of these they compel by the power of sorcery, and criminals deserving of death are also thus made use of. Whoever voluntarily surrenders himself for this purpose, escapes retribution for a year. Various conveniences are reserved for him. In due time, men armed with swords cut them down, and from their movements or immobility or other aspects, they have cognizance of scarcity or plenty or duration of years [of the reign] or the longevity of the ruler or defeat of enemies. They also cut open a pregnant woman who has gone her full term of months and taking out the child, divine somewhat as to the

¹ Kabul and the adjacent territory as far as Ghazna and even beyond come under this appellation which is derived by *Yukuht* (*Majmu'a-ul-Buldan*) from *Zabul*, grand-father of *Rustam*.

² *Iqlim*, literally a slope or inclination, was used in the mathematical geography of the Greeks with reference to the inclination of various parts of the earth's surface to the plane of the equator. Before the globular figure of the earth was known, it was supposed that there was a general slope of its surface from S. to N. and this was called *klima*. But as the science of mathematical geography advanced, the word was applied to belts of the earth's surface, divided by lines parallel to the equator, those lines being determined by the different lengths, at different places, of the shadow cast by a gnomon of the same altitude, at noon of the same day. This division into climates was applied only to the N. hemisphere as the geographers had no practical knowledge of the earth S. of the equator. There were 19 climates as given by *Ptolemy* (*Geogr.* i, 23). The term was afterwards applied to the average temperature of each of these regions and hence our modern use of the word (*Smith's Dict. of Antiq.* 2nd ed., art. *Climates*; also *Ency. of Islam*, ii, 460). The Arabs adopted this system but restricted the number to seven. They considered three-fourths of the globe to be submerged and one-fourth above water. Of this latter 11/30 was habitable and the remainder waste or desert. The habitable portion was 33,150,000 square miles in extent each mile being 4,000 cubits, each cubit 24 digits. It was situated between the Equator and the N. pole and was divided into 7 climates.

³ This is *Teliagarhi*, a pass in the *Santhal Parganas*, *Bihar*, lying between the *Rajmahal* hills on the S. and the *Ganges* on the N. Formerly of strategic importance as commanding the military approaches to Bengal proper. The ruins of a large fort still exist, through which the E. I. Railway passes. It seems never to have been completed and was constructed in the last century by the *Teli zamindar* who was forcibly converted by the *Muhammadans*. Hence the name of the fort and the *parganah* in which it is situated. *Imp. Gazetteer*.

⁴ The *kos* is for convenience generally taken at two English miles. The basis of all linear systems is the same, *viz.*, the cubit or human forearm. Proceeding upwards four *haths* or cubits = a *danda* or staff: a 2,000 *dandas* a *kos*, which by this calculation should be 4,000 yards English or nearly 2½ miles. *Useful Tables*, p. 87. Also *Elliot's Memoir of Races*, N. W. P. II, 194.

⁵ The name given by the *Muhammadan* historians to the coast-strip of the *Sundarbans* from *Hijli* to *Meghna* Lat. 20° 30' to 22° 30' N., long. 88° to 91° 14' E. The name means "low lands overflowed by the tide" and is still applied to the *Sundarban* tracts of *Khulna* and *Bakarganj* districts. I. G. For *Isa Kh.*, D. U. Bengal, ii, 194-212.

APPENDIX I

future. There grows a wonderful tree whose branches when cut, exude a sweet liquid which quenches the drought of those athirst. They have also a mango tree⁴ that has no trunk; it trails like a climbing vine, over a tree and produces fruit. There is likewise a flower⁵ which after it has been gathered for two months, does not wither nor lose its colour or smell. Of this they make necklaces.

Bordering on this country are the dominions of the Rajah of Asham (Assam) whose great pomp and state are subjects of general report. When he dies, his principal attendants of both sexes voluntarily bury themselves alive in his grave. Neighbouring this is Lower Tibet and to its left is *Khata*.⁶ This is also called *Mahachin* which the vulgar pronounce *Machin*. From *Khan Baligh*⁷ its capital, to the ocean, a forty days' journey, they have cut a canal both sides of which are embanked with stone and mortar. Alexander of Greece advanced to that country by this route.⁸ Another road is also mentioned which can be traversed in four days and four nights.

To the south-east of Bengal is a considerable tract called *Arakan* which possesses the port of *Chittagong*. Elephants abound, but horses are scarce and of small size.⁹ Camels are high priced: cows and buffaloes there are none, but there is an animal which has somewhat of the characteristics of both, piebald and particoloured, whose milk the people drink. Their religion is said to be different to that of the Hindus and Muhammadans. Sisters may marry their own twin brothers, and they refrain only from marriages between a son and his mother. The ascetics, who are their repositories of learning, they style *Wali* whose teaching

they implicitly follow. It is the custom when the chief holds a court, for the wives of the military to be present, the men themselves not attending to make their obeisance. The complexion of the people is dark and the men have little or no beard.

Near to this tribe is *Pegu* which is also called *Chin*. In some ancient accounts it is set down as the capital city of *Chin*. There is a large military force of elephants and infantry, and white elephants are to be found. On one side of it is *Arakan*. There are mines of rubies, diamonds, gold, silver, copper, naphtha and sulphur, and over these mines there is continual contention between this country and the *Maghs* as well as the tribes of Tipperah.

The original name of Bengal was *Bang*. Its former rulers raised mounds measuring ten yards in height and twenty in breadth throughout the province which were called *Al*.¹⁰ From this suffix, the name Bengal took its rise and currency. The summer heats are temperate and the cold season very short. The rains begin when the sun is midway in Taurus (May) and continue for somewhat more than six months, the plains being under water and the mounds alone visible. For a long time past, at the end of the rains, the air had been felt to be pestilential and seriously affected animal life, but under the auspices of his present Majesty, this calamity has ceased.

Its rivers are countless and the first of them in this province is the *Ganges*: its source cannot be traced. The Hindu sages say that it flows down from the hair of *Mahadeva's* head. Rising in the mountains towards the north, it passes through the province of Delhi, and imperial Agra, and

⁴ The *Willoughbeia edulis*. It is known to natives of Bengal, Assam and the Chittagong Hill tracts, as the Loti A 'm (*Loti*, for Sanskrit *lata*, a creeper), but botanically is far removed from the true mango. The fruit is said to be pleasant to taste. The leaf of the dried specimen is very similar to the ordinary mango leaf; the fruit is about 2½ inches long and 2½ broad (Dr. King).

⁵ The *Tulsi* (*Ocimum Sanctum*). [More probably, *Bakul*—A.M.]

⁶ China for nearly 1,000 years, writes Yule (*Marco Polo*, 2nd ed. Introd., p. 11) has been known to Asia under the name of *Khitai*, *Khata* or *Cathay* and is still called *Khitai* by the Russians. [*Ency. Islam*, ii. 737 under *Kara Khitai*.]

⁷ De Guignes (*Hist. des Huns*) gives this name to Peking, called also *Tatou* the *grand court* of *Khan Baligh*, the *court of the Khan*. Several towns have received this name which as it signifies the royal residence is transferable to any that the monarch may honour with his presence. It is the *Cambalu* of Western geographers and historians and placed by them in Northern China or Grand Tartary, while the Orientals locate it in China Proper. (*Ency. Islam*, ii. 898.)

⁸ In B. C. 329 Alexander crossed the Oxus in pursuit of Bessus and after putting him to death, he passed the Jaxartes (Sir Daria) and defeated several Scythian tribes north of that river. This was the northernmost point that he reached. A. Fazl is merely relating the Muslim legend of Alexander, for which see *Ency. Islam*, ii. 533 under *al-Iskandar*. [J. S.]

⁹ The domestic animals of the Arakan Hill Tracts according to the *Imp. Gaz.* are the *gayal*, buffalo, ox, goat, pig, dog. "The *Gayal* (*Bos Frontalis*) has interbred with the common Indian cattle; these hybrids are brought down by the Bhutias to the annual fair in the Darrung District: though they thrive in Shillong they soon die if kept in the plains. The *Gayal* is plentiful along the spurs of the Bhutan hills, amongst the Dufflas, Lushais, and along the hilly tract well into Chittagong." *Sport in British Burmah* by Lieut-Col. Pollock. An alternative reading gives, "horses are scarce, and asses and camels are high-priced", which Gladwin has adopted.

¹⁰ Sansk. *ali* a mound of earth or ridge for crossing ditches, dividing fields and the like.

APPENDIX I

Allahabad and Behar into the province of Bengal, and near *Qazihattah* in the *Sarkar* of Barbakabad, it divides into two streams. One of these, flowing east-wards, falls into the sea at the port of Chittagong. At the parting of the waters, it takes the name of *Padmawati* and pursues a southern course. It is divided into three streams; one, the *Sarsuti* [*Saraswati*]; the second the *Jamna* (*Jamuna*) and the third the *Ganges*, called collectively in the Hindi languages *Tribeni*,¹³ and held in high veneration. The third stream after spreading into a thousand channels, joins the sea at *Satagaon* [*Hugli*]. The *Sarsuti* and the *Jamna* unite with it. In praise of this stream the Hindu sages have written volumes. From its source to its mouth it is considered sacred but some spots have a peculiar sanctity. Its water is carried as an offering of price to far distant places. Believing it to be a wave of the primeval river, they hold its worship to be an adoration of the supreme being, but this is no part of the ancient tradition. Its sweetness, lightness and wholesomeness attest its essential virtues. Added to this, it may be kept in a vessel for years without undergoing change.

Another river is the *Brahmaputra*. It flows from *Khata*¹³ (*China*) to *Kutch* and thence through the *Sarkar* of *Bazuha* and fertilising the country, falls into the sea.

And again there is the sea which is here a gulf of the great ocean, extending on one side as far as *Basrah* and on the other to the Egyptian *Qulzum*¹⁴ and thence it washes both *Persia* and *Ethiopia* where are *Dahlak* and *Suakin*, and is called (the Gulf of) *Oman* and the *Persian Sea*.

The principal cultivation is rice of which there are numerous kinds. If a single grain of each kind were collected, they would fill a large vase. It is sown and reaped three times a year on the same piece of land with little injury to the crop. As fast as the water rises, the stalks grow, so that the ear is never immersed, inasmuch as those experienced in such matters have taken the measure of a single night's growth at sixty cubits.¹⁵ The people are submissive and pay their rents duly. The demands of each year are paid by instalments in eight months,

¹³ *Sansk. tribeni* three braids of hair. Wilford says (*Asiatic Research*, Vol. XIV, p. 396) that the waters of these three rivers do not mix. The waters of the *Jamna* are blue, those of the *Sarasvati* white and the *Ganges* is of a muddy yellowish colour.

¹⁴ Its rise is supposed to be from the S. E. base of the sacred *Kailas* hill, on the opposite side of the water—parting in which the *Sutlej* and the *Indus* also take their rise. Its course, confluents and history may be read in the I. G.

¹⁵ This is the ancient *Klyasma*, the site of the modern *Suez*, in the neighbourhood of which the *Tel Qulzum* still retains the name which has been given to the *Red Sea*. *Ency. Islam*, ii, 1114.

¹⁶ Gladwin has six for sixty. The long stemmed rice, according to the I. G. is extensively cultivated in the swamps. The seed is sown when the marshes are dry or nearly so, and when the rains set in the plant shoots up with the rise of the water and can be grown in water to a depth of from 18 to 20 feet, but even this is not in one night.

¹⁷ I have imitated the example of Gladwin in veiling the following passage under the mask of a learned language and with a slight alteration have borrowed his words. (*Jarrett*.)

they themselves bringing mohars and rupees to the appointed place for the receipt of revenue, as the division of grain between the government and the husbandman is not here customary. The harvests are always abundant, measurement is not insisted upon, and the revenue demands are determined by estimate of the crop. His Majesty in his goodness has confirmed this custom. Their staple food is rice and fish; wheat, barley and the like not being esteemed wholesome. Men and women for the most part go naked wearing only a cloth (*lungi*) about the loins. The chief public transactions fall to the lot of the women. Their houses are made of bamboos, some of which are so constructed that the cost of single one will be five thousand rupees or more and they last a long time. Travelling is by boat, especially in the rains, and they make them of different kinds for purposes of war, carriage or swift sailing. For attacking a fort they are so constructed that when run ashore, their prow overtops the fort and facilitates its capture. For land travel they employ the *Sukhasan*. This is a crescent-shaped litter covered with camlet or scarlet cloth and the like, the two sides of which have fastenings of various metals, and a pole supporting it is attached by means of iron hooks. It is conveniently adapted for sitting in, lying at full length or sleeping during travel. As a protection against sun and rain they provide a commodious covering which is removable at pleasure. Some enjoy the luxury of riding on elephants but they rarely take to horseback. The mats made here often resemble woven silk. *Tria*¹⁶ inde genera eunuchorum veniunt, quo Sandalos, Badamos at Kafuros nuncupant. Priores, partibus genitalibus readicaliter exsectis, Atlises etiam nominant. Badamis pars solum penis relinquuntur. Kafuros adhuc teneroe aetatis, testes vel compressi conficiuntur vel exsecantur: tamen notatum est, castrationem, quae pervicaciam caeteris omnibus animalibus tollit, hominibus solis excitare.

Salt is in great demand and is brought from long distances. Diamonds, emeralds, pearls, cornelians and agates are imported. Flowers and fruit are in plenty. The betel-

APPENDIX I

nut is of a kind that stains of a red colour the lips of those who chew it.

Jannatabad is an ancient city: for a time, it was the capital of Bengal and was widely known as *Lakhnauti* and for a while as *Gaur*. His Majesty the late Emperor *Humayun* distinguished it by this title of *Jannatabad*. It has a fine fort and to the eastward of it is a lake called *Chhatiapatia* in which are many islands. Were the dam that confines it to break, the city would be under water. About a *kos* to the north of the fort, is a large building and a reservoir, monuments of great antiquity. From time immemorial, its water has been considered to be of a poisonous character. The place was called *Piyasbari* (abode of thirst), and criminals condemned to death, were there confined who in a short time perished from the effects of this brackish water. At present in the blessed reign of His Majesty, this practice has been discontinued.

Mahmudabad.—The marshes around the fort have added to its impregnability. The ruler of this district, at the time of its conquest by *Sher Khan*, let some of his elephants loose in its forests from which time they have abounded. Long pepper grows in this tract.

The *Sarkar* of *Khalifatabad* is well wooded and holds wild elephants. The *Sarkar* of *Bakla* extends along the sea shore. The fort is surrounded by woods. On the first day of the new moon the sea steadily rises until the fourteenth, and from the fifteenth till the end of the month as gradually falls. In the 29th year of the Divine Era, a terrible inundation occurred at three o'clock in the afternoon, which swept over the whole *Sarkar*. The *Rajah* held an entertainment at the time. He at once embarked on board a boat, while his son *Parmanand Rae* with some others

climbed to the top of a temple and a merchant took refuge in a high loft. For four hours and a half the sea raged amid thunder and a hurricane of wind. Houses and boats were engulfed but no damage occurred to the temple or the loft. Nearly two hundred thousand living creatures perished in this flood.

In the *Sarkar* of *Ghoraghat*, silk is produced and a kind of sackcloth [jute]. Numbers of eunuchs are here and hill ponies in plenty are procurable. There are many kinds of indigenous fruits, especially one called *Latkan*.¹⁷ It is the size of a walnut with the taste of a pomegranate and contains three seeds.

The *Sarkar* of *Barbakabad* produces a fine cloth called *Gangajal* (Ganges water), and a great abundance of oranges.

In the *Sarkar* of *Bazuha* are extensive forests which furnish long and thick timbers of which masts are made. There are also iron mines.

The *Sarkar* of *Sonargaon*¹⁸ produces a species of muslin very fine and in great quantity. In the township of *Egara Sindur* is a large reservoir which gives a peculiar whiteness to the cloths that are washed in it.

In the *Sarkar* of *Sylhet* there are nine¹⁹ ranges of hills. It furnishes many eunuchs.

There is a fruit called *Suntarah*²⁰ in colour like an orange but large and very sweet. The *China root*²¹ is produced in plenty. In ancient times it had not been discovered until some scientific travellers from European Turkey introduced it to universal notice. Aloes-wood is abundant in these mountains. At the end of the rains they fell the trees to the ground, and after a certain time they give them various names according to their greenness or maturity.

¹⁷ Dr. King of the Royal Botanical Gardens, Calcutta, considers this to be a species of *Elæocarpus*. The fruits of all the species are a good deal alike, varying in size from an olive to a walnut, having an external fleshy pulp more or less palatable (in some species of fair flavour) and containing a stone. The latter is usually found to be divided into 3 cells one of which contains a mature seed, the seeds in the other two being abortive. The taste of the pulp of the *E. serratus* and *E. lanceæfolius* (both natives of *Rangpur*) is a good deal like that of the pomegranate.

¹⁸ This was the ancient Mahammadan capital of Eastern Bengal but is now an insignificant village called *Painam* in the *Dacca District*. I. G. [Still the home of very ancient and very rich merchant families—A. M.]

¹⁹ In the south of the district, says the *Gazetteer*, eight low ranges of hills run out into the plain, being spurs of the *Tipperah mountains*. The highest is about 1,000 feet above sea level. There is also a small detached group, the *Ita hills*, in the centre of the district.

²⁰ Commonly *Sangtarah*. The name is supposed to be a corruption of *Cintra*, but its mention by *Babar* in his *Memoirs* seems subversive of this derivation, for though the fruit is said to have been an eastern importation into Portugal, it is improbable that the foreign name could have been current in India at so early a date. *Humayun* praises it highly saying that no one cares for any other fruit who has this. He states that it is found only at *Sonargaon* in Bengal and in the greatest perfection only at one place. A note to the *Memoirs* (p. 329) says that the description of the fruit by *Babar* suites more the *Citrus decumana* than any other, and its Bengali name *Batavi nimbu*, the *Batavia lime*, denotes its being an exotic.

²¹ The root of a species of *smilax* of a pale reddish colour with no smell and very little taste. The *smilax glabra* or *lancoæfolia*, not distinguishable, according to *Roxburg*, by the eye from the drug known as *China root*. It is a native of *Sylhet* and the adjacent *Garrow country*.

APPENDIX I A

The Bhangraj²² is a bird of a black colour, with red eyes and a long tail. Two of the feathers extend to a length of a gaz. They are snared and tamed. It catches the note of any animal that it hears, and eats flesh. The *Sherganj*²³ is of the same kind but its beak and legs are red; in imitating sounds, it matches the other and pursues sparrows and the like and eats them.

Chatgaon (Chittagong) is a large city situated by the sea and belted by woods. It is considered an excellent port and is the resort of Christian and other merchants.

In the *Sarkar* of *Sharifabad* is a beautiful

species of cattle, white in colour, and of a fine build: like camels they are laden kneeling down and carry fifteen *man* weight. It is noted for the Barbary goat and for fighting cocks.

In the *Sarkar* of *Satgaon*,²³ there are two ports at a distance of half a *kos* from each other; the one is *Satgaon*, the other *Hugli*: the latter the chief; both are in the possession of the Europeans. Fine pomegranates grow here.

In the *Sarkar* of *Mandaran* is a place called *Harpah* in which there is a diamond mine producing chiefly very small stones.

APPENDIX IA

Extract from 'Ain—I—Akbari of Abul Fazl—I Allami, vol. II' (A Gazetteer and Administrative Manual of Akbar's Empire and Past History of India)

Translated into English—COLONEL H. S. JARRETT and J. N. SARKAR, pp. 46—52

A'IN V

THE 'AML-GUZAR OR COLLECTOR OF THE REVENUE

Should be a friend of the agriculturist. Zeal and truthfulness should be his rule of conduct. He should consider himself the representative of the lord paramount and establish himself where every one may have easy access to him without the intervention of a mediator. He should deal with the contumacious and the dishonest by admonition and if this avail not, proceed to chastisement, nor should he be in apprehension of the land falling waste. He should not cease from punishing highway robbers, murderers and evildoers, nor from heavily mulcting them, and so administer that the cry of complaint shall be stilled. He should assist the needy husbandman with advances of money and recover them gradually. And when through the exertions of the village headman the full rental is received, he should allow him half a *biswah*¹ on each *bigha*, or otherwise reward him according to the measure of his

services. He should ascertain the extent of the soil in cultivation and weigh each several portion in the scales of personal observation and be acquainted with its quality. The agricultural value of land varies in different districts and certain soils are adapted to certain crops. He should deal differently, therefore, with each agriculturist and take his case into consideration. He should take into account with discrimination the engagements of former collectors and remedy the produce of ignorance or dishonesty. He should strive to bring waste lands into cultivation and take heed that what is in cultivation fall not waste. He should stimulate the increase of valuable produce and remit somewhat of the assessment with a view to its augmentation. And if the husbandman cultivate less and urge a plausible excuse, let him not accept it. Should there be no waste land in a village

²² Bhringa-raj, *Edolius paradiseus* or large racket-tailed Drongo. Plumage uniformly black with a steel-blue gloss. Length to end of ordinary tail 14 inches; wing 6½; tail to middle 6½; outer tail feather 12 to 13 inches more; the shaft having the terminal end for about 3½ inches barbed externally, but towards the tip only on the inner side, and turning inwards so that the under-side becomes uppermost. It will eat raw meat, lizards, and almost any kind of food offered to it. It imitates all sorts of sounds, as of dogs, cats, poultry. The Bhring-raj (king of the bees) is found in the dense forests of India from the Himalaya to the Eastern Ghats as far S. as N. L. 15°.

²³ Jerdon. *Sherganj Cissa Sinensis*, Brisson. *Cissa Venatoria*, Blyth—the greenjay. It is found in the South Eastern Himalayas and in the hill ranges of Assam, Sylhet, Arakan and Tenasserim. These birds wander about from tree to tree and pick grasshoppers, mantides and other insects, are frequently tamed and caged and are amusing and imitative. They sing lustily a loud screeching strain and are highly carnivorous. The shrike-like habit, in confinement, of placing a bit of food between the bars of their cage is in no species more exemplified than in this—Jerdon. II, 312.

²⁴ The traditional mercantile capital of Bengal from the Puranic age to the time of the foundation of the town of Hugli by the Portuguese. Its decay commenced in the latter part of the 16th century owing to the silting up of the channel of the Saraswati. In 1632, Hugli being made a royal port, all the public offices were withdrawn from *Satgaon* which soon sunk into ruin. *Stat. Acct. of Bengal*, III, 307-310.

¹The 20th part of *bigha*.

APPENDIX I A

and a husbandman be capable of adding to his cultivation, he should allow him land in some other village.

He should be just and provident in his measurements. Let him increase the facilities of the husbandman year by year, and under the pledge of his engagements, take nothing beyond the actual area under tillage. Should some prefer to engage by measurement and others by appraisement of crops, let him forward the contracts with all despatch to the royal presence. Let him not make it a practice of taking only in cash payments but also in kind. This latter is effected in several ways. First, *konkut*; *kan* in the Hindi language signifies grain, and *kut*, estimate. The whole land is taken either by actual mensuration or by pacing it, and the standing crops estimated in the balance of inspection. The experienced in these matters say that this comes little short of the mark. If any doubt arise, the crops should be cut and estimated in three lots, the good, the middling and the inferior, and the hesitation removed. Often, too, the land taken by appraisement, gives a sufficiently accurate return. Secondly, *batai*, also called *bhaoli*, the crops are reaped and stacked and divided by agreement in the presence of the parties. But in this case several intelligent inspectors are required, otherwise the evil-minded and false are given to deception. Thirdly, *khet batai*, when they divide the fields after they are sown. Fourthly, *lang batai*; after cutting the grain, they form it in heaps and divide it among themselves, and each takes his share home to clean it and turn it to profit. If it be not prejudicial to the husbandman, he may take the value of the corn-bearing land in cash at the market rate. If on this land they sow the best kinds of produce,² in the first year he should remit a fourth of the usual assessment. If at the time of collection, the better produce is found to be larger in quantity than the previous year, but less land cultivated, and the revenue be the same, let him not be provoked or removed to contention. He should always seek to satisfy the owner of the crops. He should not entrust the appraisement to the headman of the village lest it give rise to remissness and incompetence and undue authority, be conferred on high-handed oppressors, but he should deal with each husbandman, present his demand, and separately and civilly receive his dues.

He must take security from land surveyors, assessors and other officers of

² *Jins-i-Kamil* such as sugar, *pan*, indigo, opium or cotton in contradistinction to *jins-i-adna*, inferior crops, such as maize.

³ For *muqaddam*, Wilson, 351.

⁴ *Zar-i-khas* in the text should be translated as His present Majesty's coin. Jarrett took it to mean 'any special kind of coin', but this interpretation is wrong. It is not necessary to read *Khalis* for *Khas* (from a variant) as suggested by Jarrett ("fine gold"). J. S.

revenue. He should supply the officials engaged in the land measurements, for each day on which they are employed, with 16 *dams* and 31 *seers*, and as a monthly ration, on the following scale:

	Flour ser	Oil ser	Grain ser	Vegetables &c dam
Superintendent of survey	5	$\frac{1}{2}$	7	4
Writer	4	$\frac{1}{2}$	4	4
Land surveyor and four thanadars, each	8	1	5	5

He shall affix a mark to the land surveyed and shall take a bond from the headman that there shall be no concealment regarding the land, and the various crops shall be duly reported. In the process of measurement if any inferior portion of land be observed, he shall at once estimate its quantity, and from day to day take a note of its quality and this voucher he shall deliver to the husbandman. But if this discovery be made after the collection of the revenue, he shall gather information from the neighbours and from unofficial documents and strike an average. In the same way as the *karkun* (registrar of collections) sets down the transactions of the assessments, the *Muqaddam*³ (chief village revenue officer) and the *patwari* (land-steward) shall keep their respective accounts. The Collector shall compare these documents and keep them under his seal and give a copy thereof to the clerk. When the assessment of the village is completed, he shall enter it in the abstract of the village accounts, and after verifying it anew, cause its authentication by the *karkun* and *patwari*, and this document he shall forward weekly to the royal presence and never delay it beyond fifteen days. After the despatch of the draft estimates to the imperial court, should any disaster to the crops occur, on ascertaining the exact particulars on the spot, he shall calculate the extent of the loss and recording it in writing, transmit it without delay in order that it may be approved or a commissioner despatched. He should collect the revenue in an amicable manner and extend not the hand of demand out of season. He should begin the collection of the spring harvest from the *Holi*, which is a Hindu festival occurring when the sun is about to pass from Aquarius and is entering or has reached midway in Pisces and the Autumn harvest from the *Dasharah*, which is a festival falling when the sun is in the middle or last days of Virgo or the first ten of Libra. Let him see that the treasurer does not demand any special⁴ kind of coin, but take what is

APPENDIX I A

of standard weight and proof and receive the equivalent of the deficiency at the value of current coin and record the difference in the voucher. He should stipulate that the husbandman bring his rents himself at definite periods so that the malpractices of low intermediaries may be avoided. When there is a full harvest, he should collect the appropriate revenue and accept no adjournment of payments of future crops.

Whosoever does not cultivate land liable to taxation but encloses it for pasturage, the Collector shall take for each buffalo six *dams*, and for an ox, three *dams* yearly, but for a calf or a buffalo which has not yet calved, he shall make no demand. He shall assign four oxen, two cows and one buffalo to each plough and shall lay no imposts on these. Whatever is paid into the treasury, he shall himself examine and count and compare it with the day-ledger of the *karkun*. This he shall verify by signature of the treasurer and placing it in bags under seal, shall deposit it in a strong room and fasten the door thereof with several locks of different construction. He shall keep the key of one himself and leave the others with the treasurer. At the end of the month, he shall take from the writer (*bitikchi*) the account of the daily receipts and expenditure and forward it to the presence. When two lakhs of *dams* are collected, he shall remit them by the hands of trusty agents. He shall carefully instruct the *patwari* of each village to enter in detail in the memorandum which he gives to the husbandman, the amount he receives from the same; any balances he shall enter under each name in a book and forward it attested by the signatures of the headmen; and these, at the next harvest, he shall recover without distress. He shall carefully inspect the *suyurghal*⁵ tenures, sending copies of them to the registry office to be compared. He should ascertain the correctness of the *chaknamah*,⁶ and resume the share of a deceased grantee or one who is an absentee or actually in service of the state. He should take care that land cultivated by the farmer himself and not by the tenant, as well as resumed lands, should not be suffered to fall waste; the property of the absentee or of him that dies without an heir he should duly keep under ward and

report the circumstances. He should see that no capitation tax be imposed nor interfere with the remission of dues granted by former governments.

He shall not make the occasions of journeying, feasting or mourning an opportunity for exactions, and refrain from accepting presents. Whenever a *muqaddam* or *patwari* shall bring money or, advancing to the dais shall present a dam in obeisance, he shall not accept it. In the same way he shall renounce *balkati*, which is the practice of taking a small fee from each village when the harvest is ready for reaping. He shall also waive all perquisites on handicrafts, market-booths, police, travelling passports, garden produce, temporary sheds, enclosure, fishing rights, port-dues, butter, oil of sesame, blanketing, leather, wool, and the like malpractices of the avaricious who fear not God. He shall provide for the periodic appointment of one among those best acquainted with the district, to reside at the royal court and furnish it with the minutest particulars. Every month he shall submit a statement of the condition of the people, of the *jagirdars*, the neighbouring residents, the submission of the rebellious, the market prices, the current rents of tenements, the state of the destitute poor, of artificers and all other contingencies. Should there be no *kotwal*, the Collector must take the duties of that office upon himself.

A' IN VI

*The Bitikchi*⁷

Must be conscientious, a good writer, and a skilful accountant. He is indispensable to the collector. It is his duty to take from the *kanungo*⁸ the average decennial state of the village revenues in money and kind, and having made himself acquainted with the customs and regulations of the district, satisfy the Collector in this regard, and lend his utmost assistance and attention. He shall record all engagements made with the agriculturists, define the village boundaries, and estimate the amount of arable and waste land. He shall note the names of the *munsif*,⁹ the superintendent (*zabit*), the land-surveyor and *thanadar*, also that of the cultivator and headman, and record below, the kind of produce cultivated. He should also set down

⁵ An assignment of land revenue for charitable purposes: also a grant of land without stipulation of any condition or service. *Wilson*, 495.

⁶ This is a grant of alienated lands specifying the boundary limits thereof. *Chak*, according to Elliot, is a patch of rent-free land detached from a village. *Wilson*, 97.

⁷ A word of Turkish origin, signifying a writer or scribe. *Encl. Islam* i, 734.

⁸ An officer in each district acquainted with its customs and land-tenures and whose appointment is usually hereditary. He receives report from the *patwaris* of new cases of alluvion and diluvion, sales, leases, gifts of land, etc., which entail a change in the register of mutations. He is a revenue officer and subordinate to the *tahsildar*. Carnegy, *Kachh, Technical*. *Wilson*, 260.

⁹ *Munsif*—An officer employed to superintend the measurement of the lands of a village in concert with the villagers. [*Wilson*, 356.] For the position of the *munsif* in Sher Shah's revenue system, see 'Abbas Sarwani, near the end. [*J. S.*]

APPENDIX I A

the village, the pergunnah and the harvest, and subtracting the deficiency take the value of the assets, or after the manner of the people of the country, inscribe the name, the kind of produce and the deficiency below the date of cultivation.

When the survey of the village is complete, he shall determine the assessment of each cultivator and specify the revenue of the whole village. The Collector shall take the revenue on this basis, and forward a copy of the survey, called in Hindi *Khasra* to the royal court. When drawing out the rolls, if the former documents are not available, he should take down in writing from the *patwari* the cultivation of each husbandman by name and thus effect his purpose, and transmit the roll together with the balances and collections punctually, and he shall enter the name of the *tahsildar* below each village, in the day-ledger. He shall record the name of each husbandman who brings his rent and grant him a receipt signed by the treasurer. Copies of the rolls of the *patwari* and *muqaddam* by means of which they have made the collections, together with the *sarkhat*, that is the memorandum given to the husbandman, he shall receive from the *patwari*, and inspecting them, shall carefully scrutinize them. If any falsification appears, he shall fine them and report to the Collector daily and the collection and balances of each village and facilitate the performance of his duty. Whenever any

cultivator desires a reference to his account, he shall settle it without delay and at the close of each harvest he shall record the collections and balances of each village and compare them with the *patwari's*, and enter each day in the ledger the receipts and disbursements under each name and heading, and authenticate it by the signature of the Collector and treasurer. At the end of the month, he shall enclose it in a bag under the seal of the Collector and forward it to the presence. He shall also despatch daily the price-current of mohurs and rupees and other articles under the seals of the principal men, and at the end of each harvest, he shall take the receipts and disbursements of the treasurer, and forward it authenticated by his signature. The abstract and settlement of the assessment, at the close of each year, he shall transmit under the signature of the Collector. He shall enter the effects and cattle plundered in any village, in the day-ledger, and report the circumstances. At the year's end, when the time of the revenue-collections has closed, he shall record the balances due from the village and deliver the record to the Collector and forward a copy to the royal court. When removed from office, he shall make over to the Collector for the time being his account under the heads of balances, advances, etc., and after satisfying him in this regard, take the detail thereof and repair to the Court.

APPENDIX II

Extract from "Travels in the Mogul Empire, Vol. II"

By FRANCIS BERNIER

ANSWER TO THE FOURTH ENQUIRY, AS TO THE FERTILITY, WEALTH AND BEAUTY OF THE KINGDOM OF BENGAL

Egypt has been represented in every age as the finest and most fruitful country in the world, and even modern writers deny that there is any other land so peculiarly favoured by nature: but the knowledge I have acquired of Bengal during two visits paid to that kingdom, inclines me to believe that the pre-eminence ascribed to Egypt is rather due to Bengal. The latter country produces rice in such abundance that it supplies not only the neighbouring but remote states. It is carried up the Ganges as far as Patna, and exported by sea to Masulipatam and many other ports on the coast of Coromandel. It is also sent to foreign kingdoms, principally to the island of Ceylon and the Maldives. Bengal abounds likewise in sugar with which it supplies the kingdoms of Golconda and the Carnatic, where very little is grown, Arabia and Mesopotamia, through the towns of Mokha and Bassora, and even Persia, by way of Bender-Abbassy. Bengal likewise is celebrated for its sweetmeats, especially in places inhabited by Portuguese, who are skilful in the art of preparing them, and with whom they are an article of considerable trade. Among other fruits, they preserve large citrons, such as we have in Europe, a certain delicate root about the length of sarasparilla, amba and pine-apples, two common fruits of India, small mirobolan plums, which are excellent; lemons and ginger.

Bengal, it is true, yields not so much wheat as Egypt; but if this be a defect, it is attributable to the inhabitants, who live a great deal more upon rice than the Egyptians, and seldom taste bread. Nevertheless, wheat is cultivated in sufficient quantity for the consumption of the country, and for the making of excellent and cheap sea biscuits, with which the crews of European ships, English, Dutch and Portuguese, are supplied. The three or four sorts of vegetables which, together with rice and butter, form the chief aliment of the common people, are purchased for the merest trifle, and for a single rupee twenty or more good fowls may be bought. Geese and ducks are proportionably cheap. There are also goats and sheep in abundance; and pigs are obtained at so low a price that the Portuguese, settled in the country, live almost entirely upon pork. This meat is salted at a cheap rate by the Dutch and English, for the supply of their respective vessels. Fish of every species, whether fresh or salt, is in the same profusion. In a word, Bengal abounds with

every necessary of life; and it is this abundance that has induced so many Portuguese, half-casts, and other Christians, driven from their different settlements by the Dutch, to seek an asylum in this fertile kingdom. The Jesuits and Augustins, who have large churches and are permitted the free and unmolested exercise of their religion, assured me that Hooghly alone contains from eight to nine thousand Christians, and that in other parts of the kingdom their number exceeded five and twenty thousand. The rich exuberance of the country, together with the beauty and amiable dispositions of the native women, has given rise to a proverb in common use among the Portuguese, English and Dutch, that the kingdom of Bengal has a hundred gates open for entrance, but not one for departure.

In regard to valuable commodities of a nature to attract foreign merchants, I am acquainted with no country where so great a variety is found. Besides the sugar I have spoken of, and which may be placed in the list of valuable commodities, there is in Bengal such a quantity of cotton and silks, that the kingdom may be called the common storehouse for those two kinds of merchandise, not of Hindostan only, but of all the neighbouring kingdoms, and even of Europe. I have been sometimes amazed at the vast quantity of cotton cloths, of every sort, fine and coarse, white and coloured, which the Dutch alone export to different places, especially to Japan and Europe. The English, the Portuguese, and the native merchants deal also in these articles to a considerable extent. The same may be said of the silks and silk stuffs of all sorts. It is not possible to conceive the quantity drawn every year from Bengal for the supply of the whole of the Mogul Empire, as far as Lahore and Cabul, and generally of all those foreign nations to which the cotton cloths are sent. The silks are not certainly so fine as those of Persia, Syria, Said and Baruth, but they are of a much lower price; and I know from indisputable authority that, if they were well selected and wrought with care, they might be manufactured into most beautiful stuffs. The Dutch have sometimes seven or eight hundred natives employed in their silk factory at Kassem-Bazar. The English and other merchants employ likewise a great number.

Bengal is also the principal emporium for saltpetre. A prodigious quantity is imported from Patna. It is carried down the Ganges

APPENDIX II

with great facility, and the Dutch and English send large cargoes to many parts of India, and to Europe.

Lastly, it is from this fruitful kingdom that the best gum-lac, opium, wax, civet, long pepper and various drugs, are obtained; and butter which may appear to you an inconsiderable article, is in such plenty, that although it be a bulky article to export, yet it is sent by sea to numberless places.

It is fair to acknowledge, however, that strangers seldom find the air salubrious, particularly near the sea. There was a great mortality among the Dutch and English when they first settled in Bengal; and I saw in Balasore two beautiful English vessels, which had remained in that port a twelve-month in consequence of the war with Holland, and at the expiration of that period, were unable to put to sea, because the greater part of the crews had died. Both the English and Dutch now live with more caution and the mortality is diminished. The masters of vessels take care that their crews drink less punch; nor do they permit them so frequently to visit the Indian women, or the dealers in arrack and tobacco. Good Vin de Grave or Canary and Schiraz wines, taken in moderation, are found excellent preservatives against the effects of bad air. Their punch is composed of arrack, a spirit distilled from molasses, lemon juice, water and nutmeg. It is pleasant enough to the taste, but most deleterious in the effects.

In describing the beauty of Bengal, it should be remarked that throughout a country extending nearly a hundred leagues in length, on both banks of the Ganges, from Raja-Mahil to the sea, is an endless number of canals, cut from that river with immense labour, for the conveyance of merchandise and of the water itself, which is reputed by the Indians to be superior to any in the world. These canals are lined on both sides with towns and villages, thickly peopled with pagans; and with extensive fields of rice, sugar, corn and other species of vegetables, mustard, sesame for oil, and small mulberry trees, two or three French feet in height, for the food of silk worms. But the most striking and peculiar beauty of Bengal is the innumerable islands filling the vast space between the two banks of the Ganges, in some places six or seven days' journey asunder. These islands vary in size but are all extremely fertile, surrounded with wood, and abounding in fruit trees, and pine-apples, and covered with verdure; a thousand canals run through them, stretching beyond the sight, and resembling long walks arched with trees. Several of the islands, nearest to the sea, are now abandoned by the inhabitants, who were exposed to the attacks and ravages of the Arracan pirates, spoken of in another place. At present they

are a dreary waste, wherein no living creature is seen except antelopes, wild hogs, fowls and tigers, which sometimes swim from one island to another. In traversing the Ganges in small rowing boats, the usual mode of conveyance among these islands, it is in many places, dangerous to land, and great care must be had that the boat, which during the night is fastened to a tree, be kept at some distance from the shore, for it constantly happens that some person or another falls a prey to tigers. These ferocious animals are very apt, it is said, to enter into the boat itself, while the people are asleep, and to carry away some victim, who if we are to believe the boatmen of the country, generally happens to be the stoutest and fattest of the party.

I remember a nine days' voyage that I made from Pibley to Hooghly, among these islands and canals, which I cannot omit relating, as no day passed without some extraordinary accident or adventure. When my seven-oared boat had conveyed us out of the river of Pibley, and we had advanced three or four leagues at sea, along the coast, on our way to the islands and canals, we saw the sea covered with fish apparently large carp, which were pursued by a great number of dolphins. I desired my men to row that way, and perceived that most of them were lying on their side as if they had been dead; some moved slowly along, and others seemed to be struggling and turning about as if stupefied. We caught four and twenty with our hands, and observed that out of the mouth of every one, protuberated a bladder, like that of a carp, which was full of air and of a reddish colour at the end. I easily conceived that it was this bladder which prevented the fish from sinking, but could never understand why it thus protruded, unless it were that having been long and closely pursued by the dolphins, they made such violent efforts to escape, that the bladder swelled, became red, and was forced out of the mouth. I have recounted this circumstance to a hundred sailors, whom I found incredulous; with the exception, indeed, of a Dutch pilot, who informed me that sailing in a large vessel along the coasts of China, his attention was arrested by a similar appearance, and that putting out their boat they caught, as we did, with only their hands, many of the fish.

The day following we arrived, at rather a late hour, among the islands; and having chosen a spot that appeared free from tigers, we landed and lighted a fire. I ordered a couple of fowls and some of the fish to be dressed, and we made an excellent supper. The fish was delicious. I then re-embarked, and ordered my men to row on till night. There would have been danger in losing our way in the dark among the different canals,

APPENDIX II

and therefore we retired out of the great canal in search of a snug creek, where we passed the night; the boat being fastened to a thick branch of a tree, at a prudent distance from the shore. While keeping watch, I observed a strange appearance in the heavens, such as I had seen twice at Delhi. I beheld a lunar rainbow, and awoke the whole of my company, who all expressed much surprise, especially two Portuguese pilots, whom I had received into the boat at the request of a friend. They declared that they had neither seen nor heard of such a rainbow.

The third day, we lost ourselves among the canals, and I know not how we should have recovered our right course, had we not met with some Portuguese, who were employed in making salt on one of the islands. This night again, our boat being under shelter in a small canal, my Portuguese, who were full of the strange appearance on the preceding night, and kept their eyes constantly fixed toward the heavens, roused me from my sleep and pointed out another rainbow as beautiful and as well defined as the last. You are not to imagine that I mistake a halo for an iris. I am familiar with the former, because during the rainy season at Delhi, there is scarcely a month in which a halo is not frequently seen round the moon. But they appear only when that luminary is very high above the horizon: I have observed them three and four nights successively, and sometimes I have seen them doubled. The iris of which I speak, was not a circle about the moon, but was placed in an opposite direction, in the same relative position as a solar rainbow. Whenever I have seen a night iris, the moon has been at the west and the iris at the east. The moon was also nearly complete in its orb, because otherwise the beams of light would not, I conceive be sufficiently powerful to form the rainbow; nor was the iris so white as the halo, but more strongly marked, and a variety of colours was even discernible. Thus you see that I am more happy than the ancients, who, according to Aristotle, had

remarked no lunar rainbows before his time.

In the evening of the fourth day we withdrew, as usual, out of the grand canal to a place of security, and passed a most extraordinary night. Not a breath of wind was felt, and the air became so hot, and suffocating, that we could scarcely respire. The bushes around us were so full of glow-worms that they seemed ignited; and fires resembling flames arose every moment to the great alarm of our sailors, who did not doubt that they were so many devils. Two of these luminous appearances were very remarkable. One was a great globe of fire, which continued longer than the time necessary to repeat a pater-noster, the other looked like a small tree all in flames, and lasted above a quarter of an hour.

The night of the fifth day was altogether dreadful and perilous. A storm arose so violent, that although we were, as we thought, in excellent shelter under trees, and our boat carefully fastened, yet our cable was broken, and we should have been driven into the great canal there inevitably to perish, if I and my two Portuguese had not, by a sudden and spontaneous movement, entwined our arms round the branches of trees, which we held tightly for the space of two hours, while the tempest was raging with unabated force. No assistance was to be expected from my Indian boatmen, whose fears completely overcame them. Our situation while clinging for our lives to the trees was indeed most painful; the rain fell as if poured into the boat from buckets, and the lightning and thunder were so vivid and loud and so near our heads, that we despaired of surviving this horrible night.

Nothing however could be more pleasant than the remainder of the voyage. We arrived at Hooghly on the ninth day, and my eyes seemed never sated with gazing on the delightful country through which we passed. My trunk, however, and all my wearing-apparel were wet, the poultry dead, the fish spoilt, and the whole of my biscuits soaked with rain.

APPENDIX III

Remarks on the Husbandry and Internal Commerce of Bengal

BY

HENRY THOMAS COLEBROOKE

[*Late of the Bengal Civil Service*]

ADVERTISEMENT

BY THE AUTHOR

(HENRY THOMAS COLEBROOKE)

An unfinished treatise on the Husbandry and Commerce of Bengal, which was the joint production of several Gentlemen conversant with different branches of the subject, was printed at Calcutta nearly ten years ago, for private circulation, and has remained unpublished for various reasons, but principally because the authors intended to revise and complete the work at a future period.

Extracts from it having since appeared in more than one publication, the author of the first portion of the treatise, however conscious that it is the least valuable and interesting, has thought it necessary to reprint an amended edition of that part, which was exclusively written by himself. The remainder of the original work related

to manufactures and external commerce, and was chiefly written by a Gentleman now deceased. As it never received the corrections of its author, and the revision of it is a task to which his colleague does not feel himself competent, it has been judged expedient to confine the present volume to the distinct subjects of Husbandry and Internal Commerce.

It may be proper to apprise the reader, that the original treatise was written in 1794, and was corrected for this edition in 1803. Several passages already require alteration since the last revision, and still more since the work was first printed. The reader is requested, therefore, to bear in recollection, that he does not peruse a composition of very recent date.

PREFACE

TO THE

LONDON EDITION

At a moment when the attention of Parliament and the country is again imperiously called to the situation of the British interests connected with East Indies, the republication of a work, deservedly valued by those who had perused the first Edition, cannot but be acceptable.

It is much to be regretted that the premature death of one of its original compilers, and the avocations of the learned writer of what is now produced, deprive

the public, for the present, of a complete edition.

In order to account for the new orthography in which these remarks are now printed, it may not be improper to mention that its author is not only a member of the Asiatic Society, but, from his critical knowledge of the Sanskrit and other Oriental Languages, highly capable of spelling the foreign terms according to the original words.

APPENDIX III

CHAPTER I

General Aspect of Bengal, Its Climate, Soil, and Inhabitants

1. The regions, immediately governed by the Presidency of Fort William, comprehend the whole Subas of Bengal and Bihar; a part of the adjoining Subas of Ilahabad,¹ Oresa,² and Berar³ and some tracts⁴ of country which had maintained their independence, even in the most flourishing period of the Moghul Empire. But these are inferior, both in extent and in value, to the province of Bengal; and for this reason, when we use that name, without any express limitation, we mean all the provinces over which Great Britain exercises avowed sovereignty, committed to the immediate administration of a council at Calcutta.

2. The first aspect of Bengal suggests for this kingdom the designation of a champaign country. The elevated tracts, which it does contain, are considered to be only an exception to the general uniformity; and the inundation, which annually takes place in the regions watered by the numerous mouths of the Ganges, seems the consequence of a gradual descent, and does not any further invalidate the notion of a general level. But the physical divisions of Bengal will not be inaccurate, if these distinctions be received as characters, instead of exceptions. The sacred Ganges flows to the sea through a champaign country limited by chains of mountains, and by elevated tracts, which Bengal touches, and on which it even encroaches in many places. The principal stream of the Ganges, losing its sanctity after sending a hallowed branch⁵ towards the sea, inundates, in its subsequent progress, the tracts⁶ through which it flows. This portion of Bengal, not inconsiderable in its area, is the most valuable for its produce and manufactures. The elevated tract, occupying the south-west angle of this province, is not only inferior in extent, but

is of less note in the views of commerce or finance. Engaging little attention from the political observer, it might yield its place in the physical divisions of Bengal, to a distinction founded on the characteristic produce of different parts of the champaign country. Rice, which is luxuriant in the tract of inundation, thrives in all the southern districts; but, in the ascent of the Ganges, it is observed gradually to yield the first place in husbandry to wheat and barley. The mulberry, acclimated in the middle provinces of Bengal, shows a better defined limit where it meets the culture of the poppy, which is peculiar to the northern and western provinces. This distinction is not insignificant, though it does not extend to many productions. Sugar and Indigo are common to the whole champaign, and so are coarse cloths; coarse, at least, when contrasted with the more delicate fabrics of the tract subject to the annual inundation.

3. The distinction, which was first noticed, is not inconsistent with one remarked by the Hindus themselves. In their opinion, the resort of the Antelope sanctifies the countries graced by his presence, while his absence degrades the regions which he avoids. This seems more connected with physical observation than with popular prejudice. The wide and open range, in which the Antelope delights, is equally denied by the forests of the mountains and by the inundation of the fens.

4. Geographical divisions may be likewise described, which shall be consistent with sensible differences of climate within the limits of this province. The periodical winds, that prevail in the Bay of Bengal, extend their influence over the flat country until they are diverted by chains of mountains into another direction, nearly

Reprinted from the edition published in 1884 by Robert Knight of *The Statesman and Friend of India* Office—A. M.

¹ Benares is in Suba Ilahabad.

² A part only of Oresa is included in the British dominions.

³ Part of the districts of Ramgerh, etc., is in Suba Berar.

⁴ Mostly on the northern frontier, viz., part of Morung conquered in the middle of the present century; and Cooch, and other provinces, which have become tributary since the English acquired their present influence in Bengal.

⁵ The Bhagirat'hi, or Kasimbazar, River.

⁶ The tract of annual inundation (for which see the maps in Rennel's Atlas) was anciently called Beng.; whence, probably, the name of Bengal is derived. The upper parts of Bengal proper, which are not liable to inundation, were called Barendra, and are mostly north of the Ganges. On the west of the Bhagirat'hi were Utter-rari and Dacshin-rari. The east of the same river was Bhagre. Other districts are also included in Bengal, as Anga, Saubira, Chaura, Halavaria, Mala, Gaura; and, in Bihar, are found Magadha, Naipura, Mit'hila, or Tirabhucti, Betrapa, and many others. These names are yet unforgotten, and are even more familiar to the Bengalese than the sub-divisions of the Suba into Sircars, as formed under the Moghul government and as still preserved in official documents. The present geography attends to the limits of jurisdictions according to the different systems which have been adopted for the Administration of Bengal. They have undergone frequent alterations from the Chacras of Jaaffer Khan to the present Zilas.

APPENDIX III

correspondent however with the course of the Ganges. Northerly and southerly winds blow, alternately during unequal portions of the year, over that part of the province which faces the head of the bay. The northerly wind prevails during the cold season, a southerly one during the hot; but the period of their change seems to be earlier on the eastern side of the Delta of the Ganges than on the west; corresponding herein with a similar difference in the periodical winds on the respective shores of the bay. The seasons of Bengal conform nearly with these changes of the prevailing winds. They are commonly distinguished by the terms of cold, hot, and rain; but the natives on the result of closer observation, subdivide them, and reckon six seasons, each containing two months.

5. The spring and the dry season occupy four months, during which the heat progressively increases until it becomes almost intolerable even to the natives themselves. In the middle parts of Bengal, however, the extreme sultriness of the weather is moderated by occasional thunder storms, accompanied by rain or hail, and driven by sudden gusts of north-west wind. In the eastern districts, milder showers of rain are still more frequent and refresh the heated atmosphere. But, in Bihar, and in districts contiguous to it, a parching wind from the westward prevails during a large portion of the hot season. It blows with great strength during the day, but is commonly succeeded at night by a cool breeze in the contrary direction; and it sometimes ceases for days or weeks, giving way to easterly gales. Beyond the limits of Bihar, the parching winds are still more prevalent; refreshing breezes, or cooling showers of rain and hail more rare.

6. At length the scorched inhabitants are relieved by the rainy season, which, in general, commences nearly at the same time throughout the whole province. During the two first months, according to the usual course of seasons, the rain is heavy and continual; in this period an intermission of many successive days is rare, and the rain pours with such force and continuance, that three, four, and even five, inches of water have fallen in a single day. In the two subsequent months, the intermissions are more frequent and of longer duration; and the heat and closeness of the weather has entitled this season to the name of sultry. The rivers, and the Ganges especially, which had begun to rise even before the commencement of the rainy season, continue to increase during the two first months of it, and the Ganges reaches its greatest height in the

⁷ The water of inundation, having dissolved clay, deposits it in the progress of evaporation. But running water deposits sand, and keeps the clay, calcareous salts, and other fertilising substances

third. By this time all the rivers of Bengal are swollen, and the Delta of the Ganges is overflowed; other portions of Bengal are indeed exempted from annual inundation; but they sometimes experience it, as a calamity, in years when a sudden and uncommon fall of rain swells the rivers beyond the level which they usually attain. This temporary variation in the quantity of water does not much affect the general average of the year; for, the annual fall of rain, in the lower parts of Bengal, is seldom short of seventy inches and as seldom exceeds eighty.

7. At the approach of winter, the rivers begin to decrease, showers cease to fall, and the inundation gradually drains off or evaporates. Fogs, the natural consequence of such evaporation in cold weather, are frequent in most parts of Bengal proper. Dew, at this season, is everywhere abundant and penetrating; and in the higher latitudes of India, as well as in the mountainous tracts of it, frost and extreme cold are experienced. Even in the flat country, ice is obtained by the simple artifice of assisting evaporation in porous vessels, although the atmosphere be much warmer than the freezing temperature; and a blighting frost is sometimes deplored in Bihar and Benares. The natives do therefore not improperly distinguish the winter into two seasons, the frosty and the dewy. It must, however, be remarked, that dews are copious in Bengal throughout the whole winter, and greatly assist vegetation, affording nearly as much moisture as corn requires in a soil so loose, though retentive, as that which is most prevalent throughout the province.

8. The general soil of Bengal is clay, with a considerable proportion of silicious sand, fertilised by various salts, and by decayed substances, animal and vegetable. In the flat country, sand is everywhere the basis of this stratum of productive earth; it indicates an accession of soil on land which has been gained by the dereliction of water. The progress of this operation of nature presents itself to the view in the deviations of the great rivers of Bengal, where changes are often sudden and their dates remembered. A period of thirty years scarcely covers the barren sand with soil sufficient to fit it for rewarding the labours of the husbandman; the lapse of a century does not remove it half a span from the surface. In tracts, which are annually inundated, the progress is more rapid; and that for obvious reasons, which equally explain why such tracts exhibit a greater depth of productive soil and a larger proportion of clay than other regions. A compound of calcareous and silicious earth assumes, in many places, a firm

APPENDIX III

texture, and forms a stone named Kunkur.* In some parts, iron ore enters into the composition, and gives it a still firmer texture. A similar accretion of sand and clay bears the same appellation. Silicious stones of various kinds which have fallen from the hills, chequer the contiguous plains, and form one more exception to general uniformity. If the variable proportions of clay and sand, and the circumstances of frequent alterations in the channels of rivers, be considered great inequality of soil may be expected, though it be composed of few substances.

9. In his progress through Bengal, the traveller will not confine himself to remark the natural diversity in the aspect of the country, but will compare the neat habitations of the peasants, who reside in hilly regions, with the wretched huts of those who inhabit the plain; and the contrast may suggest a reflection, how little the richest productions and most thriving manufacturers contribute to the general comfort of the people at large.

10. In the tract of annual inundation, insulated habitations, and fields raised considerably above the level of the country, exhibit the effects of patient industry. In the same tract, during the season of rain, a scene presents itself, interesting by its novelty: a navigation over fields submerged to a considerable depth, while the ears of rice float on the surface; stupendous dikes, not altogether preventing inundation, but checking its sudden excesses; the peasants repairing to the market, or even to the field, on embarkations, accompanied by their families and domestic animals, from an apprehension that the water might rise suddenly and drown their children and cattle in the absence of their boats. This practice suggests an alarming notion of threatening inundation. And, when we pass the peasant's habitation and observe the level of the flood reaching to the height of the artificial mound on which his house is built, his precaution appears far from superfluous. In the dry season, temporary habitations for the husbandman, in the midst of an extensive plain, which had lately been submerged, form a contrast to the general practice of the peasants uniting in villages and cultivating indiscriminately the adjoining lands.

* One hundred parts of Kunkur have been found to contain forty parts of air, forty-one of calcareous earth, sixteen of silicious earth, and three of calx of iron.

The mountaineers are most evidently distinguished by religion, character, language, and manners, as well as by their features, from the Hindu nation. Under various denominations, they people that vast mountainous tract which occupies the centre of India, and some tribes of them have not yet emerged from the savage state. They are perhaps aborigines, driven many ages ago from the plains of Hindustan by the Hindu colonists; but even desolate forests, an ungrateful soil, difficult roads, and a noxious climate, do not preserve to them the unmolested possession of the dreary region to which they have retired. Hindus, and even Muselmans, may be now found interspersed amongst them. It should be, however, noticed, that these mountaineers, in the progress of civilisation, do often adopt the manners, and, in time, embrace the religion, and assume the name, of Hindus.

11. If dikes to check the inundation show an attention to improvement, reservoirs and dams, constructed for irrigation in the champaign country, are equally a proof of some attention to that object, while wells for watering the fields offer a pleasing specimen of industry in the western provinces. But, if something occur to extort applause, the most desultory observation will notice more to censure. The assemblage of peasants in villages, their small farms, and the want of enclosures, bar all great improvements in husbandry. It is true, that, in a country infested by tigers, solitary dwellings, and unattended cattle would be insecure; but no apology can be offered for the peasants indifferently quitting the plough to use the loom, and the loom to resume the plough. Industry cannot be worse directed. Yet this practice is nowhere more prevalent than in the richest provinces.

12. Picturesque beauties, unknown to level countries, are not more remarkable in the elevated tracts than the characteristic features of a race of people distinct from the inhabitants of the plain. Beyond Bengal the natives of the northern mountains, betray by their features, a Tartar origin; descending to more fertile regions in the plains, which skirt the mountains, they people the northern boundary of Bengal. On the eastern hills, and in the adjacent plains, the peculiar features of the inhabitants declare with equal certainty a distinct origin; and the elevated tract, which Bengal comprises on the west, is peopled from a stock obviously distinct, or rather by several races of mountaineers, the probable aborigines of the country.* In the mixed population of the middle provinces, the observer readily distinguishes the Hindus from the Muhammedans. Among the latter, he discriminates the Moghul, the Afghan and their immediate descendants from the naturalised Muselman; among the former, he recognises the peculiar traits of a Bengalese, contrasted with those of the Hindustani. Foreign commerce has increased the diversity, by the resort which it has attracted from almost every nation of Europe and Asia. But adding little to useful population, it permits us to describe Bengal as peopled by Hindus and Muhammedans. Let us attempt to estimate this population.

APPENDIX III

CHAPTER II

Population

13. In India, no bills of mortality, nor registers of births, marriages and burials, afford data for calculation. The arguments, by which we are convinced of the great population of Bengal, arise from the results of various speculations, and are so connected with other topics, that, in stating them, we must take a general view of the whole subject which we propose to examine.

14. The inhabitants of Bengal are certainly numerous in proportion to the tillage and manufactures which employ their industry. Former computations carried the population to eleven millions; and to them a late publication seems to allude, in mentioning the number of twenty millions, for the inhabitants of the Company's territorial possessions in India; since the population of the British dominions in the Decan was then estimated at nine millions.

15. An inquiry, instituted in 1789, and conducted, chiefly, by calling upon the collectors of districts for their opinions on the population of their respective jurisdictions, furnished grounds for estimating twenty-two millions in Bengal and Bihar.¹ Sir William Jones has hinted at a higher estimate; and, though he has not mentioned the ground of his computation, it may be admitted that he has not hazarded a vague and unfounded conjecture.² We think, with him, that twenty-four millions is at least the present number of the native inhabitants of Bengal and Bihar; and we shall subjoin arguments which might lead us to compute a greater number. We cannot, therefore, hesitate in stating twenty-seven millions for the whole population, including the province of Benares.

16. *First*.—An actual ascertainment³ found 80,914 husbandmen holding leases, and

22,324 artificers paying ground rent, in 2,784 villages⁴ upon 2,531 square miles. Allowing five to a family, this gives more than 203 to a square mile; and, for the whole of the Dewani provinces, at that proportion, it gives a population of 30,291,051; or including Benares, 32,987,500; since the area of Bengal and Bihar is 149,217 square miles, and, with Benares, not less than 162,500.

17. The district, in which this ascertainment was made, is not among the most populous, but is more so than the generality of districts. In some parts of Bengal, vast tracts of land are almost wholly waste; if a fourth of the area were excluded for this cause, the ratio of the population to the square mile, resulting from an ascertainment in this district here alluded to, might be taken for three-fourths of Bengal.⁵

18. But it must be remembered, that many and numerous classes of people do not pay rent, nor contribute directly to the revenue. Some professions are exempted from ground rent, some classes are excused on account of property, others through motives of respect. The tenants of alienated estates are not comprehended in the ascertainments above mentioned: yet the free lands are equal to an eighth of the whole area of the district alluded to; and they do not bear a less proportion to the assessed lands throughout Bengal. No city, nor considerable town,⁶ was included in the ascertainment, which for that further reason, may be accounted moderate. Upon the whole we may adhere to the average, first suggested, of 200 to a square mile, in districts which are well peopled.

19. *Second*.—General measurements are occasionally undertaken for entire pergunas, and for larger districts. In the registers of

¹ Exclusive of the accession of territory obtained during the Governments of Marquis Cornwallis and Marquis Wellesley.

² Quoted from memory.

³ Preface to the translation of Al Sirajjiyah.

⁴ The result of an official inquiry in the province of Purinya.

⁵ Mauzas. By this term is meant the land attached to a village, not merely the site of buildings. It answers to the word parish more nearly than to any other English term; for, several villages or hamlets may stand in the same Mauza; and, on the contrary the same town will sometimes include several Mauzas. The common size of them may be judged from the ascertainment of 21,996 Mauzas on 18,028 square miles. Estimates have been attempted from the number of inhabitants found in a few villages, deducting thence an argument applicable to the whole number of Mauzas. Such inquiries have been too limited to afford sufficient grounds for an accurate estimate; but the results, which have come to our knowledge, exhibit 179 inhabitants in each village, *viz.*, 92 males and 87 females. The whole number of Mauzas in Bengal and Bihar is not less than 180,000. If there be 135,000 inhabited villages, the population should exceed twenty-four millions, exclusive of the inhabitants of cities and large towns. We appeal to the recollection of every person, who has traversed the populous parts of Bengal, whether every village do not swarm with inhabitants? whether every plain be not crowded with villages? and whether every street be not thronged with passengers?

⁶ On this principle, the population of Bengal, Bihar and Benares might be rated at 24,740,000.

⁷ Bengal and its dependencies contain five large and as many smaller cities, forty large towns, and a great number of smaller, but not inconsiderable, towns.

APPENDIX III

such surveys, the land in tillage, the spots appropriated to special purposes, the waste and barren tracts, and the ground covered by lakes, are distinguished. Many such surveys^a have been examined, and the following proportion is grounded on them, after making an allowance for great rivers.

Rivers and lakes (an eighth)	3
Deemed irreclaimable and barren (a sixth)	4
Site of towns and villages, high-ways, ponds, & c., (a twenty-fourth)	1
Free lands (an eighth)	3
LIABLE FOR REVENUE	
In tillage (three-eighths)	9
Waste (a sixth)	4
TOTAL	24

20. If a fourth of the area of Bengal be excluded, as before, for tracts of land nearly or wholly waste, three-eighths of the remainder give 45,703 square miles; (or omitting Benares) 41,967 square miles, equal to 81,248,112 bighas, of land tilled and liable for revenue; if half the free lands be cultivated, the whole tillage is 94,790,100 bighas, or 31,335,570 acres.

21. In some districts, an inquiry, undertaken in 1790, ascertained the quantity of land tenanted by near seventy thousand cultivators; and it gave an average of less than eighteen bighas each in actual tillage; for the ascertainment comprehends no lays nor fallows, because the husbandman pays rent for no more than he really tills and sows. At this proportion, the whole quantity of 94,790,100 bighas must be used by 5,266,118 tenants; and, adding artificers and manufacturers at the proportion suggested by the ascertainment of 80,914 husbandmen, and 22,324 artificers, in the districts above mentioned, we have 6,719,035 persons paying land-rent and ground-rent. If each of these be deemed the head of a family, the

population might be estimated at 33,595,175. But several rents are not unfrequently paid by the same family: for this reason, the number of husbandmen may be thought over-rated; because in the rent-rolls which were abstracted tenants, holding land from more than one owner, or paying two rents to the same proprietor, must unavoidably have stood for two persons. The excess in the estimate, arising from this cause, is perhaps not fully balanced by the various classes which do not contribute directly to the rental.^b

22. *Third.*—Remains to compare the estimated population with the consumption. The food of an Indian is very simple; the diet of one is that of millions, namely, rice, with split pulse and salt to relieve its insipidity. Two and a half ounces of salt, two pounds of split pulse, and eight pounds of rice, form the usual daily consumption of a family of five persons in easy circumstances. Or, according to another estimate, four mans of rice, one man of split pulse, and two and a half seers of salt, suffice for the monthly consumption of a family of six persons, consisting of two men, as many women, and the same number of children. Whence we deduce, for the average consumption of salt in a year, five seers, or ten pounds a head, according to either estimate; or admitting a chatac a day for four persons, as is estimated where salt is moderately cheap, the annual consumption of each person is a little more than five and a half seers, but less than twelve pounds.

23. The annual sales of salt, under the monopoly of that article by government, exceeded 35,000,000 mans, on an average of five years ending in 1793. The quantity, and the price for which it has been sold, have since been much increased, and it is certain that no precautions can entirely prevent smuggling. The exports from Bengal into Assam and other contiguous countries;

^a For specimen of these surveys, take the following abstracts from several pergunas and Sircars Sherifabad, Mandarin, etc., measured in 1786, and in Sircar Tajpur surveyed in 1788:

Waste, but reclaimable, as well as forest and sterile, lands	449,986
Ponds	41,805
Free lands	298,275
Productive (including site of buildings)	524,909
Bighas of 80 cubits square	1,314,975

Parganas in Sircar Tajpur, measured in 1788.

Waste, but reclaimable	161,225
Barren	123,747
Ponds and roads, etc.	24,122
Free Lands	143,042
Cultivated	301,131
Total Bighas	753,267

These measurements are exclusive of rivers.

^b The same objections occur against an estimate founded on the average rents of tenants.

APPENDIX III

though not inconsiderable, are probably balanced by the contraband trade and by the illegal manufacture of impure salt obtained from ashes and the mother of nitre. These impure sorts which are deemed salutary and even necessary for cattle, though not equally so for men, were often employed by retailers in adulterating seasalt, and were also voluntarily consumed by the poor; probably they still are so, in some degree, though less than heretofore. The quantity of salt, consumed in Bengal and Bihar, certainly exceeds 4,000,000 mans;¹⁰ exclusive of Benares, the consumption of which is supplied by its own manufacture, joined with importations from Sambher and other places. That quantity, compared with a supposed population of thirty millions of people, would indicate an annual consumption of nearly eleven pounds a head; but, if we suppose the population not to exceed twenty-four millions, we must then rate the average consumption of salt so high as fourteen pounds, which exceeds all experience in India, even where salt is cheapest.¹¹

24. From what has been stated as the daily consumption of a family, an average of nine mans a head may be deduced for the annual consumption of grain. The use of wheat and barley, in some provinces, does not materially affect the calculation; but millet, and other small grains (which constitute the principal food of the poor, and which are not equally nourishing with white corn), will increase the average.¹²

25. Several sorts of pulse are raised for cattle, but bear a small proportion to the general tillage; for the cattle are mostly supported on pastures, or on chaff and straw. Corn is imported from several of the countries which border on Bengal; but the exportation exceeds the import; we therefore estimate the produce, consumed by 30,000,000 of persons, at 270 millions of mans, or at 300 millions, after adding grain consumed by cattle; to this again add a seventh for seed, and the whole produce in grain will be 342,857,140 mans; a very moderate produce from tillage estimated at 94,790,100 bighas.

26. But the Indian husbandry mixing in the same field corn and other articles of a very different nature, every object must be included in the computation to compare the produce with the quantity of land; and, for that purpose, the grain must be stated at its money-value. This we take from the average of many inquiries (in the course of which the cheapest and dearest provinces have been compared) at the following rates:—

<i>Maunds</i>	<i>Rupiyas</i>
150,000,000 of rice, wheat, and barley, at 12 annas .	112,500,000
60,000,000 millet, &c., at 8 annas	30,000,000
90,000,000 pulse, at 10 annas	56,250,000
	<hr/>
	198,750,000
Seed reserved for the following season, 53,000,000 mans	28,380,000
	<hr/>
	227,130,000
Oilseeds	12,000,000
Sugar, tobacco, cotton, &c.	70,000,000
Sundries	20,000,000
	<hr/>
Gross produce of land, Rupiyas	329,130,000

27. In a subsequent inquiry, we shall have occasion to show this to be moderate in proportion to the expenses of husbandry, or to the aggregate amount of rents for the tillage estimated at 95,000,000 of bighas.

28. The desultory speculations in which we have not indulged cannot avail to determine accurately the population of these provinces; but they render it not improbable that it has been hitherto under-rated. Undoubtedly it is adequate to undertake greater tillage and more numerous and extensive manufactures than now employ the labour of the Asiatic subjects of Great Britain; but wanting a vent for a greater produce, they have no inducement for greater exertion of industry. If more produce were obtained while no markets were open for the disposal of it, diligence would

¹⁰ For a most comprehensive table of the coins, weights, and measures, of India, the reader is referred to page 49 of the Asiatic Register for 1804, under the title of home-intelligence.

¹¹ In France, while the Gabelle was in force, the annual consumption of each person was estimated at nine pounds and one-sixth, where salt was sold at 62 livres for the quintal (100 lb.); eleven pounds and three-quarters, where it was sold at 33½; fourteen pounds, where it was sold at 21½; and, perhaps, eighteen pounds in districts in which salt paid a moderate duty. See Necker, *De l' Administration des Finances*, tome 2, p. 12. The French pound was somewhat greater than the English avoirdupois.

¹² Four seers of course flour are estimated for the daily consumption of a family consisting of six persons. This is equal to six mans of flour annually for each person; or nearly seven mans of wheat. The consumption of barley is reckoned at very little more. The practice of throwing away the water, in which rice has been boiled, accounts for the greater consumption of rice compared with that of wheat and barley.

In England, a quarter of wheat is reckoned sufficient for the annual food for a man; and the whole quantity of bread-corn, raised in Great Britain, has been computed at 14,000,000 quarters. Since a quarter of wheat, weighs, on an average, about 480 pounds; that estimate does not materially disagree with ours.

APPENDIX III

be unrewarded. The necessaries of life are cheap, the mode of living simple; and, though the price of labour be low, a subsistence may be earned without the uninterrupted application of industry. Often idle, the peasant and manufacturer may nevertheless subsist. A few individuals might acquire wealth by peculiar exertion; but the nation at large can use no more labour than the demand of the market is found to encourage.¹³ If industry be roused, the present population is sufficient to bring into tillage the whole of the waste lands of Bengal and Bihar; and, in most districts, improvement may be expected, whenever new channels of trade are opened to take off more or new produce. Of this we are convinced; aware, however, that the culture does require considerable labour; for, in the common husbandry, the land yields

several crops within the year. But needing no manure, except for some articles (and manured for these without labour or expense), the same quantity of land should employ fewer hands in Bengal than in England, since the labours of the husbandman suffer less interruption from the inclemency of seasons.¹⁴ The improvements, which are to be expected from a better and more diligent husbandry, may be appreciated after reviewing the present system of agriculture.

29. We must here pause to remark, that the revenue mostly follows a proportion to the area of the districts, as may be shown by a comparison of the area with the revenue collected in 1784; which distant period is taken, because districts have since been new modelled, and their area under late distributions is not ascertained.

DISTRICTS	Deduct for lands nearly waste	Sq. miles according to Rennel	Revenue of 1784
*Birbhum		3,858	6,11,321
*Bishnupur		1,258	3,86,707
Chattagon, Islamabad, and Tripura (the woods or forests of the last mentioned district are nearly waste)	9,567	4,817	6,79,197
*Dhak'ha		15,397	31,62,386
Dinsipur;		3,519	14,60,444
Crisnanagar or Nediya		3,115	10,27,427
Medinipur		6,102	8,89,941
*Purnya		5,119	10,00,479
Rajshahi and Bhagalpur (K'heragpur and K'heragdih, nearly waste)	10,487	5,453	5,034
*Rajshahi		12,909	24,00,000
Silhet.		2,861	2,33,824
*Saren and Bitya		5,106	13,12,721
Tirhut and Hajipur		7,815	7,01,234
*Bihar proper, Rotas and Shahabad		12,129	24,59,807
Berdwan		5,174	43,58,026
Pachet, Chhota Nagpur, Palamau and Ramgerh	21,732	5,000	1,61,216
Districts, the distribution of whose area is not ascertained, including the productive districts of 24-Perganas, Hugli, town of Calcutta, and Murshidabad		12,921	61,66,670
Sunderbens, Cuchbihar, and Rangamati nearly waste		37,549	—
TOTAL		149,217	2,75,59,000

30. The cultivated lands, in the tracts which are here considered as nearly waste, are fully equalled by the waste lands in districts stated by us as well cultivated; hence the argument on which a fourth of the area has been excluded as desolate. The average of revenue on the whole area is, in current rupiyas, 184 per square mile, on three-fourths, which are well cultivated, it is 246 per square mile. The revenue of most districts, compared with their area, falls between those limits. No ascertainment have been admitted in the preceding computations, but those obtained within the districts marked, where the revenue was,

in 1784, nearly 200 current rupiyas per square mile: this circumstance shows them to be in a middle class, between the depopulated and waste and the populous and highly cultivated provinces; between the very cheap and very dear districts.

31. In the present distribution of districts, the dearest and most productive are Berdwan, 24-Perganas, Nediya, and the town of Calcutta; the cheapest and least productive are Ramgerh, Silhet, Cuchbihar, and Tripura. We use no information from these, in computing the prime cost of productions and the price of labour.

¹³ This was the case in France shortly preceding the revolution and perhaps in part accelerated that catastrophe.

¹⁴ It has been estimated, that there are 40,000,000 of cultivated acres in Great Britain, probably including meadows. If this computation be accurate, two-thirds of the area of Great Britain are productive. We estimate one-third only of Bengal and Bihar to be tilled, but this is exclusive of pasturage and lays or fallows. In England, it should seem, there are four acres of arable and meadow land for every inhabitant; in Bengal, little more than one acre of tilled ground for every person. The present population then, is fully adequate to the cultivation of all land that is now waste.

APPENDIX III

CHAPTER III

Husbandry

32. The regular succession of periodical rains, followed by a mild winter, which is almost universally exempt from frost and nearly as free from rain, and this succeeded by great heat, refreshed however by occasional showers of rain and hail, afford its proper season for every production of tropical and temperate climates. Few are altogether unknown to Bengal. Those which actually engage the industry of the husbandman are numerous and varied. Among them, rice is the most important. Corn, in every country, is the first object of agriculture as the principal nourishment of the inhabitants; in this, where animal-food is seldom used, it is especially important.

33. The natural seasons of rice are ascertained from the progress of the wild plant. It sows itself in the first month of the winter; vegetates, with the early moisture, at the approach of the rains; ripens during their period; and drops its seed with the commencement of the winter. A culture, calculated to conform to this progress, is practised in some districts. The rice is sown in low situations, when nearly desiccated; the soil, hardening above the seed, gives no passage to early showers; but the grain vegetates at the approach of the rains and ripens in that season, earlier or later, according as the field is over-flowed to a less or to a greater depth. This method is bad, as it exposes the seed to injury during a long period, in which it should remain inert; the practice is not frequent. Common husbandry sows the rice at the season when it should naturally vegetate, to gather a crop in the rains; it also withholds seed till the second month of that season, and reaps the harvest in the beginning of winter. The rice of this crop is esteemed the best, not being equally liable with the other to early decay. In low situations, where the progress of desiccation is tardy, and on the shelving banks of lakes, which retain moisture till the return of the wet season, a singular cultivation sows rice at the end of the rains; and, by frequent transplanting and irrigation, forces it to maturity during the hot season. In situations nearly similar, the husbandman sows rice in the winter for an early harvest, obtained by a similar method at the commencement of the rains.

34. In almost every plant, culture, in proportion as it is more generally diffused,

¹ Peas, chiches, pidgeon-peas, kidney-beans, etc. The sorts most generally cultivated are *Pisum sativum*, *Cicer arietinum*, *Cytisus cajan*, *Ervum bisperrum*, *Lathyrus sativus*, *Phascolus*, *Max*, *Mungo* and *lobatus*, *Dolychos bistorus*, etc.

² Indian millet, panic, etc. The most common sorts are *Holcus spicatus* and sorghum, *Panicum Italicum*, and another species to which no specific name has been yet assigned, *Cynosurus coracanus*, *Paspalum frumentacum*, etc.

induces numerous varieties. But the several seasons of cultivation, added to the influence of soil and climate, have multiplied the different species of rice to an endless diversity, branching from the first obvious distinction of awned and awnless rice. The several sorts and varieties, adapted to every circumstance of soil, climate, and season, might exercise the judgment of sagacious cultivators; the selection of the most suitable kinds is not neglected by the Indian husbandman. There is room, however, for great improvement, from the future light to be thrown on this subject by the observations of enlightened farmers.

35. Other corn is more limited in its varieties and its seasons. Of wheat and barley, few sorts are distinguished; they are all sown at the commencement of the winter and reaped in the spring. A great variety of different sorts of pulse finds its place in the occupations of husbandry.¹ No season is without its appropriate species; but most sorts are either sown or reaped in the winter. They constitute a valuable article in husbandry, because they thrive even on poor soils, and require little culture. Millet, and other small grains², though bearing a very low price as the food of the poorest classes, are not unimportant; several sorts, restricted to no particular season, and vegetating rapidly, are useful, because they occupy an interval after a tardy harvest, which does not permit the usual course of husbandry. Mays (maize—A.M.), which may be placed in this second class of corn, is less cultivated in Bengal than in most countries where it is acclimated. For common food, inferior to white corn, it has not a preference above millet to compensate the great labour of its culture. It is, however, the most general produce of poor soils in hilly countries, and is also very generally cultivated in the western provinces.

36. The universal and vast consumption of vegetable oils is supplied by the extensive cultivation of mustard, linseed, sesamum, and palm-christi. The first occupy the winter season; the sesamum ripens in the rains, or early after their close.

37. Among the most important of the productions of Bengal rich in proportion to the land which they occupy, valuable in commerce and manufactures, are tobacco, sugar, indigo, cotton, mulberry, and poppy. Most of these require land solely appropriated to

APPENDIX III

the respective culture of each; they would here deserve full notice, together with some other articles, were we not in this place limited to a general review of the usual course of husbandry, and of the implements and methods which it employs.

38. The arts and habits of one country elucidate those of another. The native of the north may deem everything novel in India; but, if he has visited the southern kingdoms of Europe, he will find much similarity to notice. The plough and the spade of Bengal, and the coarse substitute for the harrow, will remind him of similar implements in Spain. Cattle treading out the corn from the ear, will revive the remembrance of the same practice throughout the south of Europe, where, also, he has already remarked the want of barns and of enclosures; the disuse of horses for the plough; the business of domestic economy conducted in the open air; and the dairy supplied by the milk of buffaloes.³

39. The plough is drawn by a single yoke of oxen, guided by the ploughman himself. Two or three pairs of oxen, assigned to each plough, relieve each other, until the daily task be completed. Several ploughs in succession deepen the same furrows, or rather scratch the surface; for the implement, which is used throughout India, wants a contrivance for turning the earth, and the share has neither width nor depth to stir a new soil. A second ploughing crosses the first, and a third is sometimes given diagonally to the preceding. These frequently repeated, and followed by the substitute for the harrow, pulverise the surface, and prepare it for the reception of seed. The field must be watched for several days, after it has been sown, to defend it from the depredations of numerous flocks of birds. This is commonly the occupation of children, stationed to scare the birds from the new-sown ground. It is also necessary to prolong the defence of the field in those districts which are much infested by wild boars, buffaloes, and deer. For this purpose a stage is erected and a watchman is stationed on it at night to scare wild animals, should they approach. In all districts, mays and some sorts of millet, when nearly arrived at maturity, generally need defence from the depredations of birds by day and of large

bats by night. For this purpose, also a watchman is placed on an elevated stage; and other expedients, common in all countries, are likewise resorted to. These expedients add neither to the expense nor to the toils of husbandry; but the employment of watchmen must be counted as some addition to the labour of agriculture.

40. After the plant has risen, the rapid growth of weeds demands frequent extirpation; particularly during the season of rains; for few indigenous herbs vegetate in the dry season, and weeding is therefore little, if at all, required for plants which are cultivated in the winter and in the spring. Viewing the labours of the weeders, the observer is not easily reconciled to see them sitting to their work. The short-handled spud, which they use for a hoe, permits no other posture; but, however, familiar that may be to the Indian his labour is not employed to advantage in this mode of weeding.

41. The sickle (for scythe is unknown) reaps every harvest. With this, also, much unnecessary labour is employed; not merely from the want of a more convenient implement, but from the practice of selecting the ripest plants which the Indian, taught by the harvest of different plants ripening successively, extends to the gathering of a simple crop. Yet such, sometimes, are contradictions which custom has established, that while the peasant returns frequently to one field to gather the plants as they ripen, he suffers another to stand long after the greatest part of the crop has passed the point of maturity. He justifies his practice upon circumstances which render it unfeasible to enter these fields to select the ripe plants without damaging the rest, and upon the inferiority of crops which mix with ripe corn, a considerable proportion not fully matured. Though his excuse be not groundless, his loss is considerable, by grain dropping before the time of harvest, in so great a quantity, that if the field remains unsown during the following, it will nevertheless afford a crop by no means contemptible.⁴

42. The practice of stacking corn, intended to be reserved for seed, or for a late sale is very unusual. The husk, which covers rice, preserves it so perfectly, that, for the grain, the practice would be superfluous: and, the management of rice serving for the type of

³ The Buffalo is a native of India, but is now common in Egypt, in Greece, and in the southern parts of Italy. The Gyal, an undescribed species, which must be placed between the domestic bull and the buffalo, is well known in the Eastern parts of Bengal, beyond the Brahmeputro and Megna rivers. It is found there both wild and tame, but has not spread to other parts of the British dominions. The bull of Europe is unknown in India; but several other varieties are here domesticated, as the Zebu, etc. However, we shall, in the sequel of this treatise, use the English names of the species.

⁴ Instances of this are frequent: the remarkable result of one deserves to be mentioned. An early inundation covered a very extensive tract of ground before the rice had been sown; the landlord remitted the rents, but claimed the spontaneous crop, and he profited by the accommodation; realising from this harvest a greater amount than that of the rents which he remitted; although in addition to the common expenses, he was at considerable cost to watch the crop, and was probably defrauded of a large proportion of the harvest.

APPENDIX III

their whole husbandry, it is neglected by the peasants in keeping other corn. A careless pile, which waits the peasant's leisure, to thrash out his grain has no defence from the inclemencies of the weather. At his convenience, the cattle tread out the corn, or his staff thrashes the smaller seeds. The grain is winnowed in the wind, and is stored either in jars of unbaked earth or in baskets made of twigs or of grass.*

43. The want of roads, which indeed could not possibly be constructed to give access to every field in every season, does not leave it in the option of the farmer to bring home all his harvests by means of cattle; but the general disuse of beasts of burden, in circumstances which would permit this mode of transport, is among the facts which show a great disproportion between the husbandry and population.†

44. Irrigation is less neglected than facility of transport. In the management of forced rice, dams retain the water on extensive plains, or preserve it in lakes to water lower lands, as occasion may require. For either purpose much skill is exerted in regulating the supplies of water. In some places, ridges surround the field and retain water raised from lower ground by the simple contrivance of a curved canoe swinging from a pole. In other situations, ridges are also formed round the field both to separate it from contiguous lands and to regulate the supplies of water: this is more especially practised in the culture of transplanted rice. Dams, advantageously constructed, assist the irrigation of considerable tracts. In some provinces water is raised from wells, by cattle or by hand to supply the deficiencies of rain. Each of these methods, being within their compass, is the separate undertaking of the peasants themselves: but more considerable works, though not less necessary, are much neglected. Reservoirs, ponds, water-courses, and dikes,‡ are more generally in a progress of decay than of improvement.

45. The rotation of crops, which engages so much the attention of enlightened culti-

vators in Europe, and on which principally rests the success of a well conducted husbandry, is not understood in India. A course extending beyond the year, has never been dreamt of by a Bengal farmer; in the succession of crops within the year he is guided to no choice, of an article adapted to restore the fertility of land, impoverished by a former crop. His attention being fixed on white corn, other cultivation only employs the interval of leisure, which the seasons of wheat and rice allow; excepting, however, sugar, silk, and other valuable productions, to which even corn is secondary. It would be superfluous to specify the different courses which occur, each succeeding year, in practice; since they are not regulated by any better consideration than that of convenience in regard to time. As little would it tend to any useful purpose to develop the various combinations of different articles grown together on the same field, or in the stubble of a former harvest or sown for a future crop before the preceding harvest be gathered. A competent notion may be formed of this practice by supposing a farmer eager to obtain the utmost possible produce from his land, without any compunction for the impoverishment of the soil; able to command, at any season, some article suited to the time, and not content to use his field so soon as the harvest makes room for sowing it afresh, but anticipating the vacancy or obtaining a crop of quick vegetation during the first progress of a slower plant.

46. It may be easily judged that this avidity must disappoint itself, both because the several articles deprive each other of the nourishment which would have afforded a more abundant crop of either separately; and because the land, being impoverished makes bad returns for the labour and the seed. In most situations the soil exhausted by this method of husbandry, soon requires time to recruit. The Indian allows it a lay, but never gives a tilled fallow.¶ This however would not be ill judged, if the manage-

* The practice of storing grain in subterraneous hoards, which is frequent in Benares and in the western provinces, and also in the south of India, is not adapted to the damp climate and moist soil of Bengal. Here grain is hoarded above ground, in round huts, the floor of which is raised a foot or two from the surface. [In Barisal district paddy is frequently hoarded underground in large earthen jars—A. M.]

† In the Deccan, the central parts of which are mountainous and thinly peopled, carts are used to bring home the harvest. They are built upon a construction similar to that which prevails in Ramgerh, and other hilly parts of Bengal, and which is particularly well adapted to bad roads and uneven ground. The form of the carts, used in the flat countries of Bengal and Hindustan, is, on the contrary, ill suited for any but the best roads.

‡ In hilly countries, large ponds, and even vast lakes, are easily formed by constructing a dam across the gorge of some valley, which has a considerable declivity. Instances may be found in the hilly parts of Bengal, Bihar, and Benares; but they are still more frequent, and on a larger scale throughout the Decan. In the flat countries of Bengal, there is often a sufficient inequality of ground to afford an opportunity for constructing a dam either to inundate the higher lands or to form a reservoir for watering lower ground.

§ Works of piety, policy, and ostentation, in former days.

¶ Probably on account of the heat which would sterilise instead of fertilising the soil by exposing a greater surface of it to the sun and air.

APPENDIX III

ment of stock gave to the lay all the benefit which belong to this method, and if the inefficacy of the Indian plough, which must be preceded by the spade, did not greatly increase the expense of opening land which has remained long untilled.

47. The abuse of dung employed for fuel instead of being used as a manure, must have concealed from the husbandman the benefit of well-managed stock: else, in his practice of pasturing his cattle in the stubble of the harvest, and in fields of which the crop has failed he could not miss noticing the advantage of a well stocked farm. For want of perceiving this benefit, the cattle, kept for labour and subsistence, are mostly pastured on small commons or other pasturage intermixed with the arable lands; or they are fed at home on straw or cut grass; and the cattle for breeding and for dairy are grazed in numerous herds on the forests and on the downs. Wherever they may be fed, the dung is carefully collected for fuel.

48. While cultivation suffers very considerably by the trespasses of cattle through the wilful neglect of the herdsman, it is a matter of surprise, that enclosures are so much neglected as we see them in Bengal. For a reason already mentioned cattle cannot be left at night unattended: but in the present practice, buffaloes only are pastured in the night, cows and oxen graze during the day. For these enclosures would be valuable, and even for buffaloes, they would not be useless¹⁰ the farmer would be well rewarded for suffering the cattle to fertilise all his arable lands instead of restricting the use of manure to sugarcane, mulberry, tobacco, poppy, and some other articles.

49. Few lands unassisted are sufficiently fertile to afford these productions; the husbandman has therefore yielded to the necessity of manuring his land for them. On the management of it, little occurs for particular notice in this place, except to mention, that oil-cake is occasionally used as a manure for sugar-cane. A course of experiments would be requisite to ascertain whether the methods, actually employed, be better suited to the soil and climate, than others which might be, or which have been, suggested after comparing the practice of other countries with the various methods pursued in different parts of Bengal.

50. For a similar reason, the consideration of other produce, the culture of which is now general, such as cotton or indigo, or which might be generally diffused, as annatto and

¹⁰ The old laws of the Hindus gave redress for the trespasses of cattle in enclosed fields but not in unfenced lands, unless the transgression were wilful on the part of the herdsman, or of the owner. Unfortunately these laws seem to be now obsolete.

¹¹ The drill-husbandry is not unknown in India. The very simple contrivances here used for sowing the drill, for covering the seed, and for hoeing the intervals with a plough drawn by oxen, are worthy of remark. Being practised in remote countries, almost unvisited by Europeans, the Indian method of drill-husbandry is probably an original invention of the country, and not borrowed from the European practice, which has never yet been introduced into any part of India.

madder, may also be deferred. Enough has been said to show, that husbandry in Bengal admits of much improvement; or rather that the art is in its infancy, or has degenerated. Husbandry was the first science cultivated, under one of the first countries populated; it should therefore seem evident, that, at some very remote area, agriculture must have been well understood. Why so useful a science should have ever fallen so much to decay, is an object of deeper research than we have science to undertake—An ignorant husbandry, which exhausts the land, and neglects the obvious means of maintaining its fertility and of reaping immediate profit from the operations which might restore it; rude implements, inadequate to the purpose for which they are formed, and requiring much superfluous labour; this again ill-divided, and of course employed disadvantageously; all loudly call for amendment.

51. The simple tools, which the Indian employs in every art, are so coarse, and apparently so inadequate to their purpose, that it creates surprise how he can ever effect his undertaking; but the long continuance of feeble efforts accomplishes (and mostly well) what, compared with the means, appears impracticable; habituated to observe his success, we cannot cease to wonder at the simplicity of his process, when contrasted with the mechanism employed in Europe. But it is not necessary that the complicated models of Europe should be copied in India. A passion for the contrivances of ingenuity has there led to the adoption of intricate machinery for simple operations. The economy of labour, in many cases, justifies the practice, whether an effect be produced at a smaller expense, or more be performed at proportionate cost, but with less labour and expense of time. In Bengal, the great value of money and the cheapness of labour would render it absurd to propose costly machinery: but there can be no objection to simple improvements, which add little to the price of the implements, and fit them to perform, more effectually and with less labour, the object undertaken. The plough is among the implements which stand most in need of such improvements.¹¹

52. The readiness, with which he can turn from his usual occupation to another branch of the same art, or to a new profession, is characteristic of the Indian. The success of his earliest efforts, in a novel employment, is daily remarked with surprise. It is not so much a proof of ingenuity and ready con-

APPENDIX III

ception as the effect of patient imitation, assisting a versatile habit which is necessarily acquired where the division of labour is imperfect; and though its performance may surpass expectation, it must ever fall short of the expeditious and finished performances of the expert mechanic, whose skill is formed by constant practice in a more circumscribed occupation.

53. The want of capital in manufactures and agriculture prevents the division of labour. Every manufacturer, every artist, working for his own account, conducts the whole process of his art, from the formation of his tools to the sale of his production. Unable to wait the market or to anticipate its demand, he can only follow his regular occupation, as immediately called to it by the wants of his neighbours. In the intervals, he must apply to some other employment which is in present request: and the labours of agriculture, ever wanted, are the general resource. The mechanic, finding himself as fully competent as the constant cultivator to the management of common husbandry, is not discouraged from undertaking it at his own risk. Every labourer, every artisan, who has frequent occasion to recur to the labours of the field, becomes a husbandman. Such farmers are all qualified to plan or to conduct a well-judged course of husbandry, and are idly employed, to the great waste of useful time, in carrying to market the paltry produce of their petty farms. If Bengal had a capital in the hands of enterprising and intelligent proprietors, who employed it in agriculture, manufactures, and internal commerce, these arts would be improved; and, with more and better productions from the same labour, the situation of the labourers would be less precarious and more affluent; although the greatest part of the profit might vest with the owners of the

money adventured. In agriculture particularly, which is the basis of the prosperity of a country, the want of pecuniary funds is a bar to all improvement. While, on the contrary, the employment of money in agriculture would introduce large farms, and from these would flow every improvement that is wanted in husbandry; and such improvements must naturally extend from agriculture into every branch of arts and commerce. Without capital and enterprise improvement can never be obtained. Precept will never inculcate a better husbandry on the humble un-enlightened peasant. It could not, without example, universally persuade a wealthier and better informed class. Positive institutions would be of as little avail. The legislator cannot direct the judgment of his subjects; his business is only to be careful, lest his regulations disturb them in the pursuit of their true interests.

54. In Bengal, where the revenue of the state has had the form of land rent, the management of the public finances has a more immediate influence on agriculture than any other part of the administration. The system, which has been adopted, of withdrawing from direct interference with the occupants, and leaving them to rent their fields from landlords, will contribute to correct the abuses and evils which had formerly rendered the situation of the cultivator precarious. But not having yet produced its full effect, there is still occasion to review the system of finances, under which abuses had grown, and had placed the occupant in a precarious situation, as truly discouraging to agriculture as any circumstance yet noticed: for, without an ascertained interest in the land for a sufficient term of years, no person can have an inducement to venture his capital in husbandry.

APPENDIX III

CHAPTER IV

Tenures of Occupants—Property in the Soil, Rents and Duties—Tenures of Free Lands and of Lands liable for Revenue

55. In examining this subject, we shall begin with the first occupant.

56. A new settler becomes a raiat if he rents land; but, if he assist in husbandry as a labourer only, he belongs to another class of cultivators, for the term raiat, though properly intending a subject in general, is here restricted to mean one who contributes directly to the revenue of the state, whether as a tenant of land paying rent or as a trader or artificer paying taxes.

57. A new settler may occupy the whole, or a part, of the land abandoned or deserted by his predecessor; or of that which has been surrendered or resigned by the former occupant; or he may obtain ground, which has lain fallow one or more years. If it have been lain for a period of three or more years, according as custom may have determined, it becomes waste or forest land: and from this a progress of years, regulated by usage or by local circumstances, restores it to the first class of arable.

58. The raiat, unless contented to be taxed by the custom of the country, and to expose himself to exactions under false constructions of that custom, must take out a putta, or lease executing at the same time a counterpart. Puttas may be for payment in cash, or in kind; this latter may be for a specific quantity of grain or for an adjustment either by an actual partition of the crop or by estimation. The tenure for payments in cash either fixes a definite rent, or requires an annual adjustment; the first may be for ascertained farms, or for specified quantities of land, and it may be either perpetual or limited to a term of one or more years. The other tenure, which requires an adjustment subsequent to cultivation, may be regulated by fixed rates or by ascertained rules. But in some instances, no fixed standard nor certain rules are discoverable.

59. Under the first sort of tenures for payment in kind, the raiat is held by engagement, or by custom, to render a certain weight or measure of grain for the rent of his farm, which is ascertained by its dimensions or by its bounds. In the second, the crop is divided when gathered. The usual rate of distribution is half the produce; other rates also are known, but are more usual in the third tenure. Whatever be the proportion, it is mostly nominal; for deductions are made from the gross crop before the partition, or from the assigned shares after it;

¹ To avoid circumlocution and obscurity, we speak of the raiat as a tenant paying rent, and of his superior as a landlord or a landholder. But, strictly speaking, his payment heretofore was a contribution to the state, levied by officers standing between the raiat and Government.

* A fee for this permission was formerly levied.

and these deductions arise from arbitrary imposts. The third tenure for payment in kind is by estimation of the crop. This is performed by measuring the field, estimating its produce by inspection, or by small trials, calculating the shares according to the established rule of partition and valuing the landlord's portion at the market-price; that value the tenant pays in cash. It is usual to allow him some indulgence by a favourable measurement and a moderate evaluation; for which reason he prefers this tenure to an actual partition, and the landlord is equally desirous of avoiding it, because it is very liable to fraud and imposition. In the rule for dividing the crop, whether under special engagements, or by custom, three proportions are known:—

Half for the Land- Half for the Tenant,
lord,

One-third for the Landlord, Two-thirds for the Tenant.

Two-fifths for the Landlord, Three-fifths for the Tenants.

60. These rates, and others less common, are all subject to taxes and deductions similar to those of other tenures; and, in consequence, another proportion, engrafted on equal partition has in some places been fixed by government in lieu of all taxes; such, for example, as nine-sixteenths for the landlord, and seven-sixteenths for the husbandman.

61. Under this tenure, the peasant ought not to reap his crop without express permission from his superior; but, should the landlord delay to attend for the partition or estimation, the harvest might thereby suffer. For this reason, or to defraud his landlord, the raiat sometimes privately gathers the crop. On these occasions it becomes necessary to measure the fields, and to estimate the produce which has been embezzled, according to the presumed fertility of the soil, compared with other lands in the neighbourhood. If the usual evaluation of different articles of produce were reduced to a table of rates, and the value in kind were turned into money, by a reference to the average-prices of common seasons, it would acquire the same form with the tenure for a rent to be ascertained subsequently to cultivation according to fixed rate; and such is the probable origin of that tenure, which may be considered as a payment in kind commuted for a modus.

APPENDIX III

62. The rates ought to be uniform as far as circumstances permit, and the rents of all tenants, within the same village or district, should be regulated by one table. As the quality of the soil, however, cannot be uniform, the rates vary, not only according to the articles of produce, and number of crops gathered off the same field within the year, but according to the soil and situation; such as sandy; exposed to inundation or to drought; annually overflowed; adjoining to, or remote from, the village; and so forth. All these variations, whether by the produce or soil, constitute the rates which compose the table. Other diversities are admitted for the sub-divisions of districts and of villages. But in some places, there is no variation according to soil and produce; on the contrary, one uniform rate is applied to the whole land which is occupied by the same tenant. A putta for an adjustment after cultivation by a general table need not specify the rates. It need only contain the term of the lease, the reservation of established taxes, the measure to be used for the land, an obligation to pay all additional cesses which shall be universally imposed, and the periods of payment. The term specified in a lease of this nature, is commonly the year for which it is granted. A raiat has nevertheless a title of occupancy, in right of which he may retain his land, so long as he continues to pay the rent in conformity with the custom of the country, or with his own particular engagement. Of this more hereafter.

63. The sum of the rates applied to the measurement, constitutes the original rent in contradistinction to additional taxes arbitrarily imposed, or required for special purposes. They commonly fall under several heads; namely, taxes in general, charges, imposts, contributions, and various fees under their particular denominations. All established cesses ought to be brought on a table showing the amount of the taxes and their proportion to the original rent. But notwithstanding the existence of a table so constructed, a reservation in this and other tenures for new but universal cesses, and the practice of levying them even without such an express stipulation, did formerly render the situation of the tenants precarious. It little availed that the general consent of the raiats was deemed necessary to the imposition of any tax unauthorized by government; a few leading raiats, gained by indulgences, easily led the multitude.

64. The measurement is made by a bigah,* which contains twenty biswas. It is a square measure on a side of twenty cat'has; but this varies from three and a half to nine cubits.

* Other denominations of land-measure are known in some districts. But the bigah is by far the most prevalent.

A pole of the established length ought to be deposited in the public office of the district, sealed at both extremities with the official seal of the province; and the measurement should be made with a pole of that length, or with a rope equal to twenty such poles. In either mode the tenant has been commonly defrauded by keeping the middle of the pole elevated, or by withholding a part of the rope. So great has been the customary fraud, that raiats have been known to consent to the doubling of their rates, upon a stipulation for a fair measurement.

65. The periods of payment are seldom specified; they are regulated by usage grounded on the estimated value of the crops produced in different seasons; and the demand is made in the customary proportions. But, if instalments be specified, it is done by a reference to a separate engagement delivered with the counterpart of the lease.

66. The tenures did not universally conform with the table of rates. Indulgence was granted to such as by rank or religion were precluded from personal labour. The reduced rates allowed to them ought to be specified in the lease; and, where the reduction has by abuse become almost universal, every lease to raiats must in like manner specify the rates of each person, even though the taxes, payable by some individuals may not have been so reduced.

67. The simplest tenure of this kind requires an annual adjustment upon the actual cultivation. But in many places the raiat is bound to make good the same amount as in the preceding year, and to pay the excess, if any. This becomes a different tenure; and the stipulation ought to be expressed in the lease. A reduction of rates, obtained on a promise of increasing the total amount of the rent, has unnecessarily given name to a particular tenure, of which any farther mention would be here superfluous. Some tenants have been indulged with leases for an indefinite term, and for an unlimited quantity of land at the established rates. These, commonly, are not liable to new taxes imposed by general consent, and their leases contain a clause to that effect.

68. Out of the adjustment after cultivation has arisen another form. After making the measurement, the separate account of each tenant becomes a record; and the annual measurement is frequently omitted in consideration of a compromise, or it is partially executed by measuring the new cultivation, and adhering to the record for the arable land of the preceding year. Upon this is founded the tenure on the record of a general survey, which becomes the rule by which the occupant is to pay rent, until a new measurement

APPENDIX III

be undertaken to equalise or correct the assessment.

69. Among tenures, we have not mentioned that of paying for the number of ploughs employed* instead of the quantity of land occupied: it is obsolete in Bengal, but is the origin of a tenure which is known in the northern dependencies of this province, and which has become vague and precarious. The limits of the farm are ascertained, but without a survey of the quantity of land. The tenant occupies it in the season of cultivation, and adjusts the rent when the crop is on the ground; but, if the landlord and tenant cannot agree on equitable terms, reference cannot now be had to any certain rule. The farm is transferred to the highest bidder, and the dispossessed farmer receives the reimbursement of his expenses.

70. None of the tenures of Bengal are secure, except those by which the rent of an ascertained farm, or field, of a specified quantity of land, is fixed by a lease granted previous to cultivation, for a definite term, or for perpetuity; whether the permanency of it be expressly stipulated; or the lease be framed, as is not uncommon for an indefinite period.

71. In the other tenures, great confusion has arisen. Measurements long omitted, without a rule of record substituted in their place, and former surveys forgotten, or their rates* become obsolete, leave no certain rule for adjusting the rents. Endeavours are used

to obtain from the tenant an undertaking for the current year; but, having to dispute arbitrary imposts, he seldom complies. The landlord, estimating the amount of his own wants, distributes it at pleasure on his tenants, and endeavours to levy this assessment. In the confusion of disputed demands, no documents are interchanged; the tenant refuses to accept a receipt because stoppages have been made, which he does not acknowledge to be just; the landlord refuses to grant a release, ever claiming more than he has realised. The confusion increases while the sole object of one party is to extort, and of the other to withhold, as much as possible. Hence arose that scene of violence, which long disgraced Bengal under the native administration, while the peasant was literary subject to the lash of the extortioner.

72. Weakness will ever oppose cunning to violence. This resource has been very successful in the hands of the peasantry of Bengal. When the power of coercion was taken from the landlord, the tenants had no future oppression to apprehend from the vague tenures by which they held; but they were not willing to relinquish the future gain which they expected to obtain by such frauds as those vague tenures might enable them to practise. When the hands of the landlord were again strengthened, he reverted to the practice of extortion. It is from these causes that little progress has been hitherto made

* It still subsists in countries bordering on Bengal, both to the northward and to the southward on the British dominions. Four oxen are commonly allowed to one plough, and a regulated tax is levied on it.

* The standard for the regulation of rates has been lost. We learn from Mr. James Grant, in his observations on the revenues of Bengal, that the assessment was limited not to exceed in the whole a fourth part of the actual gross produce of the soil. The ancient method of estimating the resources from the produce is explained in the *Ayeen Akbery*, Vol. I, page 381; see also Vol. II, page 9. In early times, the demands of the Hindu sovereigns were more moderate. The Mahabharata states, that the prince may levy a fiftieth of the produce of mines, and a tenth of the corn. Menu and other legislators authorise the sovereign to exact a sixth, an eighth, or a twelfth, part of grain, according to circumstances, and a sixth part of the clear annual increase of trees, etc. Hindu authors distinguish the cultivator occupying the land in his own right, or cultivating ground belonging to another person, who is become unable to till it, or who has expatriated, or who has removed to other land, from the husbandman, who enters on the farm without permission from the former possessor. In this last case, the prior occupant may redemand the land, and may have the produce, repaying to the husbandman his expenses; or he shall have an eighth annually, for eight years, and at the expiration of that period he may resume the land without repaying the charges. The peasant is to pay the same to the prince as to the former occupant. Other authorities direct, that the husbandman shall pay to the former possessor a tenth of the produce of lands which were waste, and had been so five years; an eighth, for such as had lain three years; and a sixth, if the ground had remained untilled during one year; he was also required to pay an equal amount to the sovereign. The institutes of Akbar inform us, that former monarchs of Hindustan exacted the sixth part of the produce of lands. (*Ayeen Akbery*, Vol. I, page 347.) Under Akber, the revenue was settled at a third of the produce of lands cultivated for every harvest, or opened after allowing a short lay, in order that the soil might recover its strength; but, for older fallows, much less was required. For example, if the land had been untilled during three or four years, and was greatly injured, the payment in the first year was two-fifths of the standard, or two-fifteenths of the produce; in the second year, three-fifths of the standard; in the third and fourth years, four-fifths; and in the fifth year, the same rate as for land regularly cultivated. The rent of ground, which has been waste, was in the first and second years inconsiderable; in the third year, a sixth of the produce; in the fourth year, a quarter of it; and, after that period, the same as for the land which had been regularly cultivated. These rates were applicable to corn only. Indigo, poppy, etc., were paid for in ready money, at proportionate rates. *Vide Ayeen Akbery*, Vol. I, pages 356, 361, and 364.

APPENDIX. III

in the adjustment of rents on definite terms, and a long period may yet elapse before they acquire regularity.

73. Besides the variety of tenures which we have noticed, a difference arises from other circumstances. A tenant, who cultivates the lands of a distant village, cannot be placed on the same footing with one who uses land in the village wherein he resides. Indulgence in regard to his rent is allowed for the purpose of enticing the distant cultivator; and the inconvenience of remote cultivation makes it necessary that he should be at liberty to relinquish at any time the land which he uses; and, consequently, his own continuance being precarious, he cannot have a title of occupancy, which shall preclude the landlord from transferring the farm to a resident husbandman desirous of undertaking it. Another distinction arises from the practice of tenants under-letting their lands to other peasants. This class of middle men is numerous. Some are authorised by the nature of their tenure where the rent and limits of the farm are fixed and ascertained; others have an express permission inserted in their lease; most have no justification for this practice, which has grown up by abuse, and which is highly detrimental. The under-tenants, depressed by an excessive rent in kind, and by usurious returns for the cattle, seed, and subsistence, advanced to them, can never extricate themselves from debt. In so abject a state, they cannot labour with spirit, while they earn a scanty subsistence without hope of bettering their situation. Wherever the system of an intermediate tenantry subsists, the peasant is indigent, the husbandry ill managed.

74. Such were formerly the principal known tenures of raiats; but of whom did they hold? This question has been much agitated.

75. In the unquiet times, which preceded the Company's acquisition of the Diwani, arbitrary power respected neither prescriptive rights nor established usages. The management, first adopted under the British authority, had no tendency to restore order; and, when the servants of the Company undertook to conduct the detail of internal administration, they found the whole system embarrassed and confused.

76. Anxious to secure for their employers all the available resources of their new acquisitions, but without intending a wrong to individuals, they entered on inquiries with laudable diligence; but it was not rewarded with adequate success in unravelling the intricacies of the revenue by ascertaining local usages; nor in tracing, by a reference to its institutes, the system of administration established under the Moghul government.

77. These inquiries were suggested by a question, which was early started; "Of what nature was the landed property of Bengal? to whom did it belong? and what were the privileges which appertained to other classes?" Various opinions were entertained on these points. Some attributed to the sovereign the lordship of the soil; but restricted this property by admitting that the peasantry, as holding immediately of the prince, had a permanent interest in the land by immemorial usage. Others thought, that the zemindars enjoyed a proprietary right in the soil of an hereditary nature, and they considered the peasantry as having no positive claim to retain the land, against the will and approbation of the immediate superior. Many could perceive no such right vested in any but the peasant who occupies the soil; they held him to be the natural proprietor of the land, yet bound to contribute to the support of the state, from which he received protection.

78. In one point of view, the zemindars, as descendants of ancient independent rajas, or as the successors of their descendants, seemed to have been tributary princes. In another light they appeared to be only officers of Government. Perhaps their real character partook of both; and they might, not inaptly, have been compared to kings nominated by the Roman republic to administer conquered kingdoms. This, however, must obviously be restricted to rajas who possessed great zemindaris. Numerous landlords, subordinate to these as well as others independent of them, cannot evidently be traced to a similar origin.

79. In examining this question, it was supposed, that a property in the soil, similar to that which is vested, of right or by fiction, in the sovereign, or in some class of his subjects throughout every state of Europe, must vest in some class of the inhabitants of Hindustan, either sovereign or subject. If it were denied to the zemindar (a denomination which readily suggested the term of landholder for its equivalent), the sovereign has been thought the only member of the state to whom that property could be attributed. Besides the presumption arising from the literal interpretation of the name, the hereditary succession of zemindars pointed out these for the real proprietors; and although the succession did not follow the rules of inheritance established by law for landed property, and admitted in practice for real estates of which the revenue had been granted away by Government; and although the hereditary succession to offices of account^r was as regular and as familiar as it was to

^r See Rous on the landed property of Bengal. Canungos.

APPENDIX III

zemindars; the advocates for the rights of zemindars deemed the argument conclusive, or appealed to humanity in support of it. For, perceiving no competitor but the sovereign for the lordship of the soil, it escaped their observation that the rights of more numerous classes might be involved in the question, and that the appeal to humanity might well be retorted.

80. These and other arguments were assisted by considerations of expediency, which decided the question, and accordingly the zemindars are now acknowledged as proprietors of the soil. Yet it has been admitted, by a very high authority that anciently the sovereign was the superior of the soil; that the zemindars were officers of revenue, justice, and police; that their office was frequently, but not necessarily, hereditary; that the cultivator of the soil, attached to his possession with the right to cultivate it was subject to payments varying according to particular agreements and local customs; that in general, he continued on the spot, but that the revenue to be paid by him to the state was to be determined by the zemindars;⁸ that the raiat certainly had a title by occupancy, in right of which he might retain the land without reference to the will and approbation of a superior; but subject to contributions for the support of the state. To assess and collect those contributions, regulated as they were by local customs or particular agreements, but varying at the same time with the necessities of the state, was the business of the zemindar, as a permanent, if not as an hereditary⁹ officer. For the due execution of his charge, he was checked by permanent and hereditary offices of record and account. As this corresponds nearly with our own opinion, it is the less necessary to offer argument and proof in support of the sentiments which we entertain.¹⁰

81. In recognising a proprietary right belonging to zemindars, no more can have been intended than to disclaim all pretensions on the part of the sovereign to a property in the soil, not to abridge or annul the rights and privileges of other classes. But under the acknowledgment of it, occasion must frequently recur for the particular vindication of every privilege which seems to clash with the property so acknowledged to be vested in zemindars. The succession of occupants will gradually afford to the zemindars, as landholders, the opportunity of limiting the tenures; leasehold farmers will succeed to privileged occu-

⁸ View of plans, etc.

⁹ He ought never, then to have had an interest in the decision which was, notwithstanding, universally the case.

¹⁰ The compiler of a new Digest of Hindu law has examined the question of a property in the soil. His dissertation on this subject is curious but fanciful. See the translation of the Digest, Vol. II, page 62.

pants; and the rights of other classes will be likewise abridged. Perhaps the certainty of stipulated rent may nevertheless be a full compensation for the loss of an indefeasible right of possession.

82. The rent or revenue, regulated by the tenures which we have described, was not sufficiently certain, and does not include all the direct payments required from the raiats. The intricacy of multiplied demands seems to have been studiously preserved by the natives, because it facilitated frauds and exactions. Many collections of the nature of land-rents were ranked among the sayar or internal duties; established fees and customary presents as well as occasional contributions, were not brought on the register of the revenue, and stoppages were made for special purposes. None of these did, strictly speaking, form a part of the land-revenue; and they have been, therefore, reserved for separate consideration.

83. The sayar, of the nature of land-rent consists of ground-rent for the site of houses and gardens, revenue drawn from fruit-trees, pastures, and math, and rent of fisheries. Other articles of sayar, collected within the village, have been abolished; such for example, as market-tolls and personal taxes. The fees alluded to were the perquisites of petwaris, mendils, canungos, zemindars, and other officers; customary presents, some of which resembled fines on the renewal of leases, were also payable to the officers of the revenue. Occasional, as well as established, contributions were required for works of general utility, such as dams, dikes, reservoirs, and bridges. Stoppages were mostly made for charitable uses, sometimes for the perquisites of zemindars, canungos, and other officers, occasionally for public works.

84. Ground-rents were not usually levied from raiats engaged in husbandry. They enjoyed an exemption for their houses, and in some places, for their gardens and orchards; but this immunity lasted no longer than while they maintained their tillage; and, if they changed their place of abode, they could not remove their huts without paying the value or an established modus. In some districts, however, the cultivating raiats did pay ground-rent; and it was for the most part brought upon the record of the land-revenue. Generally speaking, ground-rent was paid by such residents as were not engaged in husbandry, for the land which they occupied in their manufactures, as well as for their houses. It was not usually regulated by the quantity of ground which

APPENDIX III

they possessed, but was proportioned to the means of different descriptions of traders and artisans. Brahmens and persons of rank commonly enjoyed an immunity. Some also were exempted on account of poverty; others¹¹ because they gave without reward a portion of their labour for the benefit of the public, or for the service of their superiors. In many places, traders and artisans paid no direct ground-rent, being sufficiently assessed with other taxes.

85. The revenue of fruit-trees is paid either in kind by a share of the produce, or in cash upon a numeration of the trees. In some instances, it is brought on the record of the land-revenue. In several districts, the husbandmen enjoy the benefit of a common pasture; in others, they hire reserved meadows; mostly, they pay for pasturage in the form of a tax imposed upon individuals, or regulated by the number of cattle maintained by each person. The revenue of math may be regulated in the same manner with pasturage, or the grass-lands may be reserved and the grass may be cut and sold for the land-holder's benefit. The revenue of piscaries is obtained by occasionally drawing the fishery on the land-holder's account, after which any person may fish as a gleaner; or fishermen are licensed for fixed sums, or for a proportion of the produce, regulated by rates or by express agreements. In general, piscaries, as well as reserved pastures and grass-lands, were let in farm.

86. Other sayers consisted of tolls on shops, on the weighing of merchandise, or on the verifying of scales and weights, on imports and exports, on purchases and sales, on transport by land or by water, and on ferries and halting-places; personal taxes also were antiently levied as a capitation¹² on Hindus, more recently, as a tax on professions. Some of these tolls and imposts, payable in the villages by raiats contributing also to the land-revenue, were commuted for a modus. Most were levied at markets; and the tolls assumed the form of duties and customs at the principal marts.

87. These sayers have been abolished. To examine the rules by which they were levied would be now superfluous, it might gratify curiosity, but could answer no useful purpose. The rules were not sufficiently certain; this circumstance, added to the multiplicity of various collections, subjected commerce to undue exactions.

88. Fees, contributions, and stoppages, require no detailed explanation. It has been

already mentioned, that fees were mostly the perquisites of the native public officers; occasional contributions were required for works of general utility; and stoppages were mostly made for charitable purposes, sometimes for official perquisites, occasionally for public uses.

89. Improvements, benefiting the lands of a single tenant, must be undertaken by himself, on his own account, for his own advantage; such, for example, as hedges, ditches, and wells. For great undertakings of less limited advantage, such as dams and ponds, the tenants interested therein unite in a common concern. But public works of greater magnitude, such as dikes, roads, canals, reservoirs, and bridges must be undertaken by the landlord for the common benefit of himself and of his tenants; or by him, or by some other person, from motives of public spirit. This has been no unusual incentive; and it was formerly deemed unpopular to require repayment; but sometimes the landlord did claim reimbursement by direct payments, and it is equitable he should do so, if the lands, improved by such works, were already let to tenants. In such cases, reimbursement could only be obtained by an immediate subscription, or by an increase of rent; and, in the prevailing tenures, the rents could only be raised by a special tax or contribution.

90. The contributions and stoppages, which were not applied to public works, were either appropriated to charitable purposes; or together with fees, supported the native provincial officers. These charitable purposes included the maintenance of helpless poor, with the support of priests and mendicants, and the endowments of temples and colleges. Besides established contributions in money, or in kind, levied on the authority of patents, or of the written consent of the inhabitants, and besides allowances paid out of stoppages made upon a similar authority, the revenue of districts was charged with pensions and customary alms; or it was partly alienated as a fund for these purposes. The public officers had also a provision in free lands, besides the allowances charged on the revenue, and besides the fees and perquisites received from the people.

91. Numerous are the distinctions of such allowances, according to the periods of payment, the form in which they were levied, or the fund whence they issued, the appropriation of the pension, or the motive from which it was granted; all these constitute a

¹¹ For example, potters who were bound to supply travellers gratis. Add to this, the unpaid labour of many classes for their zemindar's benefit and for that of other public officers.

¹² A poll tax called Jaziyeh was imposed by the Khalif Omar on all persons not of the Muselman faith. The Muhammedan conquerors of Hindustan imposed it on the Hindus, as infidels. It was remitted by the Emperor Akber. Nevertheless, personal taxes were levied under the same appellation, at so modern a period as the late abolition of sayers in Bengal; but the instances were rare, and it was only another name for the professional tax paid by the Hindu artisans.

APPENDIX III

useless nomenclature undeserving the attention of such as are not compelled by official duty to learn those terms.

92. Free lands are likewise distinguished, according to their appropriations, for Brahmens, bards, encomiasts, ascetics, priests, and mendicants, or for a provision to the several public officers¹²; or they were described by terms of a general import, used in a restricted acceptation. These, also, it would be superfluous to specify; one, however, merits attention, as it throws some light on a general subject.

93. The *sershicen* was held upon a patent granted by an officer of the state; but that patent was grounded on the written consent of the inhabitants of the district, who agreed to make good among themselves the revenue of the lands so alienated. To understand this, it is necessary to advert to the record¹³ of the assessment as distributed on the villages, which was formed at an early period under the Moghul Government, and by which the collection of the revenue was regulated. When lands were granted by the sovereign, the revenue was alienated according to this record; and it was transferred, together with the lands, from the revenue-office to the grand almoner's or the vizir's register, according as it was appropriated for charitable and religious uses, or for civil and military purposes. There it became a permanent fund¹⁴ applicable to these purposes, at the disposal of the sovereign, through the channel of those offices, whenever the land lapsed or escheated. The subordinate officers of government, consequently, had not the power of alienating the revenue of lands; but, to make grants, they had recourse to the expedient of obtaining the consent of the inhabitants of the district to assess on their lands the recorded revenue of the ground intended to be granted away; and, as the record carried the distribution no farther than to the village, they assumed the power of granting any smaller portion of waste land, without the acquiescence of the people or the sanction of government; such grants would be the most frequent form of alienation, as the general consent to *sershicen* might not easily be obtained. Accordingly, the greatest part of the present free lands

of Bengal proper were originally granted in small portions of waste ground. The recorded revenue of few entire villages has been alienated. In the confusion which intervened between the decline of the Moghul and the rise of the British influence in Bengal, some entire villages were indeed granted by the subadars and their subordinate officers, and they also disposed of lands belonging to the alienated fund. But, as the Moghul reserved the revenue of Bengal proper for the royal exchequer, and never assigned in this province any lands for the civil and military fund,¹⁵ and little for charitable uses few very large tracts are now exempt from revenue, and most of the untaxed estates are too inconsiderable to employ many tenants.

94. The more extensive tracts of free lands are managed in the same mode as estates assessed for revenue. The system of management, which antiently prevailed in such estates, requires explanation. Every village was superintended by an officer or public servant, whose business it was to assign land to new settlers and to receive the rents of the occupants, by whatever rule they were adjusted; and in this he was checked by another office who was bound to keep a register of every payment and a record of transaction as well as to prepare accounts of the revenue due from each occupant, according to agreement or usage, and generally, to conduct all the business in which writing is requisite, while the officer first mentioned performed the duties of a land-bailiff. But the signature of both was necessary to the authenticity of every document, whether it was a lease, a receipt, or acquittance, or any other adjustment of account. They were not however amenable to the same superior; the one was subordinate to the general office of record for the whole district, the other was accountable to the person entitled to receive the revenue. The *canungo*, who held the office of record now alluded to, kept a register of every revenue-transaction and of every regulation of government, together with a record of usages of the district. He was a check on the officers of revenue; and the control may have been effectual, so long as he had the nomination of the accountants employed in each

¹² It deserves notice, that the provision in money and in kind, for zemindars and *canungos*, bore the same denomination (*Nancar*). If the zemindars had been proprietors of the soil paying a fixed land-tax, why had they a provision? or, if they were not officers, like *canungos*, why did their provision bear the same denomination?

¹³ First formed by the celebrated Raja Toder Mull. He did not live to complete it for the whole of Bengal proper. In this province the *Tucsim* of the *Tumar* was finally formed at a modern period. The *Tucsim* of the *Juma* in dams was completed in Akber's reign.

¹⁴ The pecuniary allowances also formed a fund out of which the sovereign made grants; but the subordinate officers had more influence in the disposal of these allowances than in the distribution of alienated lands: the general fund of the province was increased by any new grant made by a competent authority; or many separate funds were established by the assignment of allowances on the land and sayer revenues of districts and villages, or by grants authorising private imposts.

¹⁵ Excepting only the provision in land for officers, who were employed in the immediate administration and protection of the province itself.

APPENDIX III

village. But, though the canungo in some provinces long continued to be consulted in the nomination of the accountants, these became officers of the collections, and the canungo's control, in fact, ceased from the time when the system of farming the revenue was generally introduced.

95. Of this practice no trace appears in the Ayeen Akbery. There the officers of government are instructed to collect the revenue from the husbandman and remit their collections to the treasury. At what period the persons charged with collections became responsible for the amount to be levied by them does not appear with certainty; but so early as the reign of Aurengzib, we find the diwans required to send amins and croris to each pergunah at the proper season, and the business of the amin is described¹⁷ to be, "that, going from village to village, he do ascertain the circumstances and the cultivation of the pergunahs; and, with proper consideration for the benefit of government and ease of the raiats, adjust the revenue in due season and annually send to the superior office the usual records of the revenue, with the agreements of zemindars and with engagements for the collections under the crori's seal, taking care that these agreements do contain specified instalments; and he is thoroughly to examine, in the presence of the raiats, the crori's accounts, and give them credit accordingly".

96. Here the zemindar as regular collector or the crori, in a temporary trust, is required to engage for specific instalments, although the revenue they are to receive is adjusted by another officer, and although they are to account for the whole of their collections. This would scarcely be intelligible, had we not seen, in modern practice, the person who was intrusted with the collections made answerable for the expected revenue without being allowed to benefit by any surplus beyond his fixed salary and authorised emolument. The practice seems to have been adopted to enforce diligent attention and to prevent defalcations on frivolous pretences. It must be understood, that the officer of collections would be exonerated if he could make it appear that the deficiency was unavoidable; but such is the difficulty of obtaining justice, when it assumes the form of indulgence, that he would rather desire, as a compensation for the risk of loss, to obtain a sanction for a contingent profit; and this would be the more readily allowed, as the excess must have been usually embezzled, because the superior, having assumed a standard of expectation, would not strictly

scrutinise the accounts of an officer who had fulfilled that expectation: and thus, probably, the person who was intrusted with the collections, gradually became a farmer of the revenue. The transition was easy from the selection of an officer who was to become answerable for the revenue, or from the responsibility required from the hereditary collectors, to the acceptance of tenders from a farmer to whom official authority was committed, in consideration of the revenue which he engaged to pay.

97. This system, which cannot be too much reprobated, did not become universal, nor were its ill consequences fully felt, until it was used, among other expedients, by Kasim Ali Khan to obtain a sudden and large increase of revenue. Unable to realise the revenue for which they engaged, if they adhered to the rules by which the payments of occupants had been hitherto regulated, the farmers disregarded usage and engagements, and imposed taxes¹⁸ at pleasure, which they enforced by violence and coercion. Occupants had recourse to the desperate remedy of emigration. Their harvest and private property were confiscated; and the practice of assessing, on the remaining cultivators, the deficiency arising from desertion became general.

98. Husbandmen, thus discouraged by oppression, abandoned or neglected their cultivation. To induce them to resume it, farmers allowed every indulgence which they asked: advanced money to those who needed pecuniary aid, and granted every stipulation which was required; but, so soon as the corn was ripe, they forgot every promise, and easily found pretences for annulling agreements made with simple unsuspecting peasants, or shamelessly infringed their engagements without any pretence but their own wants.

99. Hence arose that habitual breach of faith, the remains of which are yet perceivable. The general disregard of usage and agreements rendered the offices of account and control useless and nugatory. Their authority has never been resorted to.

100. When government turned its attention to check these abuses, and, without discontinuing a farming system or relinquishing a high revenue, endeavoured to regulate the conduct of the farmers and to enforce a strict adherence to all existing engagements with occupants and cultivators, the farmers, thus controlled in their avowed oppressions, had recourse to indirect methods. Favoured a few leading cultivators, they obtained, through their influence, general agreements

¹⁷ Patents for offices contain general instructions relative to the duties of the officer. This extract from an amin's patent is taken from a book of forms compiled in the reign of Aurengzib.

¹⁸ A strong instance occurred in one district, where in the fifth month of the year, a general cess of thirty per centum was imposed by Kasim Ali's amin. The revenue fell in succeeding years far below the former standard, and has never been fully retrieved.

APPENDIX III

to authorise exactions and imposts. Peasants became farmers of revenue, with the view of granting, on their own authority, reductions in the rent of the lands occupied by themselves; and continued to farm the revenue that they might perpetuate their undue advantages. The peasants at large were discouraged by an unequal assessment: and the favoured few did not use to the best advantage the lands which they held, but formed that class of intermediate tenantry, which has been already mentioned in another place.

101. It would be endless to describe all the abuses which had grown up; they were so numerous, that the permanence of the present tenure is insufficient to excite the landlord to the arduous undertaking of rectifying abuses, and of regulating the rents; discouraged, as he is, by the difficulty of discriminating the just rights of the tenantry from their collusive advantages, and controlled by the litigiousness of tenants, who contest every point and avail themselves of every artifice which the forms of judicial proceedings can permit them to practise.

102. The farming-system, though adopted by the proprietors of free lands, was not pursued to such excess; of course it was not followed by the long train of ill consequences which we have now indicated. Having a permanent interest in the land, and being under no necessity of levying a specific sum, whether the tenants could afford it or not, the proprietors of free lands had not the same inducements to rack-rent their estates which those had who were bound for definite payments, either as zemindars or as temporary farmers.

103. The renters of free lands, engaging for a moderate revenue proportioned to the dues which are regularly demandable from tenants, were not led to the same violent or to the same indirect methods of oppression; nor did similar abuses arise from the successful resistance of cunning against power. The rents of the tenants continued less intricate and less unequal. The average assessment might, perhaps, differ little; but it was not so unequally distributed, and consequently the peasantry at large was not so much depressed.

104. This is confirmed by a comparison with tracts of land, for which renters had obtained perpetual leases, whether they were themselves zemindars of the district or farmers only of the land which they held. Though not originally assessed lower than other estates, yet, having become a permanent possession, before the long continuance of the farming-system had introduced all the abuses which have been described, they

retained the advantage of an equal and uniform assessment.

105. Among the lands assessed with revenue, the condition of large zemindaris was more deplorable than that of smaller estates. The zemindari of one individual¹⁹ formerly comprehended thirteen thousand square miles. Several other, too, were very extensive. Many were too great to be wholly superintended by the owners themselves. At the same time the magnitude of the sum, which a proprietor was bound to pay, deterred him from delegating the superintendence to irresponsible servants. He was willing to divide his risk by under-letting his estate to farmers; and he preferred this management, which was sanctioned by modern practice, to the bolder attempt of regulation and reform, which, from the long prevalence of abuses, would assume the appearance of innovation and hasardous experiment. The same considerations must have had some influence with the proprietors of smaller tracts of land; but, having their whole property within the reach of their own superintendence, being minutely acquainted with the circumstances of every part of the estate, if they did not altogether disuse the practice of under-farming, they at least exercised judgment in the conduct of it, and mostly gave some attention to the remedying of abuses.

106. If considerations of general welfare ought to supersede our feelings for the loss sustained by individuals, the dismemberment of large properties might be deemed a fortunate circumstance. Measures, tending to encourage the subdivision of landed estates among heirs, according to the common laws of inheritance, are for the same reason well judged and consistent with good policy; but this must be taken with some limitation.

107. An inferior and subordinate class of proprietors hold petty estates. In the western provinces, where the office of the first receiver of rents²⁰ has in some instances become hereditary; the class of inferior proprietors may have had its origin in the admission of heirs to succeed to the subordinate offices of collection under the zemindar. But this cannot be the origin of the petty properties which are common in the eastern districts of Bengal. These tenures seem rather to have been an extension of the rights of occupants, from vague permanence, to a declared, hereditary, and even transferable, interest. They all bear a fixed quit-rent for portions of land which are to be inherited in regular succession and some were understood to authorise the transfer by sale or donation, and consequently conferred every right which constitutes a real property: other, not compatible with aliena-

¹⁹ The zemindar of Rajshahi.

²⁰ The mukkedem of mundil.

APPENDIX III

tion by sale or gift, formed an imperfect and dependant property, which, nevertheless, was inheritable in regular succession. But both, by abuse, become liable to a variable assessment, in common with the lands of other occupants. The untransferable but hereditary properties still, however, remained a little superior to the common right of occupancy, because this ceased with possession, whereas the hereditary title authorised the taallukdar or his heir to resume possession though his actual occupancy might have been interrupted.

108. These dependant taalluks (for so they are generally called) were rated to the assessment of the village as it stands on the record already mentioned; at first the object was a specification of the revenue to be paid; afterwards it only became a designation of the property: in the intermediate period it served to regulate their actual assessment by adding the new taxes to the recorded rent, in the same proportion at which their superior zemindars were rated. The alienable properties above mentioned comprehend nearly the whole of the estates, which have been separated under the name of taalluks²¹ from the jurisdiction of superior landholders; while the other tenures, which we have mentioned as likewise prevailing in the eastern districts, continue subordinate to the zemindars; but in both the assessment has long ceased to be regulated by any certain rule. Many dependant taallukdars have, nevertheless, preserved the benefit of a quit-rent fixed in perpetuity.

109. Estates, which were originally small being subdivided according to the rules of inheritance fixed by the Hindu or by the Muhammedan law²², soon split into minute portions so inconsiderable, that the public accounts exhibit independent taallukdars assessed with an annual revenue of a few pence; yet the heirs, attached to their possessions, often limit their industry to their paltry estates; or even content themselves indolently with attempting to maintain, on the income of a subdivided patrimony, the unprofitable idleness of an opulent predecessor. Industry must be unsuccessful where it is limited to force the maintenance of a family from an inadequate portion of land. Petty possessions are almost an irresistible inducement to this unprofitable diligence; but sufficient security in leasehold

tenures, and the experienced advantage of larger farms, ought to induce petty proprietors to extend their industry beyond the limits of their own estates. As for idle indigence, it ultimately finds its own remedy, though at the expense of population. Meantime the more numerous any class of unprofitable citizens becomes, the greater is the present evil. The justice and policy of limiting the subdivision of landed property may be questioned; but certainly it should not be encouraged to a minute degree of subdivision.

110. It may even be doubted whether subdivision of property in arable land be not an evil, though it were not carried farther than may leave estates of sufficient magnitude to afford to the proprietors a humble subsistence. The Indian landholder is too much disposed to rest satisfied in the indolent enjoyment of the produce of his land; neither applying himself to husbandry on his own estate, nor to any other occupation whence he might derive some aid to his small income. Straited in his circumstances, he exacts the utmost rent from his tenant. Greater proprietors, unless impelled by the difficulties of an excessive contribution to the revenue, might pursue their own interest in allowing favourable terms to their tenants. A class of wealthy citizens contributes to the prosperity of the state by their encouragement of elegant arts and improvement of the mechanic powers; though the surest token of a thriving nation is certainly found in the consumption of superfluities by the people at large, when affluence permits the general use of more than the mere necessaries of life. But the consumption and use of mere food and apparel, by a set of idle and indigent landholders, contributes nothing to general prosperity, it shows only an unprofitable population. This class of needy proprietors is numerous in Bengal. But even the greatest landholders are not in a situation to allow that indulgence and accommodation to their tenants which might be expected on viewing their income. Responsible to government for a tax originally calculated at ten-elevenths of the expected rents of their estates, they have no probable surplus above their expenditure to compensate for their risk. In any, the greatest, calamity, a moderate tax must leave to the proprietor some income. On the contrary, a

²¹ Some taalluks seem to have been the zemindari tenure subdivided; others, not entitled to be deemed independent, were no better than permanent leases of land held in farm.

²² Estates of Mussulmans are more rapidly subdivided than those of Hindus. The law of family partnership generally preserves the unity of the estates held by Hindus. This, however, is not the most material difference. The Hindu law divides property in equal shares among heirs of the same degree, but without commonly admitting the participation of females. In general, these only inherit in default of male heirs. The Arabian law assigns to several relations their specific portions as allotted by the Koran and divides the remainder of the inheritance among the residuary heirs; giving equal shares to all males of the same degree, and half the portion of males to females in the same degree of consanguinity.

APPENDIX III

common evil must bear down him who is assessed with ten-elevenths, or even with three-quarters, of his receipts. Any calamity, any accident, even a delay in his recoveries, may involve a zemindar in difficulties from which no economy nor attention can retrieve him. He is not, therefore, likely to be an indulgent and forbearing landlord.

111. From this view of the condition of landholders, we are led to the consideration of the circumstances of tenants; and to inquire whether the gross produce of the lands sufficiently rewards the labour employed for its production, and in what degree of ease it supports the classes who subsist by

their industry. The opulence of the commonalty constitutes the wealth of the nation, and the country may be deemed flourishing in proportion as the peasants are in an easy condition. Their general mode of life, compared with what may be deemed reasonable wants, will show whether the people at large are well or ill supported; considering, at the same time, the reward of labour to determine whether voluntary abstemiousness or real poverty debar them from a fuller gratification of their wants. But, since the earnings of country-labour cannot be treated of separately from the detail of husbandry, we shall resume that subject.

APPENDIX III
CHAPTER V

Profits of Husbandry in Bengal

112. We have described the peasants as applying the labour which they give to husbandry, solely to ground used on their own account, and we have mentioned a class of tenantry monopolising land to re-let it to the actual cultivator at an advanced rent, or for half the produce; but, it must be understood, that, though this, too, generally describes the whole tenantry, peasants are not wanting who superintend the culture performed by their servants or by hired labourers: such are Brahmins and others who are restrained by prejudice from personal labour; or men of other tribes, whose circumstances admit of their contenting themselves with superintending the management of the land; or less opulent persons, who nevertheless, call in the assistance of hired labour to aid their own. Reference being had to the quantity of land tenanted, perhaps the greatest part would be found to be held by tenants who do employ labourers. But, since the servants often till ground on their own account also, the peasants were truly in respect of number, described as labouring unassisted on the lands which they use.

113. A cultivator, who employs servants, entertains one for every plough, and pays him monthly wages, which on an average, do not exceed one rupiya per mensem; in a cheap district, we have found the monthly hire as low as eight annas. But the task, on a medium of a bigha a day, is completed by noon. The cattle are then left to the herdsman's care, and the ploughman follows other occupations during the remainder of the day; mostly he cultivates some land on his own account, and this he generally rents from his employer for a payment in kind. The quantity of land, commonly used by the ploughman, is ascertained by the usage of some districts, which authorise a specific quantity of land to be underlet by tenants; namely, for each plough two bighas, equal to three of the standard to which we reduce the variable measures of land.¹

114. If the herd be sufficient to employ one person, a servant is entertained; and receives, in money, food, and clothing, to the value of one rupiya and a half per mensem. The same herdsman, however, generally attends the cattle of several peasants, receiving, for every head, a monthly allowance

equal to about half an anna. One herdsman can tend fifty oxen or cows.

115. Where several ploughs are kept, the peasant usually has a pair of oxen particularly assigned to the implement which supplies the purpose of a harrow; for this is thought to require stronger cattle than are sufficient for labour. A plough complete costs less than a rupiya. The price of a grooved beam used as a harrow to break and level the ground, is yet more considerable. The cattle employed in husbandry are of the smallest kind: they cost, on an average, not more than five rupiyas each.²

116. The price of this labour may be computed from the usual hire of a plough, with its yoke of oxen, which we state, on the medium result of our inquiries, at two annas per diem.

117. The same cattle are also employed to drag an implement which bears some resemblance to the harrow, but which is used for rice and some other objects to thin a luxuriant vegetation, and to disperse the plants equally in the field: it serves, at the same time, to remove the weeds.

118. For a hand-weeding the labourers are very generally paid in grain instead of money. Their usual daily allowance is from two to three sers, or twice as many pounds of grain. They bring own hoes, which are small spuds, and of which the cost is very trifling. Twenty labourers may weed a bigah in a day. For transplanting, the daily allowance and the labour performed are nearly the same as for weeding. No tool is required for transplanting rice, the whole operation being performed by the hand; but, for other cultures where a tool is requisite, an implement resembling a hoe on a long handle, or one like a chisel, also on a long handle is employed. For hand-hoeing, the large hoe, which in Bengal serves the purpose of a spade, is employed. It is wide and curved, and set on the handle at an acute angle: this compels the labourer to stoop much in working. The same tool serves for clearing of old lays preparatory to opening them with the plough, and for other purposes for which a spade would be useful. The pay for digging, and generally for all country labour, is regulated by the same allowance of two to three sers per diem, as above-mentioned. But reaping is

¹ At half produce, and cultivated solely by the personal labour of the ploughman, three bighas cannot pay the labour with more than seven rupiyas per annum; they must be added to the monthly rupiya paid by his employer.

² The average price of cattle for husbandry throughout Bengal might perhaps be taken still lower than five rupiyas, for they are bought in the vicinity of Calcutta at five and six rupiyas a head.

APPENDIX III

generally performed by contract, the reapers being hired at a sheave in sixteen, or, if they also carry in the harvest, at a sheave in eight; and the whole expense of gathering the harvest may be paid with one measure of grain in six, which provides for the labour of reaping, carrying, winnowing, measuring, and storing, the crop. The thrashing is not included; for corn is not usually thrashed, but is trodden out by the cattle of the farm.

119. Though rice and pulse may find a market in the husk, and the task of cleaning rice and splitting pulse generally fall on the first purchaser; yet, not unfrequently employing the peasant's leisure, it may be counted among the labours of the cottage. It is executed with a wooden pestle and mortar; or the rice is cleaned under a beater of very simple contrivance, worked by a pedal. When the husk has been removed by long beating upon the dry rice, such grain is preferred for home-consumption. If previously scalded, it is better adapted for preservation, and has been therefore more approved in foreign com-

merce. As the expense of fuel is nearly equal to the economy of labour, the allowance for husking rice is almost uniform at a contract to return, in clean rice, five-eighths of the weight delivered in the husk. The surplus, with the chaff or bran, pays the toil.

120. We shall not have formed a just notion of the reward of country labour, without comparing the price of it to what is gained by a cultivator, who delivers half the produce in lieu of rent: in this comparison it will be unnecessary to notice the small deductions usually made before partition. Some are favourable to the cultivator, because they defray a part of his expenses; others unfavourable, because they are taxes for the measurement of the produce, or for religious appropriations. The advantage and disadvantage are perhaps nearly balanced, and we consider him as obtaining no more than an exact half of the produce to reward his labour and defray his expenses.

121. Ten mans of rice are a large produce from one bigha, and a return of fifteen for one:

Cultivator's share	Mans	5	0	0
Seed which the proprietor of the land had advanced, and which is repaid to him with 100 per centum by way of interest.	0	26	10½	
The labour of reaping, &c., at the rate of a sixth of the whole crop	1	26	10½	
Ditto weeding twenty days at 2½ sers	1	10	0	
		<hr/>	<hr/>	
		3	23	5
		1	16	11
Ditto husking with the wastage at three-eighths		0	21	4
		<hr/>	<hr/>	
		0	35	7

thirty-five sers and seven-sixteenths of clean rice, at the average rate of twelve anas for the man, are worth eleven anas nearly; and this does not pay the labour of ploughing, at two anas per diem for eight days. It appears, then, that the peasant, cultivating for half-produce, is not so well rewarded for his toil as hired labourers; and it must be farther noticed, that he is under the necessity of anticipating his crop for seed and subsistence; and of borrowing for both, as well as for his cattle and for the implements of husbandry, at the usurious advance of a quarter, if the loan be repaid at the succeeding harvest, and of half, if repaid later: we cannot then wonder at the scenes of distress which this class of cultivators exhibits, nor that they are often compelled, by accumulating debts, to emigrate from province to province.

122. It is obvious, that, where the produce is greater in proportion to the seed and to the quantity of land, the sum of labour remaining the same, this partition of crop may leave to the peasant a sufficient payment for his toil; on the other hand, where it is less,

it may be absolutely unequal to afford the simplest necessaries. This is so true, that, in most lands, cultivation for this proportion of the crop is utterly impracticable. We therefore took a higher produce and estimated less labour than the general average would have suggested to us. But this must be now noticed, together with the requisite return of profit on the outlay, to compare the average-produce with rents paid in money.

123. In the husbandry of corn and small grains; it has been already stated, that a considerable proportion of the land yields several crops within the year: much indeed yields only one; but, on the other hand, the practice of crowding crops seems ill judged, and it returns less in proportion to the labour and expense than successive cultivation. We may therefore assume, as the middle course of husbandry, two yearly harvests from each field; one of white corn, and another of pulse, oil-seed, or millet. Not that, on a medium, land does actually produce two annual crops, but the greater expense of cultivating two separate portions,

APPENDIX III

for their respective harvests, at two different seasons, is nearly compensated by the profit of obtaining, in some instances, more than two crops from the same field, where circumstances permit; at the same time, the quantity of ground, which is actually used, is more than would be required if all land uniformly yielded two harvests.

124. A plough, with the usual yoke of two or three pair of oxen assigned to it, is equal in common management to the full cultivation of fifteen bighas of land: and the expense, estimated at twenty-two rupiyas eight anas, averages one rupiya and a half for the bigha.

	Rs.	A.	P.
Ploughman, at one rupiya per mensem	12	0	0
Allowance to the herdsman (say for five oxen, at half an ana each), two anas and a half per mensem, or, per annum	1	14	0
Pasture, two anas a head; annually	0	10	0
Interest on thirty rupiyas, the cost of the cattle, and on two rupiyas, the cost of the plough and other implements, at two per centum per mensem, including the wear and tear of the plough, and the replacing of cattle	8	0	0
TOTAL	22	8	0

125. On the medium assumed of the two crops per annum, the produce may be taken at seven mans of rice in the husk, and three and a half mans of pulse or other grain gathered at the second harvest.^a

	Rs.	A.	P.
Seven mans, equal to four mans and fifteen sers of clean rice, at 12 anas	3	4	6
Three and half mans, at 10 anas	2	3	0
TOTAL	5	7	6

^a In the first volume of Gladwin's Translation of the Ayeen Akbery, page 356, is a table of the mean produce of such land as is regularly cultivated. It is calculated on the medium of three years. To compare this with our estimate may be curious.

The bigha noticed by the Ayeen Akbery contains 3,000 square Ilahi Guz, and the man consists of forty sers, each ser weighing thirty dams. The bigha, for which our estimate is formed, contains 1,600 square yards, and the man consists of forty sers, containing eighty sica weight: 3,600 Ilahi Guz are equal to 3,025 square yards; and thirty dams to forty-three sica weight.

	Produce of a bigha of 3,600 Ilahi Guz, in mans and sers of 30 dams	The same produce reduced to the bigha of 1,600 square yards, in mans of 80 Sa. Wt. to the ser;
Clean rice, average of three sorts	16 33 0	4 35 0
Wheat and barley	12 38 8	3 30 0
Pease, chiches, vetches, and other pulse, average of eight kinds	7 8 0	2 0 0
Millet, average of two kinds	9 27 0	2 35 0
Seeds, yielding oil, average of three kinds	6 16 0	1 35 0

	Rs.	A.	P.
Seed repaid, a twelfth; and expense of reaping, &c., a sixth	1	6	0
Labour of sowing, weeding, &c., equal to two weedings, or forty day-labourers, at two and a half sers 2 ms. 20 srs. at 8 annas	1	4	0
Labour of cattle for the plough, &c.	1	8	0
Rent, a fourth of the gross produce, including all payments to the landholder or his officers	1	6	0
TOTAL	5	8	0

126. The peasant, consequently, does not derive from corn-cultivation the very humble maintenance which we suppose, unless his family share in the labour for which we calculate him to pay, or apply their leisure to other occupations, or, unless we take into account the profit drawn by him from the land which he underlets to his ploughmen at half-produce. In fact, it is not upon the cultivation of grain that the peasant depends for his profit or even for his comfortable maintenance. In grazing-districts it is the dairy, in others it is the culture of some more valuable produce, which aids the husbandry of corn. In districts, where cattle abound, the occupying of arable-land is necessary to entitle the peasant to pasture in the forest and on the downs a proportionate herd of cattle; in other provinces, corn, though not equally profitable with dearer articles, serves to alleviate the risk attending the cultivation of them: for, they seem precarious in exact proportion to the greatness of the profit which they are expected to afford. On the failure of his mulberry or his sugar-cane, the peasant, had he no corn, must suffer the extremities of want; but, raising in that and other grain a sufficiency for mere subsistence, he can wait the supply of his other wants from the success of other culture; or, he can reserve a hoard from the crop of a successful year to meet the difficulties of one that is calamitous.

APPENDIX III

127. The price of corn, which, in Bengal, fluctuates much more than in Europe,⁴ has a considerable influence on the value of most other articles, though it cannot regulate the price of all.⁵ When the demand for any one of them is limited to few persons as it is under a commercial monopoly, the purchaser is enabled to fix his own price. That of raw opium, for example, is regulated by Government; and the purchase of silk also is almost entirely in the hands of the Company's agents. This circumstance gives uniformity to the price of the raw material. The value of all such articles must then be nearly uniform; at least their price cannot be affected, but distantly by the abundance of the rice harvest:

128. A peasant, who should place his principal dependence on the culture of such productions, must experience absolute want if he sell a scanty crop at no higher rate than abundant harvests at the same time that corn bears a very advanced price; but so long as he sows a sufficient proportion of land with corn, he cannot be destitute of food, whether the price of grain be high or low. From this and other culture he can seldom fail of being also enabled to discharge his rent, though he may be much straitened for the supply of his various wants, over and above a bare subsistence.

129. But the profits of cattle are less precarious; they consist in the increase of stock from kine and in the milk of buffaloes. Cows are usually fed near home, on reserved pastures, or on the waste lands of the village: buffaloes needing more nutriment, and thriving on rank vegetation do not find sufficient pasturage in populous districts. The herds of this sort of cattle are most numerous in the northern and western provinces, where, in the rainy season, they find pasturage on down which are never submerged; and, in the dry season, on forest-lands, which are mostly inundated during the rains. But many herds of buffaloes travel in the dry season into the vast forests which border on Bengal.

130. Cattle are grazed at a very small expense. It does not exceed eight anas a head annually for buffaloes and four anas for cows. A herdsman, hired to attend fifty cows or thirty buffaloes, at wages in grain, money, and clothes, amounting to one

rupiya and a half per mensem (or less, if the average be taken in grazing-districts only), does, in fact, receive an ana for each cow, and less than one ana for each buffalo; but this average, which has been computed for all Bengal, is higher than the usual rates in grazing-districts; the whole annual expense, incident to stock, cannot there exceed seven anas for each buffalo and three anas for each cow.

131. The profits of the dairy arise from the sale of milk, of curds in various forms, and of clarified butter. As the last is the only produce which admits of being transported to a distant market, we calculate the profit as if the whole milk underwent this preparation. The buffalo cow daily supplies the dairy with two to three sers of milk. Upon an estimate of milch-kine, in the proportion of two-thirds of the whole herd throughout the year, the annual produce is nearly fifteen mans of milk for each cow. The dairyman will contract, without wages, to deliver two sers and a half of clarified butter for a man of milk. At this rate, the owner of the herd should receive thirty-seven sers and a half of clarified butter for fifteen mans of milk, and may dispose of it for seven rupiyas and a half; out of this, a deduction must be made for the transport from the dairy to the market; since, the cattle being usually grazed in wild countries, the temporary hut, which serves for a dairy, is remote from the market. This, however, with the expenses estimated at seven anas a head, will hardly reduce the annual profit much below seven rupiyas for each buffalo-cow, or thirty-five per centum on the capital, if we justly value each buffalo at twenty rupiyas, and suppose that the increase of stock fully compensates for the loss by mortality and accident. We make no account of the few male calves reared for sacrifices nor of those reared for labour; because buffaloes are rarely employed for burden or in the labours of husbandry within the limits of Bengal proper. The profits of kine, by the increase of stock, bear nearly the same proportion to the capital which is employed in the purchase of the herd. They certainly amount to thirty per centum.

⁴ Without famine or scarcity we have known corn four times dearer at the first hand in one year than in the preceding. In a cheap district, rice in the husk sold, one season, as low as eight mans for the rupiya. In the following year it was eagerly purchased at the rate of a rupiya for two mans.

⁵ When the crops of corn are very abundant, it is not only cheap, but wants a ready market. As the payments of rents are regulated by the season of harvest, the revenue is due, and must be paid, whether there be or be not a vent for the produce. To meet the demand of rent, and to provide for other disbursements which the tenant has immediate occasion to make, he must dispose of other more saleable produce, and even anticipate the harvest of it. Thus the eagerness of the vendors reduces the price of other articles in consequence of corn wanting a ready sale. For some such reason the price of corn seems to have a greater influence on the general market in Bengal than in other countries.

APPENDIX III

132. Cattle constitute the peasant's wealth; and the profits of stock would be greater, did the consumption of animal food take off barren cows and oxen which have passed their prime. This indeed, cannot happen where the Hindus constitute the great mass of the general population, since they consider the slaughter of kine and the eating of cow's flesh as sinful. But many tribes of Hindus, and even some Brahmens, have no objection to the use of other animal food. At their entertainments it is generally introduced; by some it is daily eaten, and the institutes of their religion do require that flesh should be tasted even by Brahmens at solemn sacrifices, forbidding, however, the use of it unless joined with the performance of such a sacrifice. Daily practice however, is not governed by rules of limited cogency; and meat (mutton and goat's flesh), being more than double the price of vegetable food, it cannot be afforded as a common diet upon the usual earnings of labour. Whether this circumstance has much influence, or whether entire abstinence from animal food be not rather ascribable to the prevalence of superstitious prejudices, may be questioned. Probably both have influence, though the latter has the greatest. From whatever cause it arise, the consumption of animal-food is not so considerable as to render the stock of sheep an object of general attention. Their wool supplies the home-consumption of blankets, but is too coarse, and produces too small a price to afford a large profit on this stock.

133. The orchard is what chiefly contributes to attach the peasant to his native soil. He feels a superstitious predilection for the trees planted by his ancestor, and derives comfort and even profit from their fruit. Orchards of mango trees diversify the plains in every part of Bengal. The delicious fruit, exuberantly borne by them, is a wholesome variety in the diet of the Indian, and affords him gratification and even nourishment. The palmyra abounds in Bihar; the juice extracted, by wounding its summit, becomes, when fermented, an intoxicating beverage, which is eagerly sought by numerous natives, who violate the precepts of both the Hindu and Mahamedan religions by the use of inebriating liquors. The cocnut thrives in those parts of Bengal which are not remote from the tropic; this nut contains a milky juice grateful to the palate, and is so much sought by the Indian, that it even becomes an object of exportation to distant provinces. The date-tree grows everywhere, but especially in Bihar; the wounded trunk of the tree yields a juice which is similar to that of the palmyra, and from which sugar is not unfrequently ex-

tracted. Plantations of areca are common in the central parts of Bengal, its nut, which is universally consumed throughout India, affords considerable profit to the planters. The bassia thrives even on the poorest soils, and abounds in the hilly districts; its inflated corols are esculent and nutritious, and yield by distillation an intoxicating spirit; and the oil which is expressed from its seed, is in mountainous countries a common substitute for butter.

134. Besides these, which are most common in the several provinces of Bengal, other trees are planted, but more sparingly, and that for the owner's use only without any view of profit. The various sorts of useful trees, which either grow wild or thrive with little care, are too many to be enumerated in this place. But we must not quit the subject of plantations without remarking that clumps of bambus, which when once planted, continue to flourish so long as they are not too abruptly thinned, supply the peasant with materials for his buildings, and may also yield him profit.

135. After this hasty sketch of the husbandman's pursuits, it may be proper to notice more fully such productions of the soil as are the chief objects of the merchant's attention in Bengal.

136. The valuable articles of sugar, tobacco, silk, cotton, indigo, and opium, being the principal dependence of the peasant for the supply of conveniences and for accession of wealth, are well deserving of particular consideration. Deriving a farther importance as they are the objects of external commerce, each would separately merit the amplest detail, both in regard to the present management of them and to the traffic which is carried on. But precluded from undertaking the disquisition in the whole extent which the subject embraces, we may be contented with hazarding on each topic such observations as seem most material.

137. Opium, it is well known, has been monopolised by Government. It is provided in the provinces of Bihar and Benares, and sold in Calcutta by public sale. For many reasons this monopoly seems less exceptionable than any other. It is doubtless a rational object of policy to discourage the internal consumption of a drug, which is so highly pernicious when employed for intoxication. It must not, however, be concealed, that, by the effect of the monopoly, Bihar has lost the market of the western countries, which formerly were thence supplied, but which now raise as much as is consumed, within their limits, and even furnish some opium to the British provinces. Nevertheless, if the first grower receive, from the monopolist, as equitable payment as the competition of free trade could afford him,

APPENDIX III

the monopoly cannot be deemed a public injury; it only takes for the benefit of the state, what otherwise would afford gain to a few intermediate traders.

138. When the drug was provided by contract, the price paid to the first grower was regulated by the contract made with Government. The contractor gave advances to such peasants as were desirous of undertaking the culture, and received the raw juice of poppy at the rates fixed by his contract. On a medium of these rates advertising to the quantity which may be estimated on each the raw opium appears to have been bought at the price of one rupiya for ten sixteenths of a ser, or for one pound and a quarter nearly. A learned and very ingenious inquirer* estimated the produce of one acre at sixty pounds of opium; but we think he must have been misled by the result of trials on very fertile land in a fortunate season. Such information as we have been able to obtain, has led us to estimate little more than four sers or eight pounds of opium from a bigha reduced to the standard of four cubits of the pole, or forty yards to the rope and the cultivator also reaps about seven sers of seed, which may bring eight anas, if sold for food, or for the oil that may be expressed from it.

139. This produce, from a plant which requires a good soil well manured, is by no means equal to the production of similar soils whereon other valuable plants are raised. At the same time it requires more labour and attention: and, in fact, that it is less profitable is apparent from the circumstance of the peasants not ambitioning this culture, except in a few situations which are peculiarly favourable to it. In other places they either engage with reluctance, or from motives very different from that of the expectation of profit.⁷

140. Many cultivators obtain from the same land a crop of pot-herbs, or some other early produce, before the season of sowing the poppy. It is reckoned a bad practice: whether it be so or not, the labour of the culture is not diminished by having taken an early crop. The land must in either method be thoroughly broken and pulverised, for which purpose it must be ploughed twelve or fifteen times; this work is succeeded by that of disposing the field for irrigation: several weedings, a dressing of

manure, and frequent watering, employ much labour; but the most tedious occupation is that of gathering the opium, which, for more than a fortnight, employs several persons in making incisions in each capsule in the evening and scraping off the exuded juice in the morning. If the greater labour be considered, the produce of a bigha of poppy, reckoned at seven rupiyas eight anas, is not more advantageous than the cultivation of corn: even computed at sixteen rupiyas, according to the estimate of produce above quoted, still it is less profitable than sugar-cane and mulberry.

141. But, in the culture of opium, there are circumstances which may, and which, in some places actually do, render it alluring. In estimating the medium produce, we adverted to the accidents of season, to which this delicate plant is particularly liable from insects, wind, hail, or unseasonable rain. The produce seldom squares with the true average, but commonly runs in extremes: while one cultivator is disappointed, another reaps immense gain; one season does not pay the labour of the culture, another, peculiarly fortunate, enriches all the cultivators. This circumstance is well suited to allure man, ever confident of personal good fortune.

142. The preparation of the raw opium is under the immediate superintendence of the agent or of the contractor. It consists in evaporating, by exposure to the sun, the watery particles, which are replaced by oil of poppy-seed, to prevent the drying of the resin. The opium is then formed into cakes, and covered with the petals of the poppy; and, when sufficiently dried, it is packed in chests, with fragments of the capsules from which poppy-seeds have been thrashed out.

143. This preparation, though simple, requires expert workmen able to detect the many adulterations which are practised on the raw juice. The adulteration of prepared opium is yet more difficult to discover. It has been supposed to be commonly vitiated, with an extract from the leaves and stalk of the poppy, and with gum of the mimosa; other foreign admixtures have been conjectured, such as cow-dung, gums, and resins, of various sorts, and parched rice.

144. The facility of adulterating opium, and the consequent necessity of precautions against such frauds, are circumstances which

* Dr. Keir.

⁷ To obtain, by accepting advances, an immediate supply of money when urgently wanted, or for the aid and countenance of the agent or contractor, if they have any point to contend or litigate with their landlord. It may be likewise noticed, that the contractors formerly held the peasants bound, if they planted poppy one season, to continue to do so in the following year. When this point was decided against the contractors, they required that a peasant, who relinquished the culture of opium, should resign the land, on which he had formerly planted poppy, to any other peasant willing to engage for the production of opium. It is obvious, that this also must operate as a very effectual means of compulsion. The system of contracting for the provision of opium has been wisely abandoned.

APPENDIX III

would justify the monopoly, were it even objectionable on other considerations. In a free commerce, the quality might probably be more debased to the injury of the export-trade. This subject we shall have occasion to resume.

145. Tobacco, it is probable, was unknown to India, as well as to Europe, before the discovery of America. It appears, from a proclamation of Jahangir, mentioned by that prince in his own memoirs, that it was introduced by Europeans into India, either in his or in the preceding reign. The truth of this is not impeached by the circumstance of the Hindus having names for the plant in their own language; these names, not excepting the Sanscrit, seem to be corrupted from the European denomination of it, and are not found in any old composition. However, the practice of inhaling the smoke of hemp leaves and other intoxicating drugs is ancient and for this reason, the use of tobacco, when once introduced, soon became general throughout India. The plant is now cultivated in every part of Hindustan.

146. It requires as good a soil as opium, and the ground must be as well manured. Though it be not absolutely limited to the same provinces, its culture does prevail mostly in the northern and western districts. It is thinly scattered in the southern and eastern provinces. In these, it is seldom seen but upon made ground; in those it occupies the greatest part of the rich land, which is interspersed among the habitations of the peasantry.

147. The culture is laborious, as it requires the ground to be thoroughly broken by repeated ploughings. The tobacco, though transplanted, needs one or two weedings and a hand-hoeing. It is frequently visited by the labourer to nip the heads of young plants, and afterwards to pick off the decayed leaves. But the crop is gathered with little labour, and the drying of the tobacco does not employ much time: for it is dried by simple exposure to the open air, either on beds of gross or on ropes; it is, however, removed under shelter during the great heat of the day and the heavy dew of the night.

148. The whole expense of the culture, upon an average of the districts where it most prevails, and which are among the cheapest of Bengal, does not exceed four rupiyas per bigha, although land, appropriated for tobacco, be rated at a high rent. The produce, estimated at five and a half mans from a bigha of the standard of four

cubits to the pole, and this quantity, valued at one rupiya per man, shews tobacco to be a very profitable culture. Accordingly it is eagerly pursued, although the cultivators do not acknowledge so large a profit. Upon the result of direct inquiries, we might have stated the produce at no more than three mans and a half; and the actual disbursements for labour and rent were estimated on the same information at two rupiyas and a half. But, when this was compared with other less laborious cultivation, the expense seemed greatly under-rated. At the same time we were led by small trials to doubt the information which we had received respecting the produce. An accident, affording the opportunity of ascertaining the quantity of tobacco actually obtained from a considerable quantity of land, suggested the correction which has been adopted by us.

149. Though it requires an excellent soil, tobacco might be produced in the greatest abundance to supply the consumption of Europe. Raised cheaply, it would yield a considerable profit to the exporter upon moderate freight. Small experiments have been made. Of their success we are not accurately informed; but we have reason to suppose, that the tobacco of Bengal was not of the quality or had not the preparation which are desired by the European consumer. Yet it cannot be doubted, that, under the immediate direction of persons sufficiently acquainted with the quality that is preferred in foreign markets, tobacco might be raised to suit them at no greater expense than in the present management: and, if it were provided purposely for exportation, it would be invested with a less advance on the original cost, than it can have been yet procured at a market remote from the place of growth, after passing through the hands of intermediate dealers, who trade on small capitals, and who, therefore, need large profits.

150. Tobacco might be shipped at the rate of three current rupiyas and a half, or (including every charge for duties and agency in Calcutta) at less than four current rupiyas for a man. The best tobacco bears a greater but arbitrary value; the worst, on the contrary, costs much less: we take the usual price of a middle sort, and suppose that it can be shipped at that rate, and that it could support a competition with the ordinary kinds imported into England from North America.

One ton, or 27 mans, at four Ct. Rs. per man, 108 Ct. Rs.	£10	16	0
Interest and insurance, at fifteen per centum	1	12	6
Freight payable in England, at six pounds sterling	6	0	0
	£18	8	6

APPENDIX III

Sold at thirty shillings per cwt., exclusive of customs and excise	£28	0	0			
Charges of merchandise, &c., as reckoned by the India Company on other goods at three per centum		0	14	9	27	5 3
Profit					£8	16 9

151. If freight must be paid at £15 per ton, a loss would be sustained, unless the tobacco equal the best sorts that are imported from America.

152. Excepting tobacco, which is exotic in India, this fruitful region seems to have been the parent-country of most productions, which were once ranked among luxuries, but which are now become necessaries of life. The sugar-cane, whose very name was scarcely known by the ancient inhabitants of Europe, grew luxuriantly throughout Bengal* in the remotest times. From India it was introduced into Arabia, and thence into Europe and Africa. It is said, by some authors to have been indigenous in America; this opinion might perhaps be disputed, for historical facts seem to contradict it. Certain it is, that the cane was carried in the year 1506 from the Canaries to St. Domingo, where the first sugar-work was soon after erected by an enterprising Spaniard. The cultivation was pursued with such success in the islands, and on the continent of South America, that the produce soon undersold the sugar of other countries; and the importation of it from India, which was shortly afterwards discontinued by the Portuguese, has only lately been revived.

153. A sudden rise in the price of sugar in Great Britain, partly caused by a failure in the crops of the West Indies, and partly by the increasing consumption of this article throughout Europe, was felt as a serious evil by the British nation. Their eyes were turned for relief towards Bengal, and not in vain. An immediate supply was obtained from this country; and the exportation of sugar from Bengal to Europe, which had commenced a few years earlier, still continues, and will, it is hoped, be annually, increased to meet the growing demand for it, and to benefit, in common with the West-India islands, by the advanced price which it bears in the markets of Europe.

154. From Benares to Rengpur, from the borders of Assam to those of Catac, there is scarcely a district in Bengal or its dependent provinces wherein the sugar-cane does not flourish. It thrives most especially in the provinces of Benares, Bihar, Rengpur, Birbhun, Birdwan, and Mednipur; it is successfully cultivated in all, and there seem

to be no other bounds to the possible production of sugar in Bengal than the limits of the demand and consequent vend of it. The growth for home-consumption and for the inland trade is vast, and it only needs encouragement to equal the demand of Europe also.

155. It is cheaply produced and frugally manufactured. Raw sugar, prepared in a mode peculiar to India, but analogous to the process of making muscovado, costs less than five shillings sterling per cwt. An equal quantity of muscovado sugar might be here made at little more than this cost; whereas, in the British West Indies it cannot be afforded for six times that price. So great a disproportion will cease to appear surprising when the relative circumstances of the two countries shall have been duly weighed and impartially considered. Agriculture is here conducted with most frugal simplicity. The necessaries of life are cheaper in India than in any other commercial country and cheaper in Bengal than in any other province of India. The simplest diet and most scanty clothing suffice to the peasant, and the price of labour is consequently low. Every implement used in tillage is proportionably cheap, and cattle are neither dear to the purchaser nor expensive to the owner. The preparation of sugar is equally simple and devoid of expense. The manufacture is unincumbered with costly works. His dwelling is a straw hut; his machinery and utensils consist of a mill, constructed on the simplest plan, and a few earthen pots. In short, he requires little capital, and is fully rewarded with an inconsiderable advance on the first value of the cane.

156. The same advantages do not exist in the West Indies. It is worthy of observation, that the labour of the negro constitutes more than three-fifths of the cost of sugar in Jamaica. So that, if the West-Indian planter were even able to substitute straw huts for his expensive buildings, or simple implements and earthen vessels for his intricate machinery and costly apparatus, still the price of labour would be an insuperable bar to a successful competition. Independently of calculation and comparison, it is obvious, that the labour of a slave

* Gaur, the ancient name of the capital of Bengal, and of the province itself, is apparently derived from Gur, which, both in the ancient and modern languages of India, signifies raw sugar. From the Sanscrit term for manufactured sugar (Sarcara) are derived the Persian, Greek, Latin, and modern European, names of the cane and its produce. Even the Arabic term may be also deduced from another Sanscrit word (c'hand), which bears the same signification.

APPENDIX III

must be much dearer than that of a freeman, since the original purchase will always form a heavy charge, from which hired labour is exempt. Moreover, the West-Indian slave has no incentive for exertion; nor can he be roused to it, by the smart of recent chastisement or the dread of impending punishment.

157. Slavery, indeed, is not known in Bengal. Throughout some districts, the labours of husbandry are executed chiefly by bond-servants. In certain provinces, the ploughmen are mostly slaves of the peasants for whom they labour; but, treated by their masters more like hereditary servants, or like mancipated hinds, than like purchased slaves, they labour with cheerful diligence and unforced zeal.

158. In some places, also, the land-holders have a claim to the servitude of thousands among the inhabitants of their estates. This claim, which is seldom enforced, and which in many instances is become wholly obsolete, is founded on some traditional rights acquired many generations ago, in a state of society different from the present: and slaves of this description do in fact enjoy every privilege of a freeman except the name; or, at the worst they must be considered as villains attached to the glebe, rather than as bondmen labouring for the sole benefit of their owners. Indeed, throughout India, the relation of master and slave appears to impose the duty of protection and cherishment on the master, as much as that of fidelity and obedience on the slave, and their mutual conduct is consistent with the sense of such an obligation; since it is marked with gentleness and indulgence on the one side, and with zeal and loyalty on the other.

159. Though we admit the fact, that slaves may be found in Bengal among the labourers in husbandry, yet in most provinces none but freemen are occupied in the business of agriculture. The price of their daily labour, when paid in money, may be justly estimated at little more than one ana sica, but less than two-pence sterling. In cities and large towns the hire of a day-labourer is indeed greater; because provisions are there dearer, and the separation of the man from his family renders larger earnings necessary to their support: but, even in the neighbourhood of Calcutta, men may be hired for field-labour at the rate of two rupiyas and a half per mensem, which is equivalent to two-pence half penny per diem. Compare this with the price of labour in the West Indies, or compare with it the still cheaper hire of labour by a payment in kind, a mode which is customary throughout Bengal. The allowance of grain, usually made to strong labourers, cannot be valued

at more than one ana, and does in reality cost the husbandman much less. The average would scarcely exceed a penny half penny. In short, viewed in every way, labour is six times, perhaps ten times dearer in the West Indies than in Bengal.

160. In the warmth of controversy, some advocates for the West-Indian islands averred the general imbecility of the natives of these provinces and their deficiency in toil and exertion. This objection does not require a formal refutation: we need only refer those, who entertain doubts on this subject, to the numerous and beautiful manufactures of Bengal, and to the daily proofs which its inhabitants give of patient labour and imitative genius. In other pleas, brought forward by those who contend for the right of the West-Indian merchants to the monopoly of sugar, Bengal seems to be considered by them as a foreign and tributary country, whose industry should be suppressed and discouraged, if it can, by any means, clash with the interest of particular colonies. But this can no longer be considered as a mere subjugated country, from which Great Britain draws a precarious and temporary tribute. It is now intimately connected, and ought to be firmly incorporated, with the empire, of which it forms a considerable branch, and to the support of which it largely contributes. The government of that empire has as obvious an interest in promoting its prosperity, as in studying the welfare of other provinces subject to Great Britain.

161. Convinced, as they doubtless are, that England may receive sugar from Bengal without any real injury to the West-Indian Islands, the Government will surely tolerate and even encourage, the importation of it from Bengal. For this purpose it is only necessary to equalise the duties, and permit the sugar to be conveyed on private shipping. The effects of such an equitable arrangement may be made evident, by computing the cost of sugar shipped in Bengal and the rate at which it might be delivered by the British merchant to the English consumer. We shall obviate the possibility of any objection to the grounds of this calculation, by assuming the price actually paid in Calcutta for the best clayed sugar, instead of the estimated rate at which muscovado could be afforded. It would not be unreasonable, in estimating the future cost of sugar on the supposition of a regular and extensive demand, to make a suitable deduction for greater cheapness in consequence of more universal cultivation; since the manufacturer and merchant, dealing more largely, would be contented with smaller profits on quicker returns. Great improvement, too, may be expected in the manufacture of it;

APPENDIX III

but, although this be sufficiently probable, it may be more satisfactory to ground the present estimate on the price paid in Calcutta, previously to the great enhancement caused by the late extraordinary demand.

162. On a retrospect to the period when the cultivation and manufacture kept pace

15,000 factory ms. at 6 Sa. Rs.		90,000	0	
Export-duties and fees	2,362	8		
Packing, portorage and boat-hire	5,418	12		
Commission on 90,000 Sa. Rs. at 5 per centum	4,500	0	12,281	4
			<hr/>	
			1,02,281	4
			11,864	12
Freight, at 6l per ton			3,000	0
Insurances on the outlay, at 10 per centum			1,186	9
Interest on the same, at 5 per centum, for a year			652	10
			<hr/>	
			£16,703	11
Duty on 475 tons at 15s. as is paid on West-Indian sugar		7,125	0	
Charges of merchandise, &c., as reckoned by the Indian Company, at 3 per centum on the value.		997	10	8,122 10
			<hr/>	
			£24,826	1
Deduct from the quantity originally shipped, 5 per centum for wastage and uncovered risks, the remaining 475 tons will be produced, at 70 shillings the cwt.			33,250	0
			<hr/>	
		Profit	£8,423	19

163. Compare herewith an estimate grounded on the present rates of freight and customs :

500 tons of clayed sugar shipped in Calcutta for			11,864	12
Freight, at 15l. per ton			7,500	0
Insurance on the outlay, at 10 per centum			1,186	9
Interest on the same, at 5 per centum for year			652	10
			<hr/>	
			£21,203	11
Duty on 475 ton of sugar, at £37 16 3 per centum <i>ad valorem</i> , as is now paid on East-Indian sugar.		12,572	13	
Charges of merchandise, &c.		997	10	13,570 3
			<hr/>	
			34,773	14
Amount of the sales			33,250	0
			<hr/>	
		Loss	£1,523	14

164. Hence it is evident that the exporter from Bengal, so long as he must pay 22l 10s. or even 15l. per ton for freight, and £37 16 3 per centum *ad valorem* for duties of the custom,¹⁸ can resort to the English market then only when sugar sells for more than eighty shillings the cwt., including duties: but if he were at liberty to provide freight on the lowest terms for which he could obtain it, and if duties were equalised, he might derive profit by selling clayed sugar for sixty shillings the cwt., and mus-

with the wants of the market, we may justly state the average cost of the best clayed sugar in Calcutta at six sica rupiyas for the factory man.* At this rate, a cargo of five hundred tons, imported in London, should cost the English merchant less than 36s. a cwt., exclusive of duties and charges in England.

covada for much less. Hitherto the very enhanced price of sugar in England has encouraged the importation of it from Bengal, in spite of unequal duties and excessive freight. Remove these disadvantages, and Bengal will supply Great Britain, at a cheap rate, with a part of what the calls of the English market require, and will, thereby, prevent the exaction of an inordinate profit on the sugar produced in the West Indies.

* We take a much higher rate than the average of many years would suggest, to avoid any cavils against our estimate. Sugar might probably be shipped for less than six rupiyas per man.

¹⁸ The duties are paid in England by the purchaser, but the charge in effect falls upon the importer.

APPENDIX. III

165. Let us now pass to another production, for the sale of which also India maintains a competition with the Islands of America.

166. Cotton is cultivated throughout Bengal. Formerly the produce was nearly equal to the consumption, and very little was imported by sea or brought from inland countries. But the increase of manufactures, or the decline of cultivation, has now given rise to a very large importation from the banks of the Jamuna and from the Dekhin. It is there raised so much more cheaply than in Bengal, that it supports a successful competition, notwithstanding the heavy expenses of distant transport by land and water; and undersells cotton on a middle quality in those very provinces where this article was heretofore abundantly produced. A fine sort of cotton is still grown in the eastern districts of Bengal, for the most delicate manufactures; and a coarse kind is gathered, in every part of the province, from plants thinly interspersed in fields of pulse or grain. This last kind is almost exclusive employed in the coarsest manufactures for home consumption; and the cotton, imported through the Doab, chiefly supplies the looms at which better cloths are woven.

167. Several species and numerous varieties of the plant afford this useful production. Some sorts are undoubtedly indigenous in America; others are certainly natives of India. Whether exotic or indigenous in Arabia, it has been long known there: the culture was thence introduced into the Levant; and the produce, with its Arabic name,¹¹ was conveyed in to Europe. But India has, in all times been the country most celebrated for cotton manufactures; and even now, although the skill and ingenuity of British artisans have been exerted in the improvement of this important branch of manufactures, the finest muslins of Bengal remain still unrivalled by the fabrics of Great Britain.

168. Notwithstanding this inferiority in muslins, and the disadvantage of dearer manufacture in other sorts, the establishments formed in Great Britain for cotton have added greatly to the prosperity of British commerce, and well deserve the encouragement which they receive. In the infancy of the manufacture, the West Indies abundantly supplied the raw material which was required. None was received from Bengal; and even Surat did not gain a new mart for its cotton, but continued to supply China and other countries, where the merchants of Bombay had been long accustomed

to find a vend for this production. But the increasing wants of Great Britain soon began to exceed what the West Indies were able to furnish. A consequent enhancement of price induced some enterprising merchants to send cotton, from Surat and Bombay, to Europe. The adventure was successful, and has been followed by similar experiments from Bengal to England and to China. These have been rewarded with profit; and the exportation of cotton-wool now promises to become a permanent branch of trade.

169. Should the husbandmen of Bengal find encouragement to resume the extensive culture of this production, the foreign demand will become the source of great accession of wealth to this province; or, should the competition of cotton imported from Agra continue to impede the cultivation of it in Bengal, still benefit will be derived to both countries from the commerce of an article in such general request.

170. Different sorts, very unequal in quality, are imported into Bengal; the best is brought by land from Nagpur, in the Dekhin, to Mirzapur, in the province of Benares, which town is the principal mart of cotton. Its average-price may be there reckoned at sixteen to eighteen rupiyas for 100 pounds by weight, or £2 4 6 per cwt., nearly. The usual contract for its transportation from Nagpur to Mirzapur, a distance which, by the shortest route, exceeds four hundred miles, is thirty-four rupiyas for 500 pounds laden upon one ox.¹² This, it is true, includes duties levied on the road; we shall therefore, instead of inferring the prime cost from these grounds of computation, state the usual price at Nagpur, upon the result of direct inquiries at an average-price which, reduced to English weight and money, is equivalent to twopence half-penny for one avoirdupois pound.

171. The next sort of cotton is imported at the same mart from Jalwan, a town situated to the westward of the Jamuna river, and not very distant from the city of Calpi. It is transported by land from that town to Canhpur, on the Ganges; a distance little exceeding seventy miles. From Canhpur it is brought to Mirzapur by water, and there sells, on a medium, for two pounds sterling a cwt. nearly. The market, it should be remarked, is very fluctuating; and has been known to vary within few months from eleven to twenty-two rupiyas the man; but the average here assumed will not be found, upon the minutest inquiry, to deviate much from the most strict accuracy.

¹¹ The names of cotton in most languages of Europe are obviously derived from the Arabic *Kutn*.

¹² Small oxen carry a less load, and their hire is reduced accordingly. A large ox, able to carry 500 pounds in journeys of eight or ten miles a day, may be hired, for the transport of merchandise between Mirzapur and Nagpur, at the rate of twenty rupiyas, exclusive of duties.

APPENDIX III

172. Another sort, of nearly equal value in the Indian market, but certainly superior in the length and fineness of its staple, is brought, by a land-carriage, of more than five hundred miles, from Ameraweti, a well-known mart in the Dekhin, situated about thirty miles south of the city of Elichpur. The prime cost, reduced to English money, is less than two-pence for an avoirdupois pound; as it sells at Mirzapur for the same price with that which is brought from Jalwen, or at most five per centum dearer.

173. It would be tedious to enumerate all the places whence cotton is imported. The chief mart for that which is produced in the province of Agra is Hat'hras, near the Jumuna river. It is thence conveyed, by an easy land-carriage for a hundred miles, to Ferrukhabad on the Ganges, and from that city by water to Mirzapur, where it usually sells for £1 13 per cwt. A better sort from Cuch'ora fetches a superior price, and may be estimated at the average-rate of £1 16 per cwt.

174. We have noticed this difference in the quality of various sorts of cotton imported into this province, for the purpose of showing that such kinds as shall be found best suited to the different wants of manufactures in Great Britain may, it is presumed, be now procurable in Bengal. If any sort be requisite, which is not now grown in countries contiguous to Bengal, the cultivation of it might doubtless be diffused there without difficulty. A perennial species, which produces cotton of uncommon beauty and excellence, has been already introduced from the Island of Bourbon. An enterprising individual actually formed a considerable plantation of it in the province of Benares. Though his experiment was not successful, other species, at the same or in other places, may, perhaps, be advantageously introduced.

175. The value of those sorts of cotton which have been hitherto exported from Bengal, is now ascertained by sufficient experience. The cotton of India appears to have an acknowledged superiority over that of the Levant, and equals in the British market some of the imports from Spanish America and the Brazils. Were it as well cleaned, it would support a better competition than it now does with the produce of the West-Indian Islands; and if freight from Bengal and Bombay to England were reduced to an equitable rate, it would successfully rival all other countries, even though the price of cotton-wool in Great Britain should return to the former level. An estimate of the expense, for which it may be landed in England, will confirm the opinion which we have now hasarded.

176. The price of the best cotton at the mart of Mirzapur has been estimated by us at £2 4 6; that of the lowest quality of good cotton at £1-13. The cost of conveying it by water to Calcutta is thirty rupiyas for 100 large mans, or 15s. 6d. for a ton. But it may be more advisable to take the average-price of the Calcutta market. This would be highly rated for the best sort at £2 15 the cwt. and for the other at £25; we shall, however, ground computations on these prices:
 1,140 bales of cotton, contain-
 ing 4,000 cwt, nearly, pro-
 vided at £2 15 per cwt., £11,000 0
 Freight for 570 tons by measure-
 ment, at £15 per ton, 8,550 0
 Duties on the exports from
 Calcutta at Sa. Rs. 1,762, 204 8
 Screwing, packing, portorage,
 boat-hire, and etc., 590 10
 Sa. Rs. 5,021, 590 10
 Insurance on £20,000 at £10, 2,000 0
 Commission on £11,000 at five
 per centum 550 0
 Total cost of cotton-wool
 £22,894 18

Consequently, the cost of cotton-wool imported from Bengal into England, exclusive of charges at London, is £5 14 6 per cwt. or 12½d. the pound. Were freight reduced to six pounds for a ton, the saving in that charge, with insurance, would amount to £5,630, and the best cotton would therefore cost the importer 9½d. the pound. His farther saving in the first purchase, and subsequent charges on the second sort of cotton, would amount to little more than £2,350. This, consequently, would cost him, at the present rate of freight, eleven pence the pound; or when the hire of tonnage becomes cheaper eight pence. He would derive ample profit by selling at sixteen or seventeen pence for the pound, defraying, however, the India's Company's duty and the charges of merchandise in London. Since the best sort, before mentioned, would produce a higher price, and command a more certain market, than the sorts which have been hitherto tried, we are disposed to hope that Bengal would be found capable of supporting a successful competition, in the British market, with the Levant, with Spanish America, and with all other foreign countries, which now rival the British West Indies in the English market.

177. Europe was anciently supplied with silk through the medium of Indian commerce. But, according to most authors, it was the produce of China only, and even there was sparingly produced. Were the fact important, it might be shewn, that the culture was not unknown to the eastern

APPENDIX III

parts of Hindustan. For the ancient language of India has names for the silk-worm and for manufactured silk; and, among the numerous tribes of Hindus, derived from the mixture of the original tribes, there are two classes, whose appropriated occupations (whence, too, they derive their appellations) were the feeding of silk-worms and the spinning of silk.

178. The excessive price which silk bore in Europe, when it could be obtained only through the commerce of India, rendered this the most valuable article of oriental traffic. The silk-worm, long since introduced into Greece, afterwards propagated in Italy, and more lately in France, left India deprived of its exclusive commerce in silk. Bengal has now recovered a share in the supplying of this production; but, unless we are misinformed, the raw silk of Bengal bears in the European market a price somewhat inferior to that of the best Italian silk. As the filatures of Italy have been copied in Bengal, it does not occur to us that we ought to ascribe this inferiority to defective manufacture. It has been thought that the best silk is not obtained from worms fed on the sort of mulberry which is commonly cultivated in Bengal. Experiment has seemed to confirm this notion, and possibly the management of the silk-worm may be likewise defective. That this may be the more easily ascertained, we shall fully describe the present management, although this detail will leave us no room to notice a curious topic, namely, that of silk obtained from wild worms, and from those which are fed on other plants besides mulberry. It is a subject interesting as well as curious, since much silk of this kind supplies home consumption, much is imported from the countries situated on the north-east border of Bengal, and on the southern frontier of Benares; much is exported, wrought and unwrought, to the western parts of India: and some enters into manufactures, which are said to be greatly in request in Europe.

179. To plant a new field, the waste-land is opened with the spade in the month of April; good soil is brought, and enough is thrown on the field to raise it one cubit. The ground is well broken with the plough, and levelled with an implement, which in form resembles a ladder, but which supplies the place of a harrow. The mulberry is planted in October; the slips are cut a span long, and are thrown into a hole and covered from the sun; they are continually watered until at the end of a fortnight, they begin to

vegetate. They are now transplanted into the field, in holes distant a span from each other, and nearly one span deep: four or five cuttings are placed obliquely in each hole, which is then filled up so as to cover the slips with a finger of earth closely pressed down. So soon as the plants appear in December, or January, the field is weeded. In April, when they are grown to the height of a cubit, they are topped, so as to leave a stem one hand high; otherwise it is thought that the leaves would be bitter and hard, and that the worms would refuse them. A hand-hoeing is now given, and a fortnight afterwards the leaves are ready for use. The plant is then cut down a little above the root and the silk-worms are fed with the leaves; the field is weeded, if necessary, and another crop is obtained in June, and a third in July; but the leaves only of this last crop are gathered, without cutting the stem, because that operation at so late a season would, it is apprehended, injure the plant. The field is again weeded, and a fourth crop is ready in September; after gathering it the ground is ploughed four times with two ploughs, and levelled with the implement above-mentioned. In November, a hand-hoeing assists vegetation, and accelerates the best crop, which is cut in December; this is followed by a hand-hoeing and weeding, and is succeeded by another crop in March. The same course recommences; and the field, if sufficiently attended and laboured, will continue to be productive during many years.

180. Five varieties of silk-worms are distinguished; the kind, which, as its name indicates, seems to be thought native, is preferred.¹³ The balls, preserved for the grain, are kept in bags suspended to the roof of the peasant's hut; when the insect is ready to burst its prison, a few cods are placed in a large basket on one shelf of a frame provided for the nurture of the worm. The frame in common use consists of sixteen shelves placed in a shed upon vessels filled with water, by way of precaution against ants. After the moths quit their covering,¹⁴ attendance is required to move the males, so soon as their functions have been performed, and the females, when they have produced their eggs. The basket is carefully covered with a cloth, and in a fortnight the worm quits the egg. They are first fed with leaves chopped very fine; as they advance in their growth, they are dispersed into more baskets on the several shelves of the frame, and are supplied with leaves cut

¹³ It is called *desi*. Whether this and other sorts be only varieties of the Bombay *Mori* (as is probable), or different species, we have not learnt. The wild silk-worms seem to be different.

¹⁴ From the perforated balls, a coarse silk is obtained, which is known in the home-commerce by the name of *Nat*.

APPENDIX III

In larger pieces, and latterly with whole leaves, until the period when the insect quits its food; as soon as it recommences eating, branches of mulberry are thrown on with the leaves upon them, and the insects eat with eagerness; and soon fill the baskets on the whole number of shelves: they arrive at their full size in little more than a month from their birth; and, changing their skins for the last time, are disposed to begin their cones. They are now removed to baskets divided into spiral compartments, where they spin their webs and cover themselves with silk. When the cone is completed, a few are set apart for propagation, and the rest are exposed to the heat of the sun for the purpose of killing the chrysalis.

181. The peasants sell the cones to the filatures, most of which are in the employ of the Company. From the rejected balls, they wind silk by the following process. The cones must be allowed to cool after exposure to the sun; the excretions of the worms are collected from the feeding-baskets, and thrown into a hole dug for that purpose. The balls of silk are put into the hole, which is carefully covered up. In two days the cones are taken out and boiled in an earthen vessel, and the silk is wound off by a hand-reel or by the common one, both of which are simple, and do not differ materially from the machines used for the same purpose in Europe. From the fur picked off the cones, a coarse silk is spun, which is used for making carpets and for other purposes.

182. In the districts to which our inquiries respecting silk have been limited, the culture

of the mulberry is estimated at fifteen rupiyas fourteen anas, and the produce at nineteen rupiyas eight anas for the bigha.¹⁴ From the apparent profit of three rupiyas and ten anas must be deducted the superintendence of the culture, and some labour which is not provided for in the estimate; such as that of gathering the crop and transporting it.

183. The peasant, who feeds his own silk-worms, gives full employment to his family; how far their labour is rewarded may be judged from the usual estimation of the produce of silk. A frame, filled with worms from 640 cones, produces near fifty pounds weight of balls of silk, after consuming ten loads of mulberry leaves; consequently one hundred weight and a half of cones, or two mans nearly, may be obtained from the produce of one bigha of land: the best cones may be sold to the filatures at the rate of eighteen sers for a rupiya; but a deduction must be made herefrom for such balls of silk as are of inferior quality. We have not materials for estimating the expense and produce of filatures. With the hand-reel, two sers (or four pounds avoirdupois) of silk are obtained from a man of cones. This reel is tedious in its operation; but labour with it is paid no better than that of spinning cotton-yarn, namely, about one rupiya and a half for a ser of yarn. However the charges of filatures cannot be much greater; and making an allowance for the proportion of inferior silk reserved for Indian consumption, and similar to what is known in Europe by the name of floretta, the prime

¹⁴ First planting for a field of one bigha.

	Sa.	Rs.	As.	P.
Cost of mulberry-cuttings			1	0 0
Eight ploughings, with two ploughs each, at four anas			2	0 0
Expense of planting the slips			2	0 0
Two hand-hoings			2	8 0
Weeding twice			2	0 0
Rent			4	0 0
Total outlay before a crop be obtained			13	8 0

ANNUAL

Four ploughings, as before			1	0 0
Two hand-hoings			2	8 0
Weeding five times			5	0 0
Rent			4	0 0
Use of money, at twenty-five per centum on the first outlay			3	6 0
			7	6 0
			15	14 0

Annual produce, if the plant be sold (as is frequently practised).

In December, 7 loads of plant (each load as much as one labourer carries), at 1 rupiya			7	0 0
March 5½ do. at 8 anas			2	12 0
May 5 do. at 8 anas			2	8 0
June 4 do. at 8 anas			2	0 0
July 6 do. at 8 anas			3	0 0
September 4½ do. at 8 anas			2	4 0
			19	8 0

APPENDIX III

cost of flature-silk, shipped for Europe, need not exceed ten current rupiyas for a ser; if it sells on a medium at twenty-five shillings for the great pound, it might afford a considerable profit.¹⁴

184. The manufacture of indigo appears to have been known and practised in India at the earliest period. From this country, whence the dye obtains its name,¹⁵ Europe was antiently supplied with it, until the produce of America engrossed the market. Within a very late period, the enterprise of a few Europeans in Bengal has revived the exportation of indigo, but it has been mostly manufactured by themselves. The nicety of the process, by which the best indigo is made, demands a skilful and experienced eye. It is not from the practice of making some pounds from a few roods of land that competent skill can be attained. Yet such was the management of the natives. Every peasant individually extracted the dye from the plants which he had cultivated on a few biswas of ground; or else the manufacture was undertaken by a dyer, as an occasional employment connected with his profession. The better management of America in this respect, rather than any essential difference in the intention of the progress, transferred the supply of the market to America; for, it is now well ascertained that the indigo of Bengal, so far as its natural quality may be solely considered, is superior to that of North America and equal to the best of South America; and, although some labour be wasted in the process used by the natives, or at least, though the labour be not so well applied as it is in manufactures conducted on a larger scale, the cheap price at which the natives did nevertheless afford it¹⁶ would have preserved the market, had not the superior quality of the indigo, which is made at large manufactures, given to this a decided preference.

185. The spirited and persevering exertions of a few individuals have restored this commerce to Bengal, solely by the superior quality of their manufacture; for, so far as regards the culture, no material change has been made in the practice of the natives. Ground of any sort, that is fertile and secure from probable inundation, is prepared as in the common husbandry, and sown in the

¹⁴ The production of raw silk in Bengal might be increased to supply much more than 150 or 200 tons, which is said to be the quantity now exported. Perhaps the districts, to which it is limited, cannot raise a much greater quantity than they do at present: but the silk-work has been tried in South Bihar, and in the northern provinces of Bengal; and, upon the result of experiment, we are warranted to presume that the production might be more generally diffused. It is at present almost confined to a part of the province of Berdwan, and to the vicinity of Bhagirahi river and great Ganges, from the fork of those rivers for a hundred miles down their stream.

¹⁵ Indicum, from which the words indico and indigo are derived. The Americans, it is said, call it anil, which is an evident corruption of the oriental name nil. Yet the plant is probably indigenous in America as well as in Hindostan.

¹⁶ It was formerly made and sold, in the province of Agra, at ten or sixteen rupiyas for the man of forty dams. See the Ayeen Akberry, vol. II, page 46.

broadcast during the latter months of the hot season, or at the commencement of the rains. It should be weeded twice or oftener; and, with no farther labour, the early plant is ready for cutting in the beginning of August; and the fields, arriving successively at maturity, supply the works until the commencement of October. Other management has been tried by throwing the land into furrows, and by sowing in drills, but without much success. One improvement, however, deserves notice, as it enlarges the season of cultivating and manufacturing indigo; it consists in sowing early in the hot season upon low lands, for a crop to be reaped at the commencement of the rains before the annual inundation, or sowing at the season upon higher ground for an early crop forced by frequent watering of the field. This has been introduced in the western districts, where circumstances have admitted of experiments. In the southern provinces, the manufacturers cultivate little themselves, but purchase the plant from the neighbouring peasantry: it seldom yields produce beyond the year in which it is sown, while rattoons or lay-overs are preserved, in the western provinces, to the second, and even to the third and fourth, years.

186. Of the expense and produce it is not easy to form an accurate estimate, because many factories purchase the plant by measure, while others pay for the quantity of land, and some plant their own indigo. The produce in different seasons is most widely unequal; and, in the same season, equal quantities of the plant afford very disproportionate quantities of the dye. However, it may be stated, that four rupiyas for a bigha do not ill pay the rent and culture; and the manufacturer need not be dissatisfied if he obtain six pounds of the dye from each bigha, at an expense of manufacture, including his own subsistence, little exceeding the cost of the plant.

187. The profit of the manufacturer depends on the quality of the indigo: and this is very unequal, since it varies according to the skill of the manufacturer. Excluding indigo of very superior quality, the medium price of it when sold for exportation, cannot be rated higher than current rupiyas 140, or sicca rupiyas 120, for a man:

APPENDIX III

this affords to the manufacturer a mere subsistence from a speculation wherein the expense is certain and the returns precarious." The fact confirms the estimate, for it is well known that little has hitherto been gained by the speculation. The successful planters are few; the unsuccessful, numerous.

188. The manufacture is nevertheless pursued with spirit, and not unreasonably; for, experience may be expected to correct the errors which are unavoidable in new undertakings. The sagacity of ingenious men has greatly improved the process, which is still in the progress of improvement, for determining the most advantageous size and proportion of the steepers and

batteries, for ascertaining with precision the period of sufficient fermentation and agitation, for drying the indigo expeditiously, and subjecting it to a process calculated to prevent injury by worms and maggots, and for an arrangement to conduct the process with the utmost cleanliness, with economy of labour, and without wastage.

189. From an inconsiderable production, it has grown, through the exertions of private persons, to an object of great commercial importance; and under a skilful and frugal management, it may be expected to reward the enterprise by which it has been established.

"It is not easy to estimate the prime-cost of indigo. In districts, where the production is cheapest in favourable seasons, it is, also, almost precarious, and sometimes fails entirely. From information received, we are disposed to state the prime-cost from 60 to 100 rupiyas for a man. Probably the real average of the cost may fall between seventy and eighty rupiyas.

APPENDIX III
CHAPTER VI

Internal Commerce, Grain, Piece-Goods, Saltpetre and other Objects of Exportation

190. Bengal, from its western boundary to the shores of the sea, is watered by the Ganges, and is intersected in every direction by many navigable streams which fall into that river. Few districts are wholly destitute of internal navigation. In most of them, lakes, rivulets, and water-courses, communicating with great rivers and becoming passable in the rainy season, conduct boats to the peasant's door. But his valuable produce being reaped at other seasons, and disposed of as soon as gathered, he derives less benefit from navigation than the survey of its extent would lead us to suppose. Land-carriage conveys the greater part of the produce from the place of its growth to that of its embarkation on the Ganges; and the rapid currents and dangerous shoals, of many considerable rivers, forbid the use of large vessels, and permit the passage of none but canoes and small boats. The navigation does, nevertheless, employ a vast number of large vessels. It is interesting to note, at a mart of great resort, the various constructions of boats assembled there from different districts, each adapted to the nature of the rivers which they generally navigate. Fancy has had some share in planning them, but the most essential differences are evidently grounded on considerations of utility. The flat clinker-built vessels of the western districts would be ill adapted to the wide and stormy navigation of the lower Ganges. The unwieldy bulk of the lofty boats, which use the Ganges from Patna to Calcutta, would not suit the rapid and shallow rivers of the western districts, nor the narrow creeks through which vessels pass in the eastern navigation; and the low, but deep, boats of these districts are not adapted to the shoals of the western rivers.

191. In one navigation, wherein vessels descend with the stream, and return by the track-rope, their construction consults neither aptitude for the sail nor for the oar. In the other, wherein boats, during the progress of the same voyage, are assisted by the stream of one creek and opposed by the current of the next, under banks impracticable to the track-rope, their principal dependence is on the oar: for, a winding navigation in narrow passages admits of no reliance on the sail. Often grounding in the shallows, vessels would be unsafe if built with keels. All the constructions of Bengal

want this addition, so necessary for sailing, and it is probably owing to the same cause, that so rude a form for the rudder, as that of a large oar, has been so long retained.

192. The various forms now in use afford vessels built more economically than they could be constructed on a European model. They are cheaply found. A circular board tied to a bambu cane forms the oar; a wooden frame, loaded with stones, is the anchor; a few bambus lashed together supply the mast; a cane of the same species serves for a yard to the sail; this, again, is made of the cheapest materials.¹ The trees of the country afford resins to sheath the vessels; and a straw-thatch supplies the place of a deck to shelter the merchandise. The vessels are navigated with equal frugality; the boatmen receive little more than their food, which is most commonly furnished in grain, together with an inconsiderable allowance in money, for the purchase of salt and for the supply of other petty wants.

193. It is estimated that the owners of vessels, and those who conduct in person the principal part of the internal commerce, transport their own merchandise for a much smaller expense than the freight which they usually charge to others. The rates of this freight, from mart to mart, are in general regular and uniform. From the average of hire for different voyages, a medium may be assumed between three and four rupiyas on a hundred mans for a hundred miles.

194. In the land-carriage, the owners of the cattle are also the principal traffickers, oftener purchasing at one market to sell at another, than letting their cattle to resident merchants. They transport the merchandise upon oxen trained to burden and sometimes upon horses, (of that small breed of ponies, which is common in Bengal,) more rarely, on buffaloes. These, though more docile even than oxen, are seldom employed for burden within the limits of Bengal proper; they require more substantial pasture than can be gleaned on a journey from the roadside; and, fond of lying in water, they would damage their load in the rivers, which they have frequent occasion to ford. Yet, in the eastern parts of Bengal, and still more so in the provinces which border on its western frontier, buffaloes are employed both for draft and carriage. We have even seen them used in the labours of husbandry. But the buffalo is more sluggish and a slower

¹ A coarse sack cloth, wove from twine made of the fibrous stem of the rushy *Crotalaria*, or of the hemp *hibiscus*; both of which plants are abundantly cultivated throughout Bengal, for this and other uses of twine, rope, etc.

APPENDIX III

traveller than the ox, and does not bear a much greater burden. Large cattle will carry a load of six mans, on easy journeys of eight or ten miles, and even the small cattle are tasked with two mans. The strongest oxen may be hired at the rate of eight anas per diem on the dearest roads. In general, the price of land-carriage need not exceed one rupiya a man for a hundred miles. The average of customary rates in different provinces would exhibit a much smaller sum; and the carrier does certainly transport merchandise for his own account at far less expense than the hire which he is accustomed to charge. He can feed his cattle, and even buy fodder when necessary, pay the wages of one driver for four bullocks, and gradually reimburse to himself the purchase of his oxen, if his daily gain amounts to two anas for every head of cattle, in a district moderately cheap, or three anas, in the dearest provinces.

195. Did the roads permit the use of carts, land-carriage would be much cheaper; but the highways are not generally in a condition for distant journeys with wheel-carriages. At a former period the communication was better assisted. A magnificent road, from the banks of the Ghaghra or Dewa to the Brahmeputre, formed a safe and convenient communication at all seasons, in a length of four hundred miles, through countries exposed to annual inundation. Of the causeways and avenues, which formed this road, some remains may yet be traced. Other highways, less extensive, but communicating from town to town, facilitated intercourse between every part of the country. At present the beaten path directs the traveller; but no artificial road, nor any other accommodation, alleviates his fatigue, and his progress is altogether barred in the rainy season.

196. That, in the short lapse of a few years, magnificent roads should have fallen into such total decay as barely to leave the trace of their former direction, and of the public inns, or serais, which accommodated travellers, must be ascribed to the want of substantial and durable materials for their construction. The country affords none, unless they be brought from hilly countries, at an enormous expense, or unless bricks be burned for the purpose. The great cost of highways, which have been constructed with these materials in the neighbourhood

of the principal European stations, discourages the hope of such roads becoming general. But, under the encouragement and attention recently given to this important object, they may be constructed, as they formerly were under the native government, by the simple expedient of raising the soil between two ditches, and throwing up causeways, where a low situation requires them. The accommodations which travellers need can only be expected when frequent intercourse will pay for the providing of them, and the state of society must be very different from the present: for, even in the principal cities, the stranger finds no accommodation either at public serais or private inns.*

197. If we turn to the routes of navigation, we shall find that travellers are not better accommodated, though this mode of travelling be most general. The various sorts of barges which are in use show, that the opulent inhabitants of Bengal are not indifferent to convenience on their journeys. But persons, whose circumstances are less affluent, navigate the rivers of Bengal on less convenient embarkations.

198. The want of accommodation, in travelling by land or water, is doubtless the consequence of limited intercourse, and becomes, in its turn a cause of discouragement to frequent communication. If duly weighed, it will appear no unimportant circumstance, whether considered as indicating general poverty or the decay of commerce and agriculture. A brisk trade requires much intercourse, and this again promotes traffic, by early information on the wants or the abundance of different provinces. A languid commerce, which merely fetches, in an established course, the produce of provinces usually cheap to dispose of it in districts usually dear, cannot note the smaller variations of markets, and consequently, the prices of different districts find their level slowly, and vibrate between wide limits. The effects which great variations in the price of land-produce have upon husbandry are obvious.

199. The languid state of internal commerce, inferred from the circumstances above-mentioned, is confirmed by the review of the commodities which it exchanges and by the estimate of their amount. The exportation of grain from corn-districts, and the returns of salt, constitute the principal

* The institution of public inns for the accommodation of travellers seems very antient in Hindustan. They were regulated by Shir Shah, who appointed a particular tribe to the charge of them. In many places, where public buildings for that purpose are wanting, the streets, or open spots, in which a few families of this tribe and profession have taken up their abode, are dignified with the name of serais, and may be called private inns. Public serais, together with wells and resting places, have always been more numerous in Hindustan proper and in the Dekhin than in Bengal; they still are so, and the reason is obvious: travelling by land is more frequent there, while travelling by water is more common in Bengal.

APPENDIX III

object of this trade. The importation of cotton from the western provinces, and the exchange of tobacco for betle-nut,² together with some sugar, and a few articles of less note, complete the supply of internal consumption. Manufactures are almost limited to the wants of their immediate neighbourhood, excluding from this consideration the provision of the public investment and the calls of foreign trade. Piece-goods, silk, salt petre, opium, sugar, and indigo, pass almost wholly through the Company's hand excepting only what foreign commerce, and the traffic to various ports in India, export, of such among these articles as the Company do not monopolise.

200. Grain, the internal commerce of which is entirely conducted by the natives themselves, supplies the consumption of the cities and the export-trade of Bengal. Though salt be the return of that trade, the corn exceeds it in amount; this cannot be rated at less than two crores for corn transported from considerable distances, exclusive, consequently, of the supplies drawn from the immediate neighbourhood of cities and sea-ports.

201. Except in cities, the bulk of the people is every where subsisted from the produce of their own immediate neighbourhood. In Bengal, they are in general fed on the produce of their own cultivation, as has already been shown, but the observations offered on that point are not applicable to the clothing of the people. At a moderate computation, the consumption of manufactures, though the dress of the natives be simple, does not fall short of six crores of rupiyas. It cannot be questioned but that, if they were fabricated in districts favourably circumstanced, from such manufactures, to supply the consumption of others better adapted to other productions, the labour, which is now employed in such districts for the supply of their own consumption, would be better directed to more profitable arts and manufactures, and hence would arise mutual benefit to both, and great encouragement to an increased internal commerce.

² No person need be told, that the use of this nut, with lime, the leaves of the betle-vine, and the inspissated juice of a species of mimosa, is universal throughout India. Another variety of the betle-nut, which is much softer than the common sort, is chewed singly, or else with cardamoms, spices, or tobacco; or with the same things which were first mentioned, but loose instead of being wrapped up in the betle-leaves. The common areca-nut is the produce of Bengal; plantations of that beautiful palm-tree are common throughout the lower parts of this province, and the nut is no inconsiderable object of inland commerce. The mimosa c'hadir (or catechu, if this barbarous name must be retained), grows wild in almost every forest throughout India. Its inspissated juice (absurdly called terra japonica) is an import from uncultivated districts into those which are better inhabited, and need not, therefore, be noticed in this place. The betle-vine (a species of pepper) is cultivated throughout India, and its leaves are seldom transported to any considerable distance from the place of their growth: covered vine-yards, containing this plant, or artificial mounds on which they have formerly stood, are to be seen in the precincts of almost every town or populous village. The culture is laborious, and, is mostly the separate occupation of a particular tribe; and for this reason, it has been left un-noticed by us in a former chapter.

202. The reflections, which we might suggest on this topic, will occur to any person who considers attentively the manufactures of Bengal; a subject to which we shall now proceed, as it naturally offers itself after the foregoing account of raw-produce and of gruff commodities. The public, however, is in possession of much information on this subject, and we shall, in consequence, confine ourselves to a few general observations.

203. An erroneous doctrine has been started, as if the great population of these provinces could not avail to effect improvements, notwithstanding opportunities afforded by an increased demand for particular manufactures or for raw-produce because, "professions are hereditary among the Hindus; the offspring of men of one calling do not intrude into any other; professions are confined to hereditary descent; and the produce of any particular manufacture cannot be extended according to the increase of the demand, but must depend upon the population of the cast, or tribe, which works on that manufacture; or in other words, if the demand for any article should exceed the ability of the number of workmen who produce it, the deficiency cannot be supplied by calling in assistance from other tribes."

204. In opposition to this unfounded opinion, it is necessary that we not only show, as has been already done, that the population is actually sufficient for great improvement, but we must also prove, that professions are not separated by an impassable line, and that the population affords a sufficient number, whose religious prejudices permit, and whose inclination leads, them to engage in those occupations, through which the desired improvements may be effected.

205. The Muselmans, to whom the argument above-quoted cannot in any manner be applied, bear no inconsiderable proportion to the whole population. Other descriptions of people, not governed by Hindu institutions, are found among the inhabitants of these provinces; in regard to these, also, the objection is irrelevant. The Hindus themselves, to whom the doctrine which we con-

APPENDIX III

bat is meant to be applied, cannot exceed nine-tenths of the population: probably they do not bear so great a proportion to the other tribes.* They are, as is well known, divided into four grand classes, but the three first of them are much less numerous than the Sudra. The aggregate of Brahmen, Cshatriya, and Vaisya, may amount, at the most, to a fifth of the population; and even these are not absolutely restricted to their own appointed occupations.⁶ Commerce and agriculture are universally permitted; and, under the general designation of servants of the other three tribes, the Sudras seem to be allowed to prosecute any manufacture.

206. In this tribe are included, not only the true Sudras, but also the several castes whose origin is ascribed to the promiscuous intercourse of the four classes. To these, also their several occupations were assigned, but neither are they restricted by rigorous injunctions to their own appointed occupations. For any person, unable to procure a subsistence by the exercise of his own profession, may earn a livelihood in the calling of a subordinate caste, within certain limits in the scale of relative precedence assigned to each; and no forfeiture is now incurred by his intruding into a superior profession. It was, indeed, the duty of the Hindu Magistrate to restrain the encroachments of inferior tribes on the occupations of superior castes: but, under a foreign government, this restraint has no existence.

207. In practice, little attention is paid to the limitations to which we have here alluded; daily observation shows even Brahmens exercising the menial profession of a Sudra. We are aware that every caste forms itself into clubs, or lodges, consisting of the several individuals of that caste residing within a small distance; and that these clubs, or lodges govern themselves by particular rules and customs or by laws. But, though some restrictions and limitations, not founded on religious prejudices, are found among their by-laws, it may be received as a general maxim, that the occupation, appointed for each tribe, is entitled merely to preference. Every profession, with few exceptions, is open to every description of persons; and, the discouragement, arising from religious prejudices, is not greater than what exists in Great Britain from the effects of municipal and corporation laws. In Bengal, the numbers of people, actually willing to apply to any particular occupation, are sufficient for the unlimited extension of any manufacture.

* In the eastern districts of Bengal, the Muselmans are almost equally numerous with the Hindus. In the middle part of Bengal they do not constitute a fourth of the population. The west-ward, the disproportion is still greater.

⁶ Menu, Chap. 10 ver. 81, 82, and 83, and ver. 98.

208. If these facts and observations be not considered as a conclusive refutation of the unfounded assertion made on this subject, we must appeal to the experience of every gentleman, who may have resided in the provinces of Bengal, whether a change of occupation and profession does not frequently and indefinitely occur? whether Brahmens are not employed in the most servile offices? and whether the Sudra is not seen elevated to situations of respectability and importance: in short, whether the assertion above-quoted be not altogether destitute of foundation?

209. Cotton piece-goods are the staple manufacture of India. The various sorts, fabricated in different provinces, from the north of Hindustan to the southern extremity of the peninsula, are too numerous for an ample description of them in this place. A rapid sketch must here suffice. It will serve to convey some notion of the various manufactures distributed through the districts of Bengal and the adjacent provinces.

210. Plain muslins, distinguished by various names according to the fineness and to the closeness of their texture, as well as flowered, striped, or chequered, muslins, denominated from their patterns, are fabricated chiefly in the province of Dakha. The manufacture of the finest sorts of thin muslin is almost confined to that province: other kinds, wove more closely, are fabricated on the western side of the Delta of the Ganges; and a different sort, distinguished by a more rigid texture, does not seem to be limited to particular districts. Coarse muslins, in the shape of turbans, handkerchiefs, etc., are made in almost every province; and the northern parts of Benares afford both plain and flowered muslins, which are not ill adapted to common uses, though incapable of sustaining any competition with the beautiful and inimitable fabrics of Dakha.

211. Under the general appellation of calicoes are included various sorts of cloth, to which no English names have been affixed. They are, for the most part, known in Europe by their Indian denominations. Khasahs are fabricated in that part of Bengal which is situated north of the Ganges, between the Mahananda and Isamati rivers, from Maldah to Berbazu. Cloths, nearly similar in quality, and bearing the same name, are made near Tanda in the Vizir's dominions. Bastas are manufactured in the south-west corner of Bengal, near Lakhipur; and, again, on the western frontier of Benares, in the neighbourhood of Alahabad;

APPENDIX III

and also in the province of Bihar, and in some other districts. Sanas are the chief fabric of Oresa; some are made in the districts of Madnipur, more are imported from the contiguous dominions of the Marhattas. A similar cloth, under the same denomination, is wrought in the eastern parts of the province of Benares; Garhas are the manufacture of Birbhum; still coarser cloths, denominated Gezis and Gezinas, are wove in almost every district, but specially in the Doab. Other sorts of cloth, the names of which would be less familiar to an English reader, are found in various districts. It would be superfluous to complete the enumeration.

212. Packthread is wove into sack-cloth in many places, and especially on the northern frontier of Bengal proper; it is there employed as clothing by the mountaineers. A sort of canvas is made from cotton in the neighbourhood of Patna and of Chatgaon; and flannel, well wove but ill fulled, is wrought at Patna and some other places. Blankets are made every where for common use. A coarse cotton cloth, dyed red with cheap materials, is very generally used: it is chiefly manufactured in the middle of the Doab. Other sorts, dyed of various colours, but especially blue, are prepared for inland-commerce and for exportation by sea. Both fine and coarse calicoes receive a topical dyeing, with permanent and with fugitive colours, for common use as well as for exportation. The province of Benares, the city of Patna, and the neighbourhood of Calcutta, are the principal seats of this manufacture; concerning which we cannot omit to remark, that the making of chintz appears to be an original art in India, long since invented, and brought to so great a pitch of excellency, that the ingenuity of artists in Europe has hitherto added little improvement, but in the superior elegance of the patterns.

213. The arts of Europe, on the other hand, have been imitated in India, but without complete success; and some of the more ancient manufactures of the country are analogous to those which have been now introduced from Europe. We allude to several sorts of cotton cloth. Dimities of various kinds and patterns, and cloths resembling diaper and damask-linen, are now made at Dakha, Patna, Tanda, and many other places.

214. The neighbourhood of Moorshedabad is the chief seat of the manufacture of wove silk; tafeta, both plain and flowered, and many other sorts, for inland-commerce and for exportation, are made there more abundantly than at any other place where silk is wove. Tissues, brocades, and ornamented gauzes, are the manufacture of Benares.

Plain gauzes, adapted to the uses of the country, are wove in the western and southern corner of Bengal.

215. The weaving of mixed goods, made with silk and cotton, flourishes chiefly at Malda, at Bhagalpur, and at some towns in the province of Berdwan.

216. Filature-silk, which may be considered as in an intermediate state between the infancy of raw-produce and the maturity of manufacture, has been already noticed. A considerable quantity is exported to the western parts of India; and much is sold at Mirzapur, a principal mart of Benares, and passes thence to the Marhatta dominions and the central parts of Hindusthan.

217. The tesser, or wild silk, is procured in abundance from countries bordering on Bengal, and from some provinces included within its limits. The wild silk-worms are there found on several sorts of trees, which are common in the forests of Silhet, Assam, and the Dekhin. The cones are large, but sparingly covered with silk. In colour and lustre, too, the silk is far inferior to that of the domesticated insect. But its cheapness renders it useful in the fabrication of coarse silks. The production of it may be increased by encouragement, and a very large quantity may be exported in the raw state at a very moderate rate. It might be used in Europe for the preparation of silk goods; and, mixed with wool or cotton, might form, as it now does in India, a beautiful and acceptable manufacture.

218. Whether these among the numerous objects which present themselves, deserve the attention of the British merchant, or the consideration of the British legislature, we will not pretend to determine. If it should be even thought expedient and equitable that the wear of Bengal muslins be prohibited for the encouragement of English manufactures, (which appears to us extremely doubtful), still let the productions of Bengal have a free vent; numerous channels would be opened which could not possibly check, or interfere with, the industry of the British manufacturer. In short, to use the words of a committee of the Court of Directors, "The natives of India are equally British subjects; and every mind must revolt at an attempt to prevent those natives from improving the produce of their soil by their ingenuity and labour."

219. The commerce of saltpetre might be slightly noticed, were it not particularly interesting on account of the decided superiority of these provinces, which is in nothing more conspicuous than in this production. Considered with a view to science, the process by which it is obtained from earth, and its reproduction in the same ground, are curious and deserving of diligent attention;

APPENDIX III

but we shall not encroach on the province of others minutely to describe that process, or to speculate on the natural operation by which earth is impregnated with this salt. We shall only remark, that the elementary substances, which form nitrous acid, are known to exist in the atmosphere.

220. Common observers have noticed that grounds much trodden by cattle, the walls of inhabited places, and, in short, any rubbish wherein putrefying animal-substances abound, do naturally afford nitre and culinary salt by exposure to the atmospheric air. Artificial beds are made in India, as in Europe, upon these principles, but with less trouble than in most other countries. It is only necessary to collect the earth of old walls, or the scrapings of roads, cowpens, and other places frequented by cattle, and to leave mounds of such earth exposed to the weather. Both nitre and culinary salt are naturally formed there; and the saltpetre is extracted by filtering water through earth so impregnated with nitre, to dissolve and bring away the salt which it contained. The brine is evaporated by boiling, and, when cold, affords nitre by crystallisation.* The salt, thus obtained, is again dissolved, boiled, and scummed; and when it has cooled, after sufficient evaporation, the brine yields the saltpetre of commerce. In the same earth nitre is reproduced within two years in sufficient quantity to subject the earth to the same process, with equal success; mixing, however, a sufficient quantity of new rubbish, without which the nitre would be neither abundant nor easily collected.

221. The manufacture of saltpetre scarcely passes the eastern limits of Bihar. The parching winds from the west did not formerly extend beyond the same limits. It is a practical remark, that the production of nitre is greatest during the prevalence of the hot winds, which are perhaps essential to its abundant formation. In the change of seasons, which has been remarked within a few years last past, the hot winds have extended their influence to Bengal proper. Perhaps the manufacture of saltpetre might now be attempted with success in many districts of this province.

222. The actual extent of the manufacture would admit of a much greater production than commerce is now supplied with. The present quantity, including the importation

from provinces west of Bihar, falls short of 200,000 mans, the greatest part of which passes into the Company's warehouses at the first cost, which does not much exceed two rupiyas for a man. The rest, paying duty and charges of transport, and affording profit to several intermediate dealers, sells in general at four or five rupiyas the man, for internal consumption, or for traffic with different parts of India.

223. The exportation of saltpetre to Europe is, at all times, chiefly confined to the Company's investment, and exceeds 50,000 mans; for their annual importations into England, on an average of thirteen years, ending in 1792, amounted to 37,913 cwt. At the commencement of the late war, the exportation by private persons, whether British subjects or foreigners, was entirely prohibited, lest the enemy should be supplied with this requisite means of warfare from the British dominions. It was afterwards authorized under certain limitations.

224. In a controversy, which arose some years ago, between the East India Company and the manufacturers of gunpowder, and of other commodities made from saltpetre, these manufacturers contended, that Great Britain ought to be the General depot of saltpetre for the purpose of supplying foreign countries with gun-powder; and that, as a raw material, the importation should be free; or at least, that it should be supplied at so cheap a rate as to enable them to contend with every competitor.

225. To shew that it is not practicable to render Great Britain the general depot of saltpetre, the Company argued that, from the usual prohibition against exporting it in time of war, foreign nations cannot rely upon Great Britain for the supply of gunpowder, when most wanted; and are compelled to support necessary establishments for making it without considering the difference of expense.

226. There certainly is much force in the argument drawn from this circumstance; but, though it must ever prevent Great Britain from occupying the whole commerce of saltpetre and gun-powder, it need not prevent the British manufacturers from possessing the principal supply of foreign markets for gun-powder and other commodities made from nitre. The Company's sales of saltpetre increased after the price was reduced; but this has been attributed to the increased

* The culinary salt is afterwards obtained by farther evaporation of the brine; but it is much contaminated with bitter salt. In provinces of India, remote from the sea (in Ayudh, and in the district of Benares, for example), a similar process is followed to obtain culinary salt, without extracting the nitre. It is only necessary to evaporate the brine, until the salt fall to the bottom of the vessel; but the natives push the evaporation too far, often leaving the brine exposed to the heat of the sun, in large shallow vats, until nothing but dry salt remain. Impure as this salt is, it may be easily refined by obvious methods, which the author of this note has often practised, and by which he has obtained culinary salt, sufficiently pure for all domestic uses.

APPENDIX III

consumption by ships employed in British commerce. Were that the true cause, it would follow that Great Britain consumes more saltpetre when at peace than when engaged in war: for, by the statement, published by the Court of Directors, of the quantity of saltpetre put up and sold from the year 1763 to 1792, it appears, that they sold 295,673 bags in thirteen years of peace from 1764 to 1776, or 22,744 per annum; and 76,059 bags in six years of war from 1777 to 1782, or 12,676 per annum; and 331,301 bags in ten years of peace from 1783 to 1792; and, likewise, that the smallest quantities sold are in the four years from 1779 to 1782, when the war was most general, viz., 39,598 bags, or on a medium, 9,899 per annum. It seems almost incredible that Great Britain should consume less saltpetre when at war with all Europe than in a period of profound peace; and yet, as the account of the saltpetre sold by the Company is more authentic, and may be better trusted, than the accounts of the saltpetre and gun-powder exported from Great Britain, it follows, from the facts proved from their documents, that the great difference between the quantity sold in peace and in war must be ascribed to the circumstance of exportation being prohibited in war; and, consequently, that a foreign demand for saltpetre, and for the manufactures made from it is not wanting.

227. Notwithstanding the necessity for all military governments maintaining establishments for the home manufacture of saltpetre, the manufacturers of Great Britain, supplied with the raw material at the rate of thirty pounds for a ton, must command every market in Europe, so long as saltpetre cannot be made in Europe for less than three times that price. Unless foreign governments prohibit the importation of gun-powder, with a view to encourage their own establishments, their subjects will not, as in Spain, pay eight pounds sterling per 100 pounds by weight, for that which is made from Spanish nitre, while they can be supplied with British gun-powder at four pounds. We must, however contend that there is not sufficient reason for compelling the Company to supply the manufacturer with saltpetre at the rate above-mentioned. Whether it be imported by private traders or by the Company, the market ought to be left unshackled; and the manufacturers of gun-powder would be thus better secured, than by any compulsory expedients, in the certainty of an ample and cheap supply of saltpetre.

228. It does not appear upon what grounds they estimate that 100,000 bags of saltpetre could be used in Great Britain, if the importation were free, to enable them to rival foreigners in the supply of foreign markets; but certainly, if commerce were free between England and Bengal, no foreigners could

Prime cost to the Company of one ton of saltpetre, shipped for five current rupiyas the bag, Rupiyas 67	£	6	14	0
Freight, fifteen pounds the ton	..	15	0	0
Interest, six per centum on the prime cost	..	0	8	0
Insurance, three per centum	..	0	4	0
Charges of merchandise, ten per centum on the prime cost	..	0	13	6
Customs	..	7	15	0
Price of one ton	£	31	0	30 14 6
Deduct wastage at five per centum	..	1	11	29 9 0
Loss	£	1	5	6

Prime cost of a ton of saltpetre, to a free trader at an advanced price, shipped for eight rupiyas the bag, Rs. 107	£	10	14	0
Freight, six pounds the ton	..	6	0	0
Interest, five per centum of 16 14	..	0	16	9
Insurance, six per centum on 21 10	..	1	5	9
Charges of merchandise, at ten per centum on the prime cost	..	1	1	6
Customs	..	7	15	0
Price per ton	£	31	0	27 13 0
Deduct wastage five per centum	..	1	11	29 9 0
Profit	£	1	16	0

This exhibits a profit of seventeen per centum on the prime cost, after estimating every charge, but freight, higher than is incurred by the Company, and after allowing a better price to the manufacturer in India. By economy in the charges, saltpetre might perhaps be afforded for twenty-five pounds per ton. In Spain, the country of Europe most favourable to the manufacture of saltpetre, its prime cost is certainly not less than £83 10 per ton (see Townsend's Travels in Spain); but, if it be true that the Spanish monopoly does not gain by selling at thirteen pence and a half for the pound, the real cost is more than £120 per ton.

APPENDIX III

enter into competition with British merchants; and the whole saltpetre might, as every other production of Bengal, be transported to Great Britain on British bottoms. England would become the general depot for the saltpetre of India, which, underselling the nitre of Europe, would supply the foreign demand.

229. The production, increased in Bengal, and rewarded with a better price than is now left to the maker, would become one among many sources of wealth to these provinces. We shall take this occasion of mentioning other.

230. Sanguine expectations have been entertained, that many articles, which have been already tried upon a small scale, might become valuable resources; and that others, which are yet untried, might be introduced with success.

231. That hides are not so trifling an article, as might by some be supposed, is apparent, when it is considered, that raw hides constitute a twentieth part in value

of the importations of Portugal from the Brazils. Not fewer than 120,000 skins are annually exported from the Brazils, and are valued at more than 80,000 pounds. Almost the whole of these pass into England to be tanned. Could an equal quantity be exported from Bengal, it might afford to these provinces a resource by no means inconsiderable; and it might be satisfactory to Great Britain to accept from her tributary the articles which she now purchases from a foreigner.

232. It is thought, by persons conversant with the subject, that there would be no exaggeration in estimating the cattle of these provinces, including buffaloes, at fifty millions. If the number did not exceed a tenth part of this estimate, the usual casualties might furnish more than the probable demand will require. At present the carrier often neglects to take the hides of cattle which die a natural death.^a

233. Hides might be exported, either raw or in the state which they now come from

^a A bull's hide is sold by the carrier for about eight anas, but a buffalo's hide is a few anas dearer; if a better tanning be requisite, it could not raise the first cost higher than one rupiya; and the skins might be shipped, and every previous charge be defrayed, for less than two current rupiyas each. One hundred buffalo hides, or two hundred and twenty-five bullock hides, may be reckoned, on the following calculation:—

100 Buffalo hides at 2½ Ct.	Rs. 250 0 0		
225 Bullock hides at 1½ Ct.	337 8 0		
Freight, at £6 for a ton		587 8 0	or £ 58 15 0
			„ 12 0 0
			„ 70 15 0
Insurance and uncovered risk, at 10 per centum			„ 7 1 6
Charges, duties, etc., at 15 per centum on 77 16 6			„ 10 13 6
			£ 88 10 0

Until an actual trial be made of several thousand hides, the accuracy of this estimate cannot be confirmed; nor can it be stated, with probable correctness, what the hides might produce nett in the English market: but, certainly, they cannot be valued at less than ten shillings for a buffalo hide, and half that sum for a bullock hide.

100 Hides	at 10s.	£ 50 0 0
225 Hides	at 5s.	„ 56 5 0
		£ 106 5 0
Cost and charges as before		„ 88 10 0
		Profit . £ 17 15 0
325 Hides shipped, as before, for		£ 58 15 0
Freight on 2 tons, at 15l.		„ 30 0 0
		£ 88 15 0
Insurance and risk on £88 15 0		„ 8 17 6
		£ 97 12 6
Charges, duties, etc., at 15 per centum on £97 12 6		„ 14 12 9
		£ 112 5 3
Gross sales, as before		„ 106 5 0
		Loss . £ 6 0 3

APPENDIX III

the tanner and currier, or they might receive a better tanning; but, it is presumed, they could not be pickled to advantage; for the high price of salt must operate against that mode of curing them. It is sufficiently probable, that at the freight of six pounds for a ton, hides might be exported with advantage and afford a profit of twenty per centum; but the rate of fifteen pounds sterling for the ton is prohibitory. Other skins, cured in the hair or otherwise, might be added to the hides of oxen; such as the skins of sheep, goats, kids, calves, and deer.

234. Buffalo's horns might also become an article of export. They would be useful in several manufactures. The first cost of them is very inconsiderable, consisting only in paying the labour of collecting them; this is a very trifling addition to the trouble of collecting hides; and the charges of transport would, therefore, constitute nearly the whole cost.

235. Should freight be ever reduced to the lowest price at which it can be afforded, corn might possibly be exported from Bengal to Europe. England does often need supplies of wheat and barley from foreign countries; but India is, perhaps, too distant for timely intelligence of such an enhancement of price as will open the ports of Great Britain for the importation of corn. Rice, wheat, and barley, may be shipped in Calcutta for nearly the same price; namely, two and half rupiyas for a bag containing two mans. This, reduced to English money and weight, exhibits three shillings and four pence or three shillings and six pence the cwt. Add, thereto, freight at four pounds for the ton and insurance at ten per centum, and it appears that rice and corn, imported from Bengal to a British port, would cost the importer little more than eight pounds sterling the ton. It is evident that he would reap some profit, after defraying all his charges at that port, by selling rice and wheat at the price which they usually bear in the market of London, and a very sufficient profit in seasons when corn is dear.*

236. But it would be more certainly advantageous to export starch from Bengal. England annually receives no small quantity of this article from Poland and other parts of Europe; much is prepared in Great Britain. The makers of it are supposed to use other materials besides wheat; at the same time, the consumption of corn in this shape is considered as an evil, because it tends to enhance the price of the necessities of life. In every point of view, then,

it would be desirable, that Great Britain should be supplied with starch from her Asiatic dominions, instead of purchasing it from foreign nations, or instead of using home-made starch, for the preparation of which her labouring poor are stinted in their food. The usual price of starch will permit the importation of it from Bengal, so soon as freight is reduced to ten pounds the ton for the homeward voyage.

237. In treating of sugar, we did not urge the admission of rum from Bengal. Perhaps it may be necessary to leave the British market, for this article, to be supplied, exclusively, from the West Indies. Perhaps, on the contrary, the importation of it might be allowed without any injury to the West-Indian planters. It has, sometimes, become necessary to open the British ports to foreign rum; if they were always open to the importation of it from Bengal, as from a part of the British dominions, the cultivation of sugar would doubtless be greatly encouraged by this vent for the spirit, distilled from what is useless at a sugar-plantation if it be not so employed; and whether Bengal be not justly entitled to such encouragement for her productions deserves serious consideration. However, we shall restrict ourselves, without strenuously urging this point, to state the benefits of exporting rum, even at the present retail price of it, which varies from twelve to sixteen anas a gallon, according to the age and quality of the spirits. Purchased in larger quantities, rum, of the strength called London-proof, might be shipped for the lowest of these prices: and the owners of sugar-plantations and rum distilleries could export it much cheaper. The difference between the prime-cost, at one shilling and six-pence or at one shilling and nine pence for the gallon, and the sale from three to five shillings for the same measure, will amply defray insurance and freight, and leave sufficient profit to the merchant.

238. Liquorice is consumed in England more largely than the culture of it in the British Islands supplies; annual imports from other parts of Europe furnish the remaining wants of London. The plant, from the root of which it is extracted, is found in Bengal, both wild and cultivated; and inspissated juice might be prepared sufficiently cheap to bear the charges of transport to Europe. Another root, which England imports from distant countries, is a native of India, and has been thence transferred to the West-Indian islands. We allude to

* During the apprehension of scarcity in England, in the year 1796, large supplies of corn were drawn from Bengal. Due praise should be given to government, to the Company, and to individuals for the public spirit manifested by them on that occasion; but freight was so dear, that a heavy loss must have been sustained. No inference, however, can be drawn from this circumstance against future success when freight is lowered.

APPENDIX III

ginger, which is cultivated in every part of Bengal, and which can be conveyed to Europe cheap enough to undersell the produce of other countries. But neither this, nor the object last-mentioned, are of sufficient magnitude to detain us from the consideration of more important topics.

239. No argument occurs against the probability of annatto, madder, coffee, cocoa, cochineal,¹⁰ and even tea, thriving in British India. The countries, in which the English hold either dominion or paramount influence, from Heridwar to Cape Comorin, afford opportunity for experiment in soil and climate similar to those in which these products are obtained in other countries. It is well known to the naturalist, that many of the birds, insects, and indigenous plants of India, are found in South America; hence seems to arise an incontrovertible argument, that the soil and climate must be similar in whatever is essential to the production of those articles which South America now furnishes. That India might rival China in the productions which are, at present, exclusively supplied by that empire, is not, perhaps, so highly probable;¹¹ but, until expectation be disappointed by actual trials, made under other circumstances than the discouragements which we at present lament, it is reasonable to hope, that, in favourable circumstances, every article which we have indicated might be introduced with success.

240. The plant, from the seeds of which annatto is prepared, by separating the colouring matter which adheres to them, is already cultivated in Bengal. We are unacquainted with the history of its introduction into this province, but it certainly appears to be exotic. Trials have been made with this drug in the English market, but they do not seem to have been attended with sufficient success to warrant the spirited prosecution of the enterprise; although some specimens of annatto from Bengal equalled the best that is imported from Spanish America.¹² As the plant is perennial, and

thrives with little care or choice of soil, the culture of it may become more general, when the best method of preparing the drug shall have been ascertained by judicious trials and confirmed by successful experience.

241. Coffee-plants have thriven in botanical and private gardens throughout Bengal. It is even said, that the plant has been found wild in forests bordering on this province; but the sorts which have been here cultivated were imported from Arabia and from the French islands. Good coffee has been gathered, but in quantities too small for a sufficient trial of it; and no commercial experiment, so far as we are informed, has been yet made to ascertain whether it can be furnished cheap enough to rival the produce of the West India islands in the markets of Europe.

242. Madder (or more properly majit'h, for the Indian sort is different from the dyer's rubia) is a native of the mountainous regions which border on Bengal. For several years past majit'h has been annually exported to England, and has fetched half the price of Smyrna and Dutch madder-roots. If it were cultivated in India, instead of being carelessly gathered from plants, which grow wild in the forests of Morang, its quality would doubtless be improved by culture, and also by care in the drying of the roots and it would better rival the madder of Europe.

243. Bengal already possesses many other objects, which would be brought into notice by a more extended commerce. Red saunders and sapan wood, imported from other parts of India, are used for dunnage in the present trade; true sandal-wood might likewise be so employed, if it can at any future period, be brought to Bengal sufficiently cheap: other sorts of colouring or fragrant wood, which are actually found in these provinces, might be applied to the same use, and might, consequently, be transported to Europe free of any expense for freight. In default of these, wood for the cabinet-maker may answer the purpose of dunnage;

¹⁰ Since this was written (in 1794), the cochineal-insect has been brought to India, from the Brazils, by Captain Neilson. The spirit and patriotism of that gentleman (now deceased) should receive its due praise; but, unfortunately, the insects, which he brought, were of an inferior sort, covered with cottony down, and known by the name of *Grana Cylvestra* in the European market. They were, nevertheless, reared with care, and plantations of *opuntia* soon rose in every part of Bengal. The experiment seems to have been attended with disappointment, notwithstanding the high price of cochineal in Great Britain. The chief cause of its failure appears to be, that the plant is too quickly destroyed by the insect. If a better management be adopted, and the other variety of this insect be obtained from South America, or if the natives of Bengal be induced to engage in this enterprise, Europe may, hereafter, be supplied with cochineal from India to the full extent of its wants.

¹¹ It has been asserted, we do not know with what degree of accuracy, that the tea-plant grows wild on the island of Silan. This circumstance tends to confirm our opinion, that it is practicable to introduce the culture of tea into British India. [About this time Colonel Robert Kyd, the founder of the Indian Botanic Garden at Sibpur, Howrah, was trying to introduce the teaplant into Bengal. See my Howrah District Handbook, 1953, p. lviii—A. M.]

¹² Annatto, sold at the Company's sales, in 1795, averaged three shillings a pound; the best sold for six shillings and six pence. Spanish annatto usually fetches from six to seven shillings for a pound.

APPENDIX III

it is already ascertained, that stain-wood, and other ornamental sorts from Bengal, have been tried in England, and have been highly approved.

244. Besides those which we have already indicated, various drugs used in dying are now exported to England, and might be furnished more abundantly if the price of freight were lowered. It may be sufficient to enumerate galls, turmeric, safflower, or carthamus; and to propose myrobalans, which are here used in preference to galls, for various purposes, for which astringent substances are required; roots of morinda, which dye a very permanent colour on cotton; and blossoms of the sorrowful nyctanthes which give a durable colour to silk.

245. Gum-arabic, and many other sorts of gum, which are requisite in various English manufactures, and resins, which might be usefully employed, are the produce of trees that grow spontaneously in Bengal. We do not notice medicinal gums, although these likewise abound in India and in contiguous countries, because the demand for them is limited, and they can well afford the highest freight. For the same reason we leave unnoticed other medicinal drugs; though many sorts, which have found a place in the modern *Materia Medica*, and other, which ought, perhaps, to be admitted there, abound in Bengal.

246. Vegetable oils, which England imports from other countries, might be supplied from these provinces, especially linseed-oil. Flax might, perhaps, be prepared in Bengal, and rival the imports from the north of Europe in the British market; hemp, too, may be prepared from the plant already cultivated here for a different purpose, and relieve Great Britain from the heavy tribute which her commerce and navy now pay to Russia.

247. Tincal, brought from the mountains of Tibet, is among the present exports of Bengal; but, if we are not misinformed, most of it passes into Holland to be there refined. The English chemists are now said to possess the art of refining borax equal to that of the Dutch process, and London might become the mart for this article. It has been exported from Bengal in a purified state, and was sold in England for twelve pounds ten shillings per cwt. in 1795, when English refined borax fetched fifteen pounds; but it was subject to the same discouraging duty with Dutch borax. We shall not presume to give any opinion regarding the policy of continuing this heavy duty on an article, which could certainly be drawn exclusively to England, by permitting the importation of borax that has been refined in Bengal.

248. Vegetable and mineral alkalis may become a considerable object of commerce.

The fossil alkali is found in abundance, and the woods of Bengal would furnish potash in great quantities. Some is already exported to England; more would be sent thither were the freight moderate.

249. The preparation of sal ammoniac can be connected advantageously with the manufacture of saltpetre, or be separately pursued to a much greater extent than at present. Several other materials required for British arts and manufactures might also be prepared in Bengal by chemical process.

250. The jealousy of Great Britain respecting her manufactures, and her solicitude for extending them, regards finished works, which give employment to numerous manufacturers, and, at the same time, add more to the value of the raw material than the mere price of their labour. Intermediate preparations, for which machinery is substituted in place of manual labour, or to which the latter cannot in England be applied so as to add more than the price of labour to the value of the materials, do not constitute a manufacture of which Great Britain can be jealous. This observation seems applicable to cotton-yarn, which the British manufacturer might receive, in preference to cotton-wool, for such manufacturers as admit of yarn being prepared out of the verge of his own superintendence. It is well known, that cotton-wool from India has been approved in Europe: and, among the many various sorts of cotton grown in these provinces, whatever sort may be found best suited to the wants of the British manufacturer would become an object of extensive cultivation. But, since cotton-wool occupies much tonnage in proportion to its weight, it is desirable that it should receive a preparation which would greatly diminish the charges of transportation.

251. If silk could be imported in the cocoon, Great Britain cannot be so eagerly ambitious of more employment for the industry of her native subjects as to refuse the admission of silk wound at foreign filatures. Yet, to this supposed case the commerce of cotton is similar; and British manufacturers can have no better objection to the importation of cotton-yarn than they would have to that of silk-thread.

252. To a government enlightened as that is, by which British India is administered, it cannot be a trifling consideration to provide employment for the poorest classes. No public provision now exists in these provinces to relieve the wants of the poor and helpless. The only employment in which widows and female orphans, incapacitated for field-labour by sickness or by their rank, can earn a subsistence, is by spinning, and it is the only employment to which the females of a family can apply themselves to maintain the men,

APPENDIX III

if these be disqualified for labour by infirmity or by any other cause. To all it is a resource, which, even though it may not be absolutely necessary for their subsistence, contributes, at least, to relieve the distresses of the poor. Their distresses are certainly great; and among none greater than among the many decayed families which once enjoyed the comforts of life. These are numerous in India; and, whether they be entitled to the particular consideration of Government or not, they have certainly a claim on its humanity.

253. In this view, it appears essential to encourage an occupation which is the sole resource of the helpless poor. That such encouragement would supply commercial advantages to England, we think, can be also proved. For this purpose, it might be shown that cotton-yarn could be imported into England from Bengal cheaper than cotton-wool. Large quantities of linen and woollen yarn are admitted, duty free, from Ireland. If it be not considered as injurious to the

manufacturing interest of Great Britain to permit the importation of linen and woollen yarn, why discourage that of cotton-yarn from Bengal by a heavy duty, besides all the other impediments which we have so often occasion to notice?

254. Many dyes and medicinal drugs as well as aromatic seeds and other grocery now imported into England from the south of Europe and from the Levant, could be supplied from India.¹³ It is not necessary to the argument that for these and other articles which we have indicated, it should be shewn that British India could undersell every other country from which Great Britain is now supplied; nor that each article, separately considered, would become an important object of commerce: collectively, they might become a source of wealth to these provinces. That England ought not to discourage the commerce of her own subjects and tributaries, in favour of foreign nations, is an axiom which need only to be stated to be admitted.

¹³ As we have restricted ourselves to treat of one part only of British India, we have not noticed many objects, the consideration of which would have led us far from Bengal. It may suffice to remark, that India does furnish aloes, assafoetida, benzoin, camphire, cardamums, cassia-lignea, and cassia-buds, arrangoes, cowries, China-root, cinnabar, cloves, cinnamon, nutmegs, mace, elephant's teeth, gums of various sorts, mother of pearl, pepper (quicksilver and rhubarb from China), sago, scammony, senna, and saffron; and might furnish anise, coriander, and cumen, seeds, and many other objects which it would be tedious to enumerate.

APPENDIX IV

Extract from An Account of the District or Zila of Dinajpur

FRANCIS BUCHANAN HAMILTON (1808-1810)

On the Population of the District and the Causes which operate on its Increase or Diminution

On the important subject of the number of inhabitants, I have little or nothing to offer that is satisfactory, for no enumeration has been made by the officers of police or revenue.

A list, called Khaneh Shumari, containing a statement of the number of houses, families, tradesmen, castes, ploughs, looms, tanks and other public works, religious and civil, that are under the care of the magistrate, is very commonly kept in native governments, and seems to be useful, where attention is paid to have it tolerably exact, which may in general be easily accomplished, and I have never heard that the people were alarmed by the execution. I cannot however take upon myself to assert, that such a measure would not occasion alarm in Bengal, because the people, for some time at least, have not been accustomed to it; but I was told that several of the proprietors of land had made such lists for their own estates, without which indeed I cannot imagine how they should be descently regulated, neither did I hear that this had given any alarm or disgust to their tenantry. I was promised a sight of one of these documents; but the promise, as usual in such cases, was not performed.

The only manner that I have of calculating the population is from the extent of cultivation, which is of course liable to great error. Two calculations may be founded on this basis.

First. It will appear in my account of the agriculture of this district, that about 480,000 ploughs are required, and one man is the usual allowance for each plough. The men employed in actual agriculture cannot therefore be less than 480,000, and these I imagine will be nearly one-fifth of their families including old people and children, which will make the agricultural population 2,400,000. Now, considering the very imperfect state of agriculture, and the rudeness of the arts on this district, I do not think that we can add more than one-fourth of this number for all the other classes of society, specially as a quantity of grain is exported. This will give 3,000,000 for the total population, being about 558 persons for each square mile.

Secondly. An estimate may be formed the quantity of rough rice, after deducting seed, that I have calculated to be annually raised in this district, is about 36,800,000 mons, which according to the trials that I made will give 27,650,000 mons of clean rice. Now

I have supposed, that to the value of 3,200,000 rupees of rice, or 4,400,000 mons are exported, and there will remain for consumption 23,250,000 mons Calcutta weight. Then allowing $\frac{1}{2}$ seer of 96 Sa. Wt. for each person daily, which is the calculation usually made in this district, this quantity of rice will feed more than 4,000,000 of people; considerable deductions however must be allowed for grain that is wasted, distilled, consumed by fire, eaten by cattle, and used in the arts; but still this population seems to be exaggerated, and the calculation founded on the number of ploughs seems more suitable to reality.

The most remarkable circumstance is, that with this overwhelming population, there is a general complaint of a scarcity of workmen. The waste lands are attributed to a want of farmers; and common workmen or porters cannot be procured without the utmost difficulty.

The difficulty in procuring farmers for waste lands, I imagine, is owing to the extreme poverty of the generality of that class of men, who have no farther means than will just enable them to cultivate land that is in good condition, and from which they can receive an immediate and certain return: while the immense profit, which those who have capital make by lending out their money to necessitous neighbours, prevents them from, laying out money on improving the soil.

The difficulty of procuring workmen and porters proceeds in my opinion, chiefly from the want of skill and of proper implements to facilitate labour, so that the quantity which individuals can perform is exceedingly small, and almost every person is therefore engaged. It must, however, I am afraid, be allowed that a want of energy and activity in the people contribute also to the same end.

That the population should be enormous is not wonderful; for there are not probably 1,000 persons born in the district who are in the army, or who have left it for service of any kind, or indeed who have at all emigrated, except scoundrels who are under the power of justice, or who have absconded from a fear of the law. These are indeed very numerous.

The notions of both Hindus and Muhammedans inculcate in the strongest manner the duty of women to propagate the species, and I may venture to say that the injunction

is complied with, as far nearly as human nature will admit. A maiden at the age of puberty would be looked upon by the natives with disgust and contempt; but few indeed are left in this humiliating situation. Besides, the Muhammedan law, and that of three-fourths of the Hindus of this district, allows widows to live in a kind of left-hand marriage, which, although not so honourable as proper matrimony, is far from being considered as sinful, or as excluding them from society. Accordingly, except prostitutes, I may safely venture to say, that in the whole district there are not 1,000 women capable of propagating the species, who are not in a situation of doing so, either as wives or concubines. Even among the pure Hindus, whose widows cannot marry, there are comparatively few persons of that description; for most of them are from other districts, and a large proportion of their widows, who do not burn nor become prostitutes, retire to their families.

The hardships imposed upon Hindu widows of rank will be seen from many circumstances in the following account. They are stript of the numerous ornaments which they enjoyed while children and wives, and are not even allowed to wear a red border to their dress; while they are compelled to sleep on the ground exposed to insects and vermin, and to act as menial servants to the vain beauties who are decked out in the ornaments of which they have been deprived. Women of a high mind often prefer the funeral pile, while many others submit with patience, especially in the families of land-holders, when they have young sons totally incapable of managing their affairs; but it is not wonderful that many young women, conscious of their beauty, and thoughtless concerning its decay, scorn to submit to such harsh regulations, and seek for refuge in the house of a bawd.

In fact, the rage for marriage is such, that a man, who has not money sufficient to defray the expense of the ceremony is every where willing to borrow it at any interest; and this involves himself and offspring in difficulties, from which death alone can relieve them. In some divisions I found, that even common labourers sold their services for from 18 to 24 months, in order to raise at once a sum sufficient to enable them to marry; and during that time, the wife of course is left to provide for herself in the best manner she can. The master in such cases finds the servant in food and raiment.

It may seem surprising, in a country where procreation has such enouragement, and where perhaps there is less emigration than in any place whatever, that the species should not multiply so fast as to render famine common, or that a single inch of ground should remain unoccupied.

I have already endeavoured to account for part of the lands remaining waste from poverty of the farmers, and the high profits on capital. With respect to the supply of food, I must state, that in the remembrance of man there have only been two famines; one in the Bengal year 1177, and one in the year 1194, the one 21 years and the other 38 years ago. Both these were owing to very unfavourable seasons, when a great part of the crop failed; and in the latter it was only in some parts of this district that any considerable number perished. In common years, or even in times of scarcity such as the present year 1808, such excess of misery is unknown; and none, so far as I could learn, perish of hunger: on the contrary, there is usually a great abundance of food.

There seem to be two principal means that keep the population within the bounds of subsistence; one is early marriage, and the other disease.

In all the larger animals nearly resembling man, with whose manners we are well acquainted, such as the horse, ass, cow, or sheep, it has been found, that where the sexes have been allowed to unite so soon as actuated by desire, the offspring was puny, and the operation uncertain; and I think we may safely extend the analogy to the human race. Some peculiar tribes of men in India, especially those in the western parts, and the bearers of palanquins, are no doubt strong men; but it is not within my reach at present to form a rational conjecture concerning the reason why these differ from their countrymen. It suffices to say, that the inhabitants of Dinajpur are a puny, weak race, and are far from having numerous families, notwithstanding their early marriages, which on the woman's side almost always are consummated before the age of 13 years, and on the man's, very commonly before the age of 16. In the families of land-holders, it is very uncommon to trace three successive generations; and in order to preserve the succession recourse must be had to adoption, more usually after one regular succession than after a longer interval. These land-holders are all married when children, and enjoy an abundant diet, comfortable dwellings, and plenty of warm clothing. It may indeed be with justice said, that the villages of Dinajpur swarm with children. This however I believe does not proceed from the prolificness of individuals, but is the natural consequence of the people being unhealthy and shortlived, which of course requires a large proportion of children to the number of adults. The moralist, who with a view of checking vice, should succeed in introducing early marriages, would, I am persuaded produce great injury. The breed of men would not only degenerate, but vice would become more predominant. Female beauty reaped too early almost instantly

APPENDIX IV

decays, disgust soon follows, and the husbands, like the land-holders of Dinajpur, would soon abandon themselves to intrigue.

The grand check however to the excess of population is disease, which makes ample room, and fever annually sweeps away immense numbers; although I do not think that any means would ever render Dinajpur a country remarkably salubrious, yet I am persuaded, that the excessive prevalence of fever is more owing to the want of stimulating diet, and of comfortable lodging and clothing, the consequence of poverty, than to any extraordinary degree of malignity in the air; and the great poverty of the natives is no doubt to be chiefly attributed to their improvidence, especially in forming early marriages, by which they have been involved in debt. The fevers are generally of the remitting kind, and terminate fatally in a few days; but more commonly they terminate in agues, or commence under that form, and are accompanied by enlargements of the spleen and dropsical swellings, which carry off the sufferer after long confinement. In fact, there are few who escape with less confinement than one month in the year, and the whole are a sickly, poor looking people.

The fever makes such ample havoc, that little room seems to be left for other diseases, some of which however are objects of great curiosity. I was prevented from gaining a proper knowledge of them, partly by my constant travelling, and numerous other avocations, which were incompatible with an attendance on the sick, and partly from my having met with no native physician. The practitioners of medicine are confined to Dinajpur and Maldeh, and were so much engaged, that I could not procure an interview of length enough to afford satisfactory information.

The small-pox on the whole does little injury, and the inoculation for that disease is pretty generally diffused. The inoculators are of both religions and of all castes. One of them, a Hindu, gave me the following account of his plan. Every year, so soon as the natural disease appears, which it usually does between the 10th of February and 12th of March, he begins to inoculate, and the season for inoculation continues until the 12th of May. Some years the spontaneous disease does not appear, and then he cannot operate, having no means of procuring matter. The inoculator in the course of his practice remembers this having happened four times. When he has found a person under the natural disease, he opens the pustules with a rude iron bodkin, and collects the matter on some cotton wool. It will keep three days, and no longer. He uses it by moistening the

cotton in water, and rubbing it on the skin, and then in that part he makes eight or ten punctures with a needle; afterwards he rubs the impregnated cotton upon the punctures. Children are not inoculated under three years of age, but generally before ten. Those who are too young for inoculation, are carefully separated from those who undergo the operation, and are made to drink sugar and water, over which some incantations to Sitola have been performed by a brahmin. Previous to the operation, the child is washed, and afterwards is not allowed to eat fish; meat is nearly out of the question, but it seems to be allowed whatever else it chooses, except cakes or bread; and sugar, plaintains, water-melons, cucumbers, and cold boiled rice are recommended as the most proper diet. Two or three times a day it is washed in cold water. Should a fever accompany the eruption, the inoculator repeats a spell (Montor) over some water, which he gives to the child to drink. He knows of no other remedy, and his skill is supposed to consist in the knowledge of a proper spell, which is a secret Muhammedan inoculators, as well as Hindus, pretend to a knowledge of. Very few indeed of those who are inoculated die, even in the worst seasons; for although the disease appears naturally almost every year, there are certain seasons, once in 10 or 12 years, when it attacks more generally than others, and it then proves uncommonly fatal. In such seasons, there dies perhaps one in a hundred of those who are inoculated. It is indeed chiefly in such seasons, that the spontaneous disease proves fatal to the natives of Dinajpur.

The inoculators, when not employed in the line of their profession, cultivate the ground with their own hands. Their fee is from one anna to one rupee for each child, according to the circumstances of the parent; and they are by no means respected, nor considered as on a footing with the practitioner of medicine.

The vaccine inoculation is totally unknown to the natives, even by report.

Measles appear occasionally, but are seldom fatal. Fluxes and choleras are common in spring, and rheumatisms in the cold weather; but these seldom kill.

The pox* is rather uncommon; and except near the town, married men are ashamed to infect their families. In and near Dinajpur, indeed, it is supposed that one person in four has this disease. Neither can the itch nor ring-worm be considered as very common, and they do not affect more perhaps than one-fourth of the people, and these of the lowest ranks, which in India must be considered as a very moderate proportion. The ring-worm is the most prevalent.

These diseases are common to natives of

* Syphilis—A. M.

APPENDIX IV

Britain and India, but there are others peculiar in some measure to the latter, which deserve particular notice.

The kind of leprosy, called *Kushtho*, or *Mohavyadhi*, (that is, the great disease,) is common, although not quite so prevalent as in some parts of Bengal. Some estimate the number affected at one in the hundred, while in other districts not more than one in 500 are supposed to suffer. I am doubtful whether or not it has yet been described by nosologists, or at least clearly distinguished from some diseases to which it has a strong resemblance; but not having it in my power to consult the work of *Sauvages*, I cannot speak positively. In this terrible disease, the skin becomes wrinkled and discoloured, the joints of the hands and feet drop off, and the patient becomes a most loathsome object. It has no tendency to spontaneous cure; but continues to afflict the patient until death. I am certain that it is not infectious; so that in several points it seems to differ from the leprosy to which the Jews were subject, and which I believe is that called *Lepra Arabum* by nosologists. I have known women, who had laboured under it for years, and who had healthy children, which they suckled, without communicating infection; and I am here assured, that men labouring under it have for years cohabited with their wives, who have continued exempt. It is reckoned however hereditary, and I believe with justice; but it seldom makes its appearance before the age of puberty. By the natives here, it is reckoned of two kinds; *Papoj*, which is inflicted on those who are great sinners, and which may be cured, if the gods please, by a pilgrimage to *Baidyonath*, near *Janggira*, on the Ganges; and *Kormoj*, which is inflicted on those who have been sinners in a former life. Were it not for the overbearing credulity of the natives, one might from thence infer, that the disease sometimes goes away spontaneously; but after much inquiry, I have not been able to learn of one case. It seems in Bengal to occupy the place of scrofula being nearly as common as that malady is in the colder parts of Europe. In a native of India, on the contrary, I have never seen a clearly marked case of scrofula; and believe such have rarely, if ever, occurred. I know from repeated trials, that arsenic is no cure for this leprosy, as has been pretended; and I have also tried mercury in vain. Neither had a full and nourishing diet any better effect in a fair trial, which I made by order of Lord Teignmouth, when that nobleman was Governor General. Mr. Halliday, surgeon at Dinajpur, informs me that he had had some success with the mineral acids.

The leprosy, in which the skin of the native becomes white (*Switre*) is but rare, although at all times there are several examples of it

in the district; and a similar state often probably takes place in the skins of Europeans without being observed or considered as a disease. At least I have seen the skins of some Europeans, that exactly resembled those of the Indians who are affected with this disorder.

The leprosy, accompanied by an enlargement of the leg, and which has been called elephantiasis by nosologists, has been often considered as a mere symptom of the first mentioned disease. The natives, I believe, with great justice consider them as perfectly distinct; and the disease which consists in a swelled leg they call *Godh*. In Dinajpur it is not a rare disease, and in some divisions it was said that one person in 200 labours under it, but in others, it is not so common. It generally commences in adults, and is accompanied by repeated attacks of pain and fever, which the natives say appear always either at the full or new moon. Each attack of fever is accompanied by an increase of swelling; but when this has enlarged to a certain extent, the attacks of fever gradually become less and less violent, and produce less and less effect on the swelling; so that afterwards the patient enjoys good health, lives to the usual age, and suffers no inconvenience, except from the size of the tumour. Both sexes are subject to the three diseases that have been last mentioned.

The women, in a few parts of this district, chiefly near the *Punabhoba* and *Atreyi* rivers, are subject to the indolent swelling in the throat, which seems to be exactly the same with the *goitre* of the Alps. By the natives it is called *Gologondo*, and its progress is nearly the same with that of the *Godh*; but the fever and pain are never so considerable, and the former is often not perceptible; while it is increasing, however, there are always slight paroxysms of pain. No remedy is known for either of these diseases. The male sex in this district, as well as in other parts of India, are subject to a swelling apparently of a similar nature, but which affects the testicles. Its paroxysms of increase are accompanied by fever and pain, which last three or four days, and are said always to appear at full or new moon. It seldom attacks persons under 20 years of age, and usually commences on only one side. In this stage, it is called *Eksira*, and sometimes is cured; but when both sides are affected, especially after a few paroxysms, and after it has acquired the name of *Korondo*, no remedy is known. After some time, the paroxysms of pain and fever entirely cease, and the swelling becomes stationary; but it is extremely inconvenient from its size, and frequently destroys the powers of generation. It is not, however, liable to degenerate into cancer, nor to affect the general health. The usual size is, that of

APPENDIX IV.

a man's head, but it is often much larger. The natives consider these three last diseases as a species of the same genus, and I believe with perfect accuracy. This last species is not so common in Dinajpur as in the southern parts of Bengal, but still many are affected.

Two febrile diseases, accompanied by local inflammation, are also exceedingly common, but are not epidemic. The one is by the natives called *Sannipatik*, and is a swelling and pain of the submaxillary glands, accompanied by fever. It frequently attacks the same person at different times, in the course of his life. This disease is very common in Dinajpur, and Mr. Halliday considers it as the same with the mumps (*Angina parotidea*) and treats it with emetics. I cannot say that I am entirely satisfied concerning the identity of the two diseases. Many of my followers suffered from it, and some more than once; but it was a mild complaint, without any symptom that required so

active a medicine as an emetic, otherwise I should have tried the plan recommended by Mr. Halliday.

The other disease is very common in every part of India, and by the natives is called *Nase*, or *Nakra*. It is a considerable fever, accompanied by much drowsiness, and by general pains, especially in the neck and shoulders. The inner membrane of the nose is considered by the natives as the seat of the disorder; but there is no considerable uneasiness in that member. The membrane is however turgid with blood. The cure applied by the natives is to draw blood from the part, by thrusting a sharp-edged grass into the nose. So far as I have had occasion to observe, the disease would readily terminate in health, without assistance; some persons however pretend to have great skill in knowing the proper time for introducing the grass, and say that then the disease is ripe.

APPENDIX V

Extract from An Account of the District or Zila of Dinajpur

By

FRANCIS BUCHANAN HAMILTON

The Land Tenures of Dinajpur (1808)

FARMS.—It is said, that in most parts of this district, Mr. Hatch introduced a regulation, by which the size of farms is restricted not to exceed 50 bighas. At any rate the people every where almost said, that there is such a regulation, and therefore often concealed the real extent of their farms. I have not heard the reasons that were assigned for this restriction, although it was probably with a view either of doing away the manner of cultivation by sharing the crop, or from some scheme of equalizing property. It may have also been made in consequence of representations from the landlords, who pretend, that large farmers neglect their lands. Neither do I know certainly whether or not such a regulation exists; for the land holders hold out a pretence of that nature, in order to render the large farmers more dependent on them, by granting them leases, that they imagine are not strictly legal.

With whatever view it was framed, or alleged to be framed, I have no doubt in stating, that the observance of such a regulation would be highly injurious both to agriculture, and to the labourer. These people, who cultivate land for a share of the produce, are in a better state than common labourers, and must fall to that level, unless they are employed as at present; for they have not stock sufficient to enable them to cultivate without assistance. Besides the reducing farms to 50 bighas would compel every rich man to give up agriculture, and to remove his stock to some other employment, which of all other circumstances would be that most destructive. Indeed the quantity of stock belonging to actual farmers is already a great deal too small, and the observance of this regulation would go near to banish it altogether.

Like other useless or pernicious regulations, however, this is constantly evaded, and leases for 50 bighas each are granted to 5 or 6 persons of the same family, it being understood, that the whole belongs to the principal person. The actual size of the farms is very various. I have already stated, that the usual extent, which can be cultivated by one plough, is 10 large bighas, or 50 Calcutta bighas, or 5 acres, but many persons rent a much smaller extent. These are chiefly tradesmen, who wish to have as much rice as will maintain their families for some time before harvest, when traders take advantage of the demand, and usually raise their grain

to an immoderate price. These tradesmen do not cultivate the fields themselves, but employ people to do it for a share. The people also, who engage in this cultivation for a share, have in general 2 or 3 bighas, for which they pay rent, and employ their leisure time in cultivating land for their neighbours for one half of the produce, on which account they are called Adhiyars, or half people.

About a half of the farmers, or those who rent lands and follow no trade, have one or two ploughs, and seldom employ servants. The head of the family and a son or brother hold the ploughs; only, if there is no boy in the family, one must be hired to tend the cattle. If the farm is not quite large enough to employ their ploughs the whole year, they cultivate somewhat additional for a share of the produce; and, if it is of a clay soil, which occupies the farmer only 6 months in the year, they hire themselves out as day labourers to those who cultivate free soil or as porters or labourers to merchants and manufacturers of sugar and indigo. Middling farmers who have 3, 4 or 5 ploughs, form perhaps 7-16ths of the whole. These are not exempt from holding the plough, but hire in servants to make up the deficiencies on the number of labourers, that may be in their families, that is to say always one man for each plough, with a number of boys sufficient to take care of the cattle. Where the soil is free, and produces a variety of crops, especially sugar cane, more men are required at some seasons of the year, particularly in the cold season, when there is nothing to do in the clay lands. Persons of this kind never hire themselves as labourers; but those who live on a clay soil employ the 6 idle months in purchasing rice, and carrying it to the marts, by which they have considerable profit. Those who live on a free soil have neither leisure nor cattle to spare for the purpose and must sell their grain to their neighbours. The profits on this kind of traffic seem to be considerable, and it is owing partly to this, in all probability, that the farmers are richer on clay lands, that produce nothing except rice, than those who occupy the richest lands in the district.

About one farmer in 16 may rent from 30 to 100 acres. These seldom labour with their own hands, but keep as many ploughs as they have dependent relations, or hire two or three additional men. The remainder of their lands they give to people who cultivate

APPENDIX V

it for a share. These men have in general large capitals, and advance money or grain, both to those who cultivate for a share, and to their other necessitous neighbours, to enable them to live, while the cultivation is going forward. It may indeed be said, that their stock carries on at least one half of the whole cultivation of the country. Most of the Adhiyars and small farmers are more indebted to them than the whole value of their stock, and for six months in the year would starve, did not the wealthy farmers advance them grain to eat. It is they who even furnish the seed, so that whenever one of them is discontented, he gives up his farm, and retires with all his dependents to some other estate, where there are waste lands, which his stock enables him to clear. The village, which he left, is then for some years unoccupied, until the landlord can find a fugitive of the same kind; and in general must use a good deal of solicitation, before he can induce the farmer with his dependents to settle. On this account the landlords do not like this class of men; but it is evident, that they are absolutely necessary; unless landlords themselves would advance money to their necessitous tenantry. In a few places I heard, that this is done, but it is only practicable to advantage on very small estates, and the having large farmers, who are able to supply the stock, is a vast advantage to all persons, that have estates of a respectable size. It is true, that these large farmers exact enormous profits for whatever they advance to their necessitous dependent; but still they are of infinite use to these people, who without their assistance would be instantly reduced to the state of common labourers, and often to beggary. It must also be considered, that the risk of advancing is great, where there is very little inclination among the people to discharge their fair debts. A clamour however, as usual, has gone abroad against the wealthy farmers, who are considered as mere flayers of the poor, and no people privately join more earnestly in the cry than the landlords. In public however they court the wealthy farmers, and it is alleged often purchase their assistance to enable them to fleece the poorer tenantry. A landlord or his agent assembles his people, and states, that he is in want of money to build a house, to perform a pilgrimage, to celebrate some holiday, to marry a son or a daughter, or to alleviate the pecuniary distress in which he is involved, and solicits the assistance of his tenant. The rich farmers have been previously gained, and give their consent to a general assessment, and the others follow their example, rather than quarrel with people on whom they depend; but it is the poor only who pay. By this mean rapacity the landlord always renders himself more dependent on these farmers, as

he squeezes from his other tenantry, what might enable them in time to cultivate with their own stock.

It must be observed, that the wants of the smaller farmers, and of those who cultivate for a share, does not originate from the large farmers. It may perhaps have sometimes been owing to the exactions made by landlords; but in most cases it has arisen from their own imprudence in spending on marriages or other ceremonies, the means that were absolutely necessary for their independent existence; and in this country the rate of interest is so high that when once a person is involved, nothing but some very fortunate accident can possibly relieve him. He receives the rice, that is necessary for seed, or for his maintenance at the high rate, which prevails for six months before the harvest, and he must pay it back at the low rate which is put upon it, when the market is glutted by every necessitous creature bringing his corn for sale, the moment that it has been beaten from the straw. He lives in tolerable plenty for six or seven months, and then is reduced to the same straits as before, and is again necessitated to borrow rice on as disadvantageous terms as formerly. The interest often therefore appears moderate enough; but the manner of payment renders the loss enormous.

I have already stated, that the lands now occupied in the district, exclusive of houses and gardens amount to somewhat above 719,400 bigahs. Of these perhaps 19,400 may be reserved in the occupation of the proprietors, who cultivate them by their servants, or by those who take a share. The lands thus occupied chiefly belong to petty Zemindars, or to the proprietors of small estates that are not taxed. Of the 700,000 remaining Bigahs perhaps 40,000 are occupied by tradesmen, and poor people who have not a sufficient quantity of land to employ one plough; the remaining 660,000 may be occupied as follows:—

6,600 principal farmers at 165 bigahs on an average 10,89,000 rs.; 8,800 great farmers at 75 bigahs, 6,50,000 rs.; 11,000 comfortable farmers at 60 bigahs, 6,60,000 rs.; 19,800 easy farmers at 45 bigahs, 8,91,000 rs.; 55,000 poor farmers at 30 bigahs, 16,50,000 rs.; 1,10,000 needy farmers at 15 bigahs, 16,50,000 rs.; total 66,00,000 rs.

I have already mentioned the stock of implements, that is proper for a farm of one plough, to be 3½ rs.; but in farms of one plough, or when a man cultivates for a share, the hatchet is generally omitted, and in larger farms one Dhengki and one hatchet is sufficient for the whole, so that the average rate cannot be reckoned at more than 2½ rs.; then two oxen for the plough are six rs. 1 cow, 3 rs. seed on an average 20 seers of rice for a bigah. This is furnished to the neces-

APPENDIX V

sitous at double the harvest price, but this exaction ought not to be charged to the expense of stock. I therefore take it at the proper price, or suppose that the farmer brings it with him, at this rate the seed for each plough, reckoning the average price of rice at 90 seers for the rupee, will be 3 rupees 5 annas 4 pice, thus then a farmer on each plough ought to have at least, implements 2 rupee 12 annas; cattle, 9 rupees; seed, 3 rupees 6 annas; house, 5 rs.; furniture, 3 rs 4 annas; clothing and ornaments, 4 rs.; food for six months until his first crops are fit for use at 2½ rs. 15 rs.; rent for six months at 10 annas a year, 4 rs. 11 annas; total, 47 rs. 1 anna.

Rich farmers generally have higher priced cattle, but their expenses for houses, food &c. do not increase in proportion. Thus a farmer having 4 ploughs cannot expend 10 rs., a month for food. The quantity of stock, required for rich land of a free soil, differs very little from what is required for a stiff clay; but this does not render the situation of the farmer on the loose soil more comfortable; for he must labour or keep servants the whole year, while the farmer in the clay lands keeps servants six months in the year only, and in the other six may employ himself and cattle to great advantage, if poor as a labourer, and if rich as a trader, and in fact, as I have frequently mentioned, the richest farmers are those on clay lands, who rear little or nothing except rice. This however does not proceed entirely from their farms being of a more profitable nature, but in some measure also from necessity. The merchants are not so eager to purchase their produce, as they are the sugar and silk raised on the richer lands, and therefore they do not so readily receive advances; consequently the inconsiderate have not the same facility in anticipating the returns of their farms, which is the general source of the wretched poverty, that prevails in this country.

I have already mentioned, that the greater part of this stock is borrowed; and on grain farms is advanced chiefly by the principal farmers before mentioned, many of whom have capitals of from 5,000 to 20,000 rs., but perhaps 5,000 may be about the average. Much also is advanced by merchants who reside between Moorshedabad and Calcutta both included, who annually purchase about 40,00,000 rs. worth of rice in this district, and make advances for a part. The agents of Zemindars in general allege, that small tenants, who cultivate with their own hands, have their farms in best order. This however may be doubted, as the agents have an interest in employing such people alone; for these are the men with whom agents can take the greatest liberty.

When the settlement of the company's revenue was made, Mr. Hatch, who valued the greater part of this district, seems to have proceeded on a general estimate of the lands of each pergunah, and for that purpose he seems to have divided them into two kinds, one that produced two crops, and the other which produced only one, and the rent of the one was usually considered as double that of the other. This may have answered his purpose sufficiently well; both for ascertaining the real value of the district and for fixing a maximum of rent beyond which those who were then in possession of the lands could not be desired to pay; but his mode of valuing estates by a general average has usually been followed by the proprietors, and both they and the farmers pretend, that they are bound to let their estates at no higher rate. This it is said is not strictly true, and would be a great absurdity. Everyone must be sensible, that much land which gives one crop only is more valuable than a great deal that gives two, and the only rational way in which land can be let, is by valuing each farm. The Zemindars however have probably adopted Mr. Hatch's plan, as a means of checking fraud in their servants and agents; for few of them manage their own estates. The usual plan therefore employed by the agents is to state a certain portion of each farm as land producing two crops (Poli) and a certain part as land producing one crop (Khyar), so as to make the amount, at the valuation which Mr. Hatch took, equal to the rent, which the farmer is to pay. This indeed, seems to be the best mode, which could have been adopted, as there are very numerous objections to the only other way that I have seen used in such cases, which is to give each man a share of all the different soils in the estate in proportion to the extent of his farm. This manner of checking their agents in the letting farms, by means that were intended for other purposes, has been in some instances attended with considerable loss to the proprietors. Where there is a great extent of poor land it cannot be brought into the neighbouring farms, even at the lowest rate of average rent; and is therefore unavoidably out of lease, and is only occupied occasionally, in which case the landlord, who resides at a distance, seldom receives any rent.

The avowed rent, so far as I could judge, seemed to be in general less than one fourth part of the produce, except on lands that produce rich crops, especially sugar-cane. On the whole, however, one fourth of the produce ought not greatly to exceed the actual rent, for the houses and yards are always rented at the highest rate of arable land, and sometimes even at more, and yet produce nothing. The rent is always paid in money. The usual time of entry is in the

APPENDIX V

two months of spring, from the twelfth of March to the twelfth of May. During these months no rent is paid; but in the month that precedes, and in that which follows the term of entry, 1-6th. of the rent is paid; and in each of the other 8 months 1-12th. is due.

In almost every part of the district the leases are granted in perpetuity, and the tenants will not accept of any other. In some places they even pretend to a right of perpetual possession at the usual rate of rent, if they have occupied a farm for ten years. This is probably one of the greatest bars to industry and improvement, that can take place in any country; as the landlord has no inducement to lay out money in improvement, or indeed to attend to the condition of his estate, farther than to get his rent as easily as possible. It may indeed be safely said, that a gradual and moderate rise of rent is the grand source of wealth and prosperity to every country, and the additional exertions which are required from the tenant always, I believe, have turned out still more for his benefit, than for that of the landlord. The proprietors of small free estates, who neither pay rent nor tax, are a proof, that the condition of the peasant is improved by paying rent. These lands are miserably neglected, and the wretched owners would just exert themselves so much, as to prevent themselves from perishing of hunger, were they not religious mendicants, who find an additional resource, that keeps them in about as good a condition, as those who cultivate a similar extent of land, that pays rent.

But this perpetual possession, which is so eagerly sought after, is almost nominal; for, so far as I could learn, not one tenant in four resides seven years on the same spot, and the bulk of them are constantly changing from one estate to another. The only advantage attending leases in perpetuity is the encouragement, which it gives to the tenant in forming plantations: but these are formed to much more advantage either by the landlord himself, or by his engaging to pay the value at the expiration of the lease, as is usually practised in Malabar, where the plantations are of much more importance than they are here. Still farther, a particular exemption may be made in favour of plantations, as is done in Mysore, where lands occupied in this manner are the only ones, which can be said to be private property. Poor lands, that are only cultivated occasionally after a fallow, are let for the time, that they are to be occupied, upon whatever terms the parties can agree; and the usual terms are one half of the produce; although the proprietor is sometimes satisfied with a low rent in money.

The whole expense of cultivation of every kind cannot be reckoned at more than one half of the produce, even on lands, that pro-

duce only ordinary crops; as men can be procured, who will cultivate it on these terms, and who live better than common labourers. These persons seldom cultivate the lands, that produce the richer crops, which are generally reserved by the farmers for their own use. For the sake of round numbers, I shall take the rent at one fourth of the produce, the farmers therefore have at least one fourth of the gross produce of the lands as clear profit, besides the profit, which they have from the milk of their cattle, and from their plantations. Now the gross produce of the cultivated lands being 20,000,000 rs., their profit from the lands is 50,00,000 while the whole value of the milk procured from farmers' cows has been estimated at 12,00,000, and in all probability this is exaggerated. The greater part of this, however, should be considered as the value of the rice, straw and bran, on which the cattle feed, and which have not been brought into the account. But in fact, so far as I could find on investigation, the avowed rent does not amount to one fourth of the produce, even excluding milk, bamboos and mangos, all articles of considerable value. Although therefore imprudence, or too great a compliance with custom may have involved the farmers in debt, the interest of which consumes a great part of the above sum, the profits of the occupation are no less certain.

It is indeed alleged by the farmers, that their poverty is not owing to an imprudent anticipation of their produce; but has arisen from the rapacity of their landlords, who exact much more from them than the rent mentioned in their leases. I have already explained the manner in which, I believe, almost every landholder, and almost every individual employed under them, as far as the extent of their jurisdiction goes, beg money from the poor farmers; and, so far as it is voluntarily given, there can be no right in indifferent persons to check the practice, farther than by reprehending it as a mean custom, of which every landholder should be ashamed. The landlord, however, were he not tied down by perpetual leases, would have the most evident interest, and most indubitable right to prevent his dependents from taking a farthing; for the richer his tenants were, the more rent they would be able to pay. At present it is totally indifferent to him what their condition is, so long as they do not run away. The poorer farmers indeed very universally complain, that they pay a great deal more than their rent, partly from fear of giving offence, and partly from mere force or fraud. They allege, that unfair receipts for their payments are given, few of them being able to read; and in order to defray every kind of extraordinary expense, which the landholder or

APPENDIX V

his agents can incur, that money is levied from them by confinement, and even sometimes by blows. The apparent expenses of the agents being much greater than their avowed allowances, leaves no room to doubt of their being in general rogues; but whether their profits arise from oppressing the farmers, or from joining them to cheat their masters, can be determined by those only who have judicial authority to investigate the matter. I am however inclined to believe, that the landlords suffer more than the farmers; because, when I recommended an application to the courts of justice, to most of those from whom I heard complaints, the universal answer was, that there was no justice for a poor man against a rich, and that the rich farmers were never molested. A complaint of such a general nature being certainly false makes me doubt of the truth of a great part of the others. It must however be stated, that the vast number of men employed in collecting the rent, which far exceeds any thing, that can be supposed necessary for the mere conveyance of messages, leads to a suspicion of force being sometimes employed; and in one place I had sufficient evidence, that the agent of a landlord had stocks in his office, which could only be employed for illicit purposes. Besides the general manner, in which the agents spoke of the farmers, convinced me, that they considered them as subjects, to whom they had a right to dictate law; and that this right was an excuse for whatever hardships they might choose to inflict.

The most common means of injuring the farmers, however, is I believe, by giving them receipts for less money than they pay, which ignorance prevents them from detecting. When the time for a final settlement comes, they find that they are in arrears two or three rupees more than they expected, and must either pay this balance, or allow their effects to be sold.

The process for the recovery of rent is so easy and expeditious, that the landlord or his agents have no excuse for the employment of arbitrary power, which can only be considered in the light of robbery; and the frauds committed in granting improper receipts, or in suing farmers for more than is actually due, in confidence of their not being able to procure redress can be considered as no less culpable; and fine, which is I believe, the only punishment that can be inflicted for such offences seems inadequate to the atrocity of their nature. As the detection of the crime is difficult, transportation beyond the seas for seven years, accompanied of course by loss of caste, could not be considered as too severe, and would probably be effectual.

If what the farmers allege has any foundation in truth, it would be also necessary to secure them in their proffers of payment being valid. If when they offered payment a receipt for the sum was refused, without an enormous deduction for light money, they should have a right to deposit the money in the hands of the Munsuf, whose receipt for it should be good to them, and whose commission and fees should of course come entirely from the person who refused the payment. At present, a farmer who does not agree to the terms proposed may be refused a receipt, and his rent being unpaid, a complaint may be made and all the expense will come to him. This is so heavy, that in general it is better for him to comply with the original demand. Such at least is what they allege. The principal means that occur to me as likely to improve the agriculture of the country, so far as relates to the tenure of the farms, are the following—

First, To encourage as far as possible, large farmers from whom a landlord may collect his rent without the assistance of an army, and whom his agents cannot pretend to fleece.

Secondly, To enforce the regulation that prohibits the granting leases in perpetuity, which is now almost universally adopted, and which is not only injurious to agriculture, but might in a great measure annihilate the landed revenue.

Thirdly, To secure the farmers from every kind of demand, except those contained in their leases.

Fourthly, To introduce a greater spirit of independence among the farmers, by discouraging as far as possible the system of advances. This it is evident must be a work of time, as the present cultivators have not stock, and must borrow it. All that can therefore be done is, if possible, to check gradually the profits on such loans, by which means the money advanced will be gradually applied to other purposes, and necessity will gradually compel the farmers to save stock until they procure a sufficiency. I am aware, that some able economists condemn all restraint on the rate of interest, and contend, that no one will borrow or lend except when it is for his advantage. I cannot here enter into a discussion of this matter, the determination of which must in a great measure depend upon the definition that is given of the word advantage. The state of capital in this district will I imagine, show, that where the usual rate of interest is higher than the ordinary gains of commerce or agriculture, the common prudence of mankind is not sufficient to prevent the rich from being tempted to lend upon very bad security, nor to hinder the poor from indulging their propensities by borrowing money on terms which nothing but mere accident can ever enable

APPENDIX V

them to repay. The consequence is, that the rich men, in place of a capital which can be realized, acquires a number of necessitous dependents, to whose wants he must administer in order to procure a share of their labour in place of interest, and these dependents are reduced to perhaps one of the worst kinds of slavery, that of insolvent debtors.

Fifthly, Each Munsuf should have a properly qualified land measurer, liable to severe punishment if detected in fraud. On application from either landlord or tenant this man should measure the field, and be paid by the person at whose request the measurement is made; and no other measurement should be admitted, except by order of the magistrate, on complaint of fraud or corruption in the public measurer.

I shall now give a few of the many statements of their profit and loss, which I received from actual farmers. I have selected one from each kind of land.

In Pergunah Devikoth a grain farm was cultivated by five ploughs, and contained 55 bigahs of land of a free soil; the bigah contains 84 large cubits, the farm therefore contained about 79½ Calcutta bigahs or 26½ acres. Two persons of the tenant's family managed two of the ploughs, and three servants were hired for the others, besides 10 rupees were expended in procuring occasional labourers: 31 bigahs of this farm were called Polli, as follows:—

1 bigah for house and garden, no produce;
2 bigahs for raising seedlings, no produce;
28 bigahs sown with summer rice, at 12 *mans* Calcutta weight the bigah, at 3 *mans* the rupee 112 rs.; 20 of these bigahs produced Sorisha, at 2½ *mans* the bigah, 40 rs.; 7 bigahs produced pulse (Khesari or lentils) at 2½ *mans* the bigah, value 60 sers the rupee, 10 rs. 8 anas; 1 bigah tobacco, 5 rs.; 24 bigahs were reckoned Khyar, each gave 15 *mans* of winter rice, 120 rs.; Total, 55 bigahs=287 rs. 8 anas.

The produce of what was cultivated with grain is nearly 3½ rs. a Calcutta bigah, which is 1 r. more than my general estimate; but then the land is a rich free soil. The farmer said, that he paid 70 rs. rent, and 8½ rs. for extra demands. This is almost 16 anas for the bigah, while I allow only 10; but then the land is richer than the average. Deducting one-half the produce for expense of cultivation, there will remain 144 rs. 4 anas, and the rent exceeds the half of this by 6 rs. 6 anas; but the man puts no value on his garden, nor on the crop which he has from the lands reserved for seedlings, and which in such soils always gives a good crop. This will nearly make up the difference. Deduct rent and half of the produce, there remains 55 rs. or 11 rs. neat on each plough.

A farmer of Pergunah Kordaho cultivates 40 bigahs of a stiff clay, and keeps four ploughs. He has two men in the family, and hires two servants for six months. The bigah is nearly equal to ¼ acre or 1½ Calcutta bigah, in all 60 Calcutta bigahs.

4 bigahs reserved for house, garden and seedlings, no produce; 10 bigahs produce 18 *mans* of winter rice, Calcutta measure, at 120 sers the rupee, 60 rs.; 10 bigahs produce 15 *mans* each, 50 rs.; 10 bigahs produce 9 *mans* each, 30 rs.; 6 bigahs produce 12 *mans* of summer rice each, 24 rs.; 144 sers of Sorisha, at 48 sers, 18 rs.; 300 sers of Khesari, at 60 sers, 5 rs.; Total, 40 bigahs=187 rs.

The produce of the 54 Calcutta bigahs of arable land is therefore 3 rs. 10 anas, also above my estimate. Deducting one-half of the produce for the expense of cultivation, the rent, which appeared on the face of the lease to be one rupee for each bigah without any deduction for seedlings, did not amount to one-half of the neat proceeds by 13 rs. 8 anas, out of 93 rs. 8 anas; but the farmer alleged, that the exactions amounted to one-half of the rent, in which case it would exceed the half of the neat produce by 13 rs. 4 anas. I have, however, already stated my doubts concerning the reality of such exactions, at least to so great an amount. The man ought also to have allowed some produce for his garden, and probably a little for his seedling-land, as the soil was rather rich. The rent, making a reasonable allowance for seedlings, is at the rate of nearly 10 anas for the whole, or about 11 1-3 anas a bigah for what is actually cultivated. Deducting one-half for cultivation and the rent, with a moderate allowance for extra charges, the gain on each plough will be nearly the same as in the former case.

A sugar-cane farmer of Lalvari Pergunah, who has three ploughs, cultivates 30 bigahs of land, the bigah consisting of 56 yards (Guz); but about four are deducted from each bigah, by the measurers tying the rope round their middle; the farm may therefore be about 45 Calcutta bigahs or 15 acres.

3 bigahs sugar-cane land; 1 bigah of cane, cut at 18 *mans* (of 96 s.w. the ser=Calcutta *mans* 21 rs. 24 anas) of extract of sugar-cane, at 2 rs. the *man*, 36 rs.; 2 bigahs of summer rice, at 15 *mans*, 10 rs.; 103 sers Sorisha, 2 rs.; 60 sers Khesari, 1 r.; 17 bigahs corn land; 17 summer rice at 15 *mans* value one-third of a rupee, 75 rs.; 5 of it only produce a second crop of Sorisha, 10 rs.; 2 bigahs for house, garden and seedlings, produce of tobacco, 5 rs.; 22 called Polli, 8 called Khyar, produce each 10½ *mans* of winter rice, 24 rs. 8 anas; Total 163 rs. 8 anas. The rent for Polli land at 2 rs.=44 rs.; ditto for Khyar at 1 r.=8 rs.; Total, 52 rs.

APPENDIX V

This is almost one-third of the produce, but in such rich land one-half of the produce is too much to allow for the expense of cultivation. Deduct however, one-half and the rent, and the remainder will be 29 rs. 12 anas, or 9 rs. 14 anas neat on each plough. On sugar farms the statements, which I have procured from the farmers, generally make the avowed rent about one-third of the produce, on corn farms one-fourth. The alleged exactions would generally reduce both to nearly one-half.

Having now stated what I observed concerning farms and farmers, I shall give an account of those who have no lands, but cultivate on account of others. These people may be divided into two classes, the Adhiyars who cultivate with their own stock, and the Krishan who are servants hired by the month. To those who have visited parts of India where the soil belongs to the sovereign, and is cultivated on his account by persons who give one-half of the produce to the state, it may seem wonderful, that the persons in Bengal who cultivate on the same tenure, should be exceedingly poor. In these other countries the cultivators are at least as wealthy as the farmers of Bengal, and no one can pretend that their soil is more productive, or requires less trouble and expense in the cultivation. Their wealth is to be accounted for in two ways. In the first place they have more prudence, industry, and skill owing probably to advances being less frequent; but this difference is not very great. The second circumstance, which chiefly contributes to their gain, is, that in these parts the produce of the cultivator's labour is divided between him and the state, which is always grossly cheated; and in Bengal the produce is divided between the farmer and cultivator, and each takes his fair share. The condition of an Adhiyar, however, was everywhere represented as better than that of a common labourer. We may state his profit and loss as follows, allowing that each family has one plough.

Profits.—15 bigahs cultivated with grain produce on an average, 41 rs. 4 anas, of which one-half is his share, 20 rs. 10 anas; his farm occupies him six months, holy days and sickness two months; he works four months for hire, at 1½ rs., 6 rs.; his wife works about the same time as he does, only much harder, by cleaning rice as I have mentioned, 7 rs. 12 anas; by spinning, 4 anas a month, 2 rs. 8 anas; Total, 36 rs. 14 anas. Charge.—A boy to tend his cattle, 4 anas; seed, 3 rs. 6 anas; interest on 36 rs. stock (he has no cow) at 24 per cent. including all advantages taken of his distress, 10 rs.; Total 13 rs. 10 anas.

So that he has remaining 23 rs. 2 anas, a very little more than the expense of the lowest class, mentioned in my account of the manner in which the people live. A considerable part of this poverty is however, owing to their having anticipated their returns, and a man who had the small stock of 36 rupees, might live in this manner without being in absolute want. That is he and his wife might clear 30 rupees a year. The number of Adhiyars is very considerable; but varies much in different parts of the country. It is probable however, that there are above 150,000 families employed entirely in this manner.

The Krishan, or servants commonly employed in agriculture, are by no means numerous, and do not amount to above 80,000 families; for the families of the greater farmers are generally numerous, and all the sons and brothers hold the plough, while hired servants are only engaged to make up the number, and those who have large farms often prefer the people who cultivate for a share. It is only the heads of the families belonging to the 16,500 farms that are exempted from personal labour. The Krishan, in lands that produce a constant succession of crops, are hired for the whole year; but in clay farms they are engaged for six months only. This however, makes little difference; as in the months, when agriculture is at a stop there, the demand for workmen is great, and they can make rather more than in the season of cultivation. The usual wages are 8 anas a month, with food and clothing, which the farmers estimate at 1 rupee a month, but in fact does not exceed 12 anas. The 8 anas go to maintain his wife and family, who are very poorly supported; but the servant is tolerably well provided, as the farmer is interested to enable him to work. He usually works about five hours in the forenoon at the plough, and two or three in the afternoon weeding or hoeing, so that his labour is moderate; but at his spare hours he repairs his hut and brings fuel. The gains and expense of his family may be as follows:—

Gains.—To the man's wages, 6 rs.; to the woman's beating rice, 7 rs. 12 anas; to do spinning, 2 rs. 8 anas; total 16 rs. 4 anas expense of a family of the lowest order 22 rs. 11 anas; deducting man's clothing, 10 anas; food one-third of the whole, 5 rs. 8 anas 2 pice; Total, 16 rs. 8 anas 3 pice.

In the expense of these two kinds of labourers, I have only supposed two small children in each family; because the women are so hardly wrought, that they do not breed fast, and before a woman has more than two children, the eldest is usually eight years old. At that age the boys of these two classes begin to tend cattle, and each can take

APPENDIX V

care of 25 heads, for each of which they get 3 anas a year, with a meal from every proprietor in turns. The girls can then assist their mothers in beating rice, but are generally very soon married. This class of people live not only very miserably, but at the celebration of marriages and other ceremonies, are generally so inconsiderate, as to run into debt as much as possible. The only means which they have of extricating themselves, is by running away or stealing, and it is alleged, that they are much addicted to both practices. It must however, be observed, that many of those who have been convicted of the last mentioned offence, have been men who had not the excuse of want to plead in their behalf.

The inconsiderate manner, in which the natives of this district anticipate their revenue, may be well exemplified by a common custom of the Krishans in the divisions of Hawora and Rajarampoor. A young labourer, usually in order to defray the expense of his marriage, bound himself to a master for from sixteen to twenty-four months, and received in advance the whole of his wages, which was immediately spent on the ceremony. For the first sixteen or twenty-four months the wife provided for herself, in the best manner she could; but, if she happened to be sick, or to have a child, her misery became extreme, and recourse was had to still further anticipations of the wages, which were always made at an enormous interest, and of course the family always continued in debt, and the extremity of wretchedness. Some indigo manufacturers, having settled in the vicinity, wanted labourers, and gave 2 rs. a month for wages, which has relieved the poor Krishans from much of their distress, and compelled the farmers to allow them one rupee a month besides their food, and this it is evident, if they are prudent, will render their situation very comfortable. From the present state of husbandry requiring such a number of people to cultivate the ground, it must be observed, notwithstanding the immense population, that labourers or servants of any kind are difficult to procure in this district, and in travelling through it, except with the assistance of the landholders, who obtained men from their dependents, I could not in any place hire 40 porters to go to the next stage, although double the highest wages were offered before they set out. The number of slaves is very small. Some rich Muhammedan farmers said, that in the last famines, some children had been purchased in order rather to keep them from starving than with a view to profit. These have turned out very ill, and were so idle and careless, that their labour became much more costly than that of hired servants. Some landholders have a few slaves as

domestics. The slaves that are employed in agriculture, and I believe the others, are allowed to marry free women; but as all the children are slaves, the master must pay a high price (5 or 6 rs.) to the girl's parents; the ceremony costs 3 or 4 rs. more.

ESTATE.—The lands of this district as usual are divided into two kinds, free and assessed (Beza and Juma Zemin). The free lands, which pay no tax to government, have been granted, by various sovereigns, either to different persons who were considered as deserving reward, or in order to maintain establishments that were considered as useful. How far the opinion of their utility is well founded, it is not perhaps necessary to discuss; but there is no doubt, that in the opinion of the people the utility is great, and therefore it is to be regretted, that there is no legal control over the proprietor of the land for the performance of the duty, for which the grant was made. Whether there is no law for the purpose, or whether it has become obsolete, I cannot say; but the practice is to consider these lands as entirely the property of the possessor, who gives whatever part of it he pleases to the establishment, or even sells it altogether. In this district the extent of these lands is not very considerable, as I was informed by the collector's Dewan, that the whole amounted to about 120,000 bigahs of the country, or probable about 180,000 bigahs of the Calcutta measure. It is probable, however, that a considerable extent may have been granted privately, and of course could not appear on the collector's books; and the violent complaints, which I heard from the possessors of free estates, against the new landholders for encroachments on their estates, probably in a great measure originated from the landholders depriving them of all the lands, which they held without right; and it is probable, that they still hold much land, to which they have no title, as it is natural to suppose, that the sacred character, which most of them enjoy, renders people unwilling to disturb them. There is, however, reason to think, that many of the families entitled to these estates have become extinct, and that the landholders have seized on these, and retain them under false names. At least I heard assertions of that nature frequently repeated; but their truth can only be investigated by those possessed of judicial authority. Of right such estates should no doubt revert to the state.

The free estates are in general very small, and the only two of any note are those belonging to the two Muhammedan establishments of Peruya, that have been already mentioned. These are managed much in the same way as the estates of Zemindars; but are much worse cultivated; and the farmers who occupy them, although their rent is

APPENDIX V

rather lower, are at least as poor as their neighbours. The other free estates, which are very numerous and small, are in general in a still more wretched state, and on an average probably one-half of each, is waste. This however is not entirely owing to mismanagement; as in general the land is of the very worst quality. The proprietors usually keep a house garden and plantation, and give as much of the remainder to be cultivated for one-half of the produce as they can; but those who cultivate in that manner cannot clear wastes, and the proprietors are too necessitous to undertake improvement. The greater part therefore, where the soil is not too poor to produce trees, is overgrown with wood. From viewing the state of this kind of property, I am fully convinced, that, if the landed revenue were removed, the country in a hundred years would not be half so well cultivated as at present, and the people would be still poorer.

The assessed lands, as is well known, are in possession of the Zemindars or landholders, who enjoy them by hereditary right and who pay a certain tax, which is considered as fixed for a perpetuity. In fact they have been placed exactly on the footing of the landlords of England, except that the land tax is higher, but then they are exempt from almost all others. At the time, when the settlement was made, it was supposed, that they were only to receive 1-11 part of the net proceeds of their estates, and the Dewan of the collector stated as his opinion, that no Zemindar cleared less than 10 per cent., and none of the larger Zemindars more than 25 per cent. of the neat proceeds. Some smaller ones who could attend to the whole detail of collection, cleared 30 per cent. The few statements in detail, which I was able to procure, agree with this opinion. The following was given as an estimate of the expense and profit of the Raja of Dinajpoor's estate in its now fallen condition. He is a boy of about eleven years of age, and lives with his mother by adoption, who has purchased 8 lots of her husband's estate. He retains only one Pergunah of the immense estate that formerly belonged to the family, and I have reason to believe, that it is the worst managed in the District.

The eight lots require the following establishment:—1 Dewan, who superintends the whole, 1,200 rs.; 8 Tohisildors, or assistants, at 25 per mensem, 2,400 rs.; 40 writers (Mohurers), at 8 rs. per mensem, 3,840 rs.; 24 Sirdars, or officers of the old militia, at 50 bigahs, 1,200 bigahs; 16 Mirdhas, or inferior officers of the same, at 30 bigahs, 480 bigahs; 200 Payiks, or soldiers of the same, at 20 bigahs, 40,000 bigahs; 8 Duffadars, or officers of a more recent militia, 384 rs.; 24 Burkhandaj, the soldiers under these, 864

rs.; 16 Dufturis, or keepers of papers 192 bigahs; 200 Kutwals, or messengers 2,000 bigahs—total bigahs, 7,872—total rupees, 8,688; bigahs of land 7,872 at 10 anas 4,924 rs. The whole is let to Izaradars, or renters, who receive 4 per cent. commission on the rental, which is 110,000, besides the unrented land, which I cannot estimate, 4,400 rs.; land-tax, 79,000—total 97,012 rs.; rental 110,000; lands given to domestic servants, 4,924—gross amount, 114,924—charges, 97,012—clear income, 17,912. The gain here is about 15½ per cent. on the gross rental. The expense of collection is not quite 16 per cent.; besides the lands are not rented.

Now, with regard to the Pergunah that has not been sold, the following is the account which I received:—1 deputy of the Dewan, 280 rs.; 1 accomptant (Juma Nabis), 360; 7 writers, 840; 1 officer of the more recent militia, 48; 7 armed men of the same, 252; 3 Dufturis, or keepers of papers, 36 bigahs; 4 officers of the old militia, 200; 100 soldiers of the same, 2,000; 150 messengers, 1,500; 3,736 bigahs of land given to persons employed in the collections at 10 anas, 2,335 rs., farmed at 4 per cent. on the rental of 96,582 rs. 3,863 rs. 4 anas total 7,978 rupees 4 anas; land tax, 81,591 rs.—total, 89,569 rupees 4 anas; rental of the lands, 96,584 rs.; lands granted to persons employed in collection, 2,335; lands granted to domestics, 1,210 bigahs at 10 anas, 756 rs.—gross rental 99,675 rupees—deduct charges, 89,569 rupees 4 anas—net profit, 10,105 rupees 12 anas. The gain here is about 10 per cent.; the expense of the collection not quite so much.

I shall now give an account of the management of a small estate belonging to Odwait Chaudhuri a merchant who has purchased a lot in the division of Thakurgram, and Pergunah Dehotto, the gross rental 6,300 rs. a year. He does not reside, and has the following establishment:—1 Tohisildar, or agent 120 rupees; 1 Jumanabis, or head accomptant, 84; 1 Mohurer, or writer, 36; 1 Potdar, or money-changer, 24; 2 armed men, Burkundaj, 57; 1 Sirdar, or chief Payik, 20 bigahs; 10 Payiks, 120; 7 Messengers, Kutwab 56—Total, 196 bigahs, 315 rupees; 196 bigahs, at 10 anas, 112 rupees, 8 anas; commission on 6,300 rupees, at 4 per cent. 252 rupees—total 679 6,300 rupees; expense, 5,179 rupees, 8 anas; rent, 4,500 rupees—total charges, 5,179 rupees, 8 anas; gross rental, net profit, 1,120 rupees, 8 anas. Here the profit is about 18 per cent., and the expense of collection about 10 per cent. of the gross amount, which is the proper allowance.

From the statements, that I have already made I cannot see, how such small profits only are gained, without the most gross mismanagement. I have stated the produce of

APPENDIX V

the cultivated lands at 199,60,000 rs. and I everywhere endeavoured to make my calculation rather moderate. I will deduct 1-40th part for free lands which is a very full allowance, even supposing that the possessors occupy more than what is their right. There will remain 194,61,000 rs. Now I think it cannot be well doubted that the farmers could without just cause of complaint pay a fourth part of the gross produce; and it is indeed in general alleged by them, that they pay more. The gross rental therefore of assessed estates ought not to be much less than 48,45,000 rs.

Although I have no doubt, that with proper care the landlords, without extending or improving the cultivation, and without the least hardship on their tenants, might realize this sum, yet, I do not believe that their rental is so great. From the most minute inquiry at every division I think, that the usual customary rent, on an average, may be taken at 10 anas, for the Calcutta bigah. I avoid entering at all into the consideration of irregular exactions, the reality or extent of which I had not the means of ascertaining. Now leaving out the lands, which are only cultivated occasionally, and which do not enter into the (Juma) rental, there are 68,83,200 bighas fully occupied. Deduct 215,000 for seedlings on clay land, which pay no rent, and there remain 66,68,200; from which deduct 1-40th for free lands, and there remain 65,23,550 which at 10 anas is 40,77,190 rs. 10 anas. To this must be added all rents for fisheries, pasturage of buffaloes, &c.; but these are small, and probably do not exceed 50,000 rs. a year. Call it only 25,000 to make up the odd number, and the very smallest rental, that ought to be admitted should be 41,00,000 rs. always however on the supposition, that the proprietor is not cheated, further than by having his lands let too low, or under $\frac{1}{4}$ of the gross produce. At this rate the tenants, exclusive of the milk, bamboos and mangoes which are a fair part of the produce of their farms, do not pay one-fourth of the produce by 7,45,000 or by 13 per cent. The landholders therefore, after deducting 10 per cent. for the expense of collection, and paying the land tax of 17,50,000 rs. should have to themselves 19,40,000 rs. which is considerably more than 50 per cent. of the net proceeds. I have no doubt, that an active man with a moderate estate would realize that sum without raising the rents above ten anas a bigah, and without taking a single farthing from any tenant more than his due. And I have no doubt, provided he secured them from the frauds of his agents, that he might take one-fourth of the produce from his tenants, not only without oppressing them, but by giving a stimulus to their exertions, so as greatly to improve

their condition. As the estates, however, are in general managed, it would be difficult to say what the real profits are. I can scarcely however think, that any of them produces so little as one-fifth of the net proceeds, and some I have no doubt amount fully to one-half, or even exceed this proportion. It is indeed said, that, when the large Zemindary of Dinajpore was sold, the assessment was divided very unequally on the lots by the native assistants of the collector, who had thus an opportunity of informing their friends, where a valuable bargain was to be found; and that now, while the profits of some purchasers are great, others make little more than what discharges the revenue. Such allegations however must be received with great caution; for in general each landlord pretends that he has no profit, and invents stories of this kind to account for his own situation; for it is perfectly evident, that the general amount of the assessment cannot consume near ten-elevenths of the clear proceeds, as was supposed, at the time when the settlement was made. A view of the manner, in which the estates are managed will throw some light on the subject.

The greater part of landholders are new men, who have purchased their estates within these few years, and who formerly were either merchants, manufacturers, agents of landholders, or officers of government. These last are not numerous. Those natives, who are not afraid of them, they are called Lotdars, or fellows who have purchased lots and are held in great contempt, while there is a general clamour against their rapacity and injustice. I must however say, that their lands are in general better cultivated, and the appearance of the people not so miserable as on some of the estates, that have belonged to one family for several generations. Of these there are still some in the district, and indeed the Dinajpore family still retains the largest possessions, which seem of all others to be the worst managed, and their tenants appear to be the poorest. Still however they are much respected; for the people submit with patience to many things, from a power to which they are accustomed, that would grieve them to endure from a person of whom they know nothing, or whom they once remember as their equal. The odium and ridicule thus thrown on the new landholders, probably prevents most of them from living on their estates, and the merchants, traders, and officers of government knowing nothing of country affairs, almost the whole estates of the purchasers of lots are managed by agents, and the check, which the proprietors have adopted to prevent fraud, seems in general, as I have before mentioned, to be taken from the settlement made by Mr. Hatch. They know, that they ought to have a certain

APPENDIX V

number of bigahs in such and such Pergunahs, that these were valued by the gentleman at such a rate, and the agent is expected to account for the amount. I know nothing of the grounds upon which Mr. Hatch went. It is said, that there is no account of them to be found in the collector's office; but it is said, that he estimated three-fourths of the whole district to be cultivated, and the rents have not been since raised, so that I am totally at a loss to account for the assessment having been made so low, especially as the country is said to have been then better cultivated than it now is.

The agents of the Lotdars manage every thing in their own way, but are under the necessity of being very cautious, as their masters are in general men of business, and those who were formerly agents themselves understand country affairs, so that their estates are improving, and are comparatively well managed.

The estates of more ancient families are on another footing. The proprietors are possessed of documents concerning their management for a number of years, and being respected live among the people, to whom they have been known from their infancy. They have therefore great advantages were they disposed to attend to their affairs, but very few of them are men of business. A great part of them never pass the threshold of their door, except to assist at some religious ceremony, and are either sunk in a miserable superstition, a prey to religious ceremony, and are either sunk in a miserable superstition, a prey to religious mendicants, and other idle persons, or are totally abandoned to dissipation; and some are addicted to both vices. Those are reckoned men of activity and business, who sit in their office a few hours a day, and look a little into the accompts, and once a year go round their estates to receive presents and homage from their tenantry. There are however some honourable exceptions, especially Guruprosad of Surahor Mankoyi, who not only investigates his accompts with care; but, when he suspects fraud, takes the measuring rope in his own hand, and examines on the spot the veracity of his agents. Every thing about him is decent and respectable, and the estate is like a garden.

On large estates there is a Dewan or chief agent, who resides at the principal office, and has under him a sufficient number of accomptants (Mohurers) the chief of whom (Jumanabis) keeps the rental. There are besides a keeper (Buksi) and valuer (Potdar) of money, people who take care of the papers (Dufturi), and a number of messengers (Kutwal). In order to protect the money, and convey it from place to place, and also, as is alleged, to enforce orders, two kinds

of guards are kept. One called Burkundaj, commanded by Dufadars and Jumadars, seem to be a more recent establishment. The other called Pyiks, commanded by Mirdhas and Serdars, are the remains of the militia of the Bengal kingdom. Both seem to have constituted the foot soldiers, whose number makes such a formidable appearance in the Ayeen-Akbery. At each large division of the estate (perhaps 20,000 rs. rental) is a deputy (Nayeb or Tohisildar) with a similar but smaller establishment. Now so far as we have come the heads of these officers are considered as persons of consequence, who are not to travel through the country, to examine into the affairs of the estate, but sit quietly in the office, to keep the accompts, to receive money and to manage affairs with the officers of government. These principal agents manage the estate in two different manners. They either collect the rent immediately from the tenants; or farm them out for a certain number of years to a kind of middle men called Izaradars.

If the rents are to be levied immediately from the tenants, the head officers employ men to cultivate the unrented land, either for a share of the produce, or for a certain sum from year to year. The rent of the land, that is let on lease, is actually received from the tenants by two persons a Patoyari and Mondol, of which there should be one Mondol for each Mauza, and one Patoyari for every two or three, unless these be very large. These two officers are in fact the only men employed, who are usually well versed in country affairs. Many landlords have of late discharged the Mondols, and employ only Patoyaris, and this seems to be a judicious saving, and a sign of approaching economy. The Patoyari is a penman, and keeps the accompts, for which he in general receives 3 per cent. on the rental; and the Mondol who in some places is called Prohdan, is the chief farmer of the village, who manages the others, and usually receives 1 per cent. commission. This commission given to the Patoyaris and Mondols is called Surunjami, and sometimes instead of 4 per cent. arises to 6. The Payiks and their officers, and the messengers, are paid in land. The other establishment is paid in money; but most of the domestic servants receive land in place of wages, and this land is not included in the rental, every means possible being taken to make that appear small.

On smaller estates a Nayeb or Tohisildar with his usual establishment are sufficient; but there are very few indeed, in which the landlord manages his own affairs without assistance. If the rents are to be farmed, an agreement is made with the person, named Izaradar, who undertakes to collect the rent, as stated in the rent-roll and to defray all

APPENDIX V

the expenses of delivering it into the agent's office. For his reward he takes the commission of from 4 to 6 per cent. above stated, and the whole profit that he can derive from the lands which are not rented. He receives also the assistance of all the militia and messengers who continue to receive their lands, and are directed to obey his orders. From three to five years is the usual period, that the lands are rented, and the contract has in no instance been extended beyond nine years. When the commission is high, or the quantity of unrented lands is great, the renter often pays a sum of money in advance. The renters are in general perfectly conversant in country affairs, and make the most of the lands; being totally unconcerned whether the tenants are ruined or not. Indeed where they are rich men, who have much influence, the tenants are uncommonly dissatisfied and clamorous; but, where they rent only small portions of an estate, the tenants complain no more of their condition than usual. Even with this security, and where a landholder receives the whole of his rent from a few Izaradars, who have very good credit, it is not usual for him to diminish his establishment.

These unwieldy establishments seem to have been originally formed, when the government collected the rent immediately from the farmer or cultivator, and when the same persons managed not only the collections, but the police and a great part of the Judicial department. The vast number of armed men Burkundaj and Payik, especially the latter, formed the infantry of the Mogul Government. The whole was continued under the Zemindars, until the perpetual settlement; because they not only collected the revenue, but managed the subordinate parts of the police, and of the administration of justice; and they were anxious to have as many armed men as possible, because these supported them in their enormities, and were no charge, as they lived on lands which the Zemindar did not bring to account. Custom and the artifice of agents keep up the establishment; for I have great reason to think, that most of these people, who are paid in lands, are mere cultivators, and pay a low rent to agents, although on paper they are represented to the landlords as having each from 10 to 50 bigahs free of rent, and to be absolutely necessary to procure the money. Some landlords are now curtailing very much, and every man that can be saved will enable the Zemindar to raise more money from his tenants, as the lowest messenger expects at least subsistence, when he goes on a message to a farmer, and all the others except presents, and usually obtain them in proportion to their rank. These are avowed, but it is alleged, that they exact much more

by violence. The greatest detriment, however, that the landlords suffer, is by the collisions between their agents and farmers, who are allowed to occupy much more land than their leases bear, and pay a bribe rather smaller than the usual rent to the agents, who whenever the tenants are refractory threaten a measurement. The Perpetual leases at a low fixed rent are also very favourable to the agents. The people in possession of such more readily submit to impositions, than those would who rented land, at its full value for a short term of years; for such tenants would always go away, if any addition was required, but a man who has a valuable farm in perpetuity, submits to much, in hopes that hereafter he may have a more just agent.

It is not usual for the Zemindars to make advances to the tenants to enable them to cultivate, although of late some have given assistance to those who were bringing in waste ground. This is in some measure excusable; but the practice is commonly very destructive, and encourages the tenantry in the anticipation of their means, which is the fault to which they are most addicted.

Although it appears evident from the Ayeen Akbery, that in the time of Akbar there were no hereditary proprietors of land in this part of the country, all the natives allege, that the office of Zemindar has always been hereditary, which may have in some measure been the case. They then merely accounted to Government for their receipts; and they pretend to say, that they have been injured by the new settlement. They allege, that formerly they were allowed great authority, both in criminal and civil causes over the people whom they managed, which was a great source of emolument, being of course venally administered; and although they were often squeezed by the Mogul Officers, and on all occasions were treated with the utmost contempt, they preferred suffering these evils to the mode that has been adopted of settling their lands, when they fall in arrears, which is a practice that they cannot endure. Besides bribery went a great way on most occasions and they allege, that bribes included, they did not actually pay one-half of what they do now, although nothing can be more moderate than the present assessment, which I am convinced does not amount to a tithe of the produce.

The principal things that ought to be inculcated on the landlords, for the improvement of their estates, is activity and industry in the management, and the utility of a suitable education to enable them to perceive, that their estates cannot be improved by beggarly and irregular demands made on the tenantry, but by encouraging those who are frugal and industrious, and by banishing those who are

APPENDIX V

idle and thoughtless. The most bitter enemies of the landlords are idle religious mendicants, who represent all attention to worldly affairs as unworthy of a man; and dissipated flatterers, who represent moderation in expense as unworthy of a great prince, a title that is bestowed by such persons on landholders, who have not 1,000 rupees a year.

One of the principal causes, that appear to me to prevent the landholders from acquiring proper habits of activity, and a proper education, is the sub-division of estates in equal shares among all the sons of a family. Where the estates are monstrous, like that of Dinajpoor, and exceed the usual capacity of man to manage, there may be no loss in the subdivision; the inevitable consequence indeed, of mismanagement will always in a short time bring them to sale, and render any precaution unnecessary; but when the estate is moderate, it may be considered as a national loss, when it is broken into portions, none of which can enable the proprietor to bestow a decent education on his children, nor to encourage anything that is ornamental or advantageous to the country. This however is not the greatest evil of the practice. The sons of a family, who know that they all will have a certain provision, naturally give themselves up to sloth, and make no exertion to acquire useful knowledge, even when their parents are willing to bestow it; but the parents even are in general sparing, knowing that their sons can exist without trouble. Now where the custom is to leave the family estate to one son, the parent knows, that the only provision he has for the others is a good and useful education, by which they may be fitted to gain a living suitable to their rank, while the young men must exert themselves, knowing that they have no other resource. Even the son who is to receive the estate, unless he chooses to be the laughing stock of his brothers, must make an exertion sufficient to acquire a knowledge that will enable him at least to superintend his affairs.

It is only among young men educated in this manner, that people fit for discharging offices in the police, law or revenue, can be procured. And the manner in which these offices are now in general filled, so far as I can learn, shows that the education of those who hold them has been miserably neglected. Although the Hindu law directs that property should descend to sons equally or at least nearly so, there is nothing, so far as I know, to prevent assessed lands from being considered in a different light; and from being viewed as a trust vested hereditarily in the Zemindar for the security of Government, which will be destroyed if the lands are frittered away among the ramifications of a numerous family; and owing to the custom of adoption, these portions never reunite. I am aware that some of the ablest Jurists and writers on political economy are strenuous advocates for the subdivision of landed estates. The speculations of these persons nearly resemble the plan that has been adopted in the colony of the Cape of Good Hope, and I will venture to assert, that this plan has hitherto repressed the progress of agriculture in that colony; and so long as it is in force, will keep that delightful country in a state of beggary. In fact, it has only been the money spent among the colonists by the Dutch and British Fleets and armies, that has prevented them from being clothed in sheep's skins like the Hottentots.

Although, as I have said before, the natives are persuaded that the office of Zemindar has always been hereditary, which is not absolutely incompatible with the idea of its having been merely an office, and totally unconnected with the property of the land; yet from all that I could learn, there is no good reason to think that any families of this district have had very ancient possessions; and it must be observed, that from the total want of history among the hindus, any custom which has obtained for 100 years, comes to them with its origin as obscure, as if it had obtained for a thousand.

APPENDIX VI

On Recent changes in the Delta of the Ganges.

By

JAMES FERGUSSON, F.R.S.

[Extract of the Proceedings of the Geological Society, from the Quarterly Journal of the Geological Society of London, Edited by the Assistant-Secretary of the Geological Society, Volume the Nineteenth, 1863, Part the First.]

CONTENTS

I. General Considerations

1. Introduction
2. Oscillation of Rivers
3. Elevation of the Banks of Rivers
4. Secular Elevation of Deltas
5. Mode in which Deltas are elevated

II. Physical changes in the Valley of the Ganges

1. Upheaval of the Madoopore Jungle
2. Silting-up of the Sylhet Jheels
3. Eastern Gap in the seaward face of the delta
4. Change in the bed of the Brahmapootra

5. Opening of the R. Jennai

6. Jessore group of rivers

7. Natore group of rivers

8. Kishnaghur group of rivers

9. Changes in the course of the R. Teesta

10. Retrocession of the junction of tributary streams with main rivers.

III. Historical evidence of the changes in the Delta of the Ganges

IV. Increase of the Delta seaward

1. Silt held in suspension in Ganges waters

2. Swatch of "No Ground"

V. Appendix

I. General Considerations

1. *Introduction.*—It may seem presumptuous in one who is neither a geologist nor has any pretension to geological knowledge to venture to address this Society on a subject so nearly akin to their special science. My excuse must be that, having resided for five years on the banks of one of the most active of the Bengal rivers, I have had opportunities which are not vouchsafed to every one of observing their phenomena, and have been a witness of the changes I am about to describe. I may also, perhaps, be allowed to state that, when I first became aware of the disturbance that was taking place around me, I set myself carefully to measure and observe what was passing; and, in 1835, made a sketch-survey of the lower Ganges and Brahmapootra, from Jafferunge to the sea. This was published by Mr. Tassin a few years afterwards, and is, so far as I know, the only survey that was made—certainly the only one published—between that made by Major Rennell and the survey now in progress, but which has not yet been given to the world. I may also mention, in extenuation, that I have waited for more than a quarter of a century in order that some one more worthy might undertake the task; but, as no one has come forward, I may perhaps be now excused for venturing upon it.

In order, however, to obviate the reproach of presumption, my intention is to confine myself wholly to the historical period, and practically to the time that elapsed between the survey made by the celebrated Major Rennell, between the years 1780-90, and the

survey now in progress; and though I shall be obliged, occasionally, to mention facts that may have occurred before the Christian era, they will be only such as are based on human evidence, and not such as properly fall within the domain of the geologist.

2. *Oscillation of Rivers.*—Before describing the actual phenomena, it may be necessary to call attention to certain principles—not very recondite, perhaps, but indispensable to a clear understanding of what is to follow.

The first of these is:—

All rivers oscillate in curves, whose extent is directly proportionate to the quantity of water flowing through the rivers.

An inspection of any good map is sufficient to prove the general correctness of this dictum, but its consequences have been strangely overlooked both by engineers and potamologists. Without attempting to enter into the theory of the question, it may be sufficient for the present to state, in illustration, that the action of rivers appears to be the exact converse of that of the pendulum.

The pendulum is a body in stable equilibrium, whose natural condition is consequently that of rest, and, being once disturbed, it seeks to regain that position; but the original force remaining, it would go on oscillating for ever if we could abstract all the natural conditions of friction, resistance of the atmosphere, etc.

A river, on the contrary, is a body of water in unstable equilibrium, whose normal condition is that of motion down an inclined

APPENDIX VI

plane; and, if we could in like manner abstract all the natural conditions of inequality of surface or of soil, it would flow continuously in a straight line; but any obstruction or inequality whatever necessarily induces an oscillation, and, the action being continuous, the effects are cumulative, as those in the pendulum are discumulative; and the oscillation goes on increasing till it reaches the mean between the force of gravity tending to draw it in a straight line, and the force due to the obstruction tending to give it a direction at right angles to the former.

If this be so, it will immediately be perceived that the extent or radius of the curves will be directly proportioned to the slope of the bed of the river. If, for instance, a river were flowing down a regular slope, through a perfectly homogeneous soil, with a fall of, say, 10 feet per mile, or 1 in 500, the curves would be so extended as to appear nearly a straight line on the map. With a fall of 1 foot per mile, the radius of the curve is, as nearly as I can ascertain, double that of a river with a fall of 6 inches; and when the fall is about 3 inches per mile, the direct and tangential forces so nearly balance one another that the curves are practically semi circles. In the latter case the chord of the curves is practically four times the width of the river. Thus a river 1,000 feet wide would oscillate once in 4,000 feet in the general direction of its course, and the extent of its curve, measured along the centre of the stream, is a little more than 6,000 feet. Between a fall of 6 inches

and 1 foot per mile, the oscillation is, apparently, once in about six times the above a foot it rises to one in ten or twelve width; above which it is extremely difficult to find examples uninfluenced by natural obstructions. It need hardly be remarked that these observations apply to rivers when their beds are full, which is the only time when they are shaping their courses.¹

There are a number of other consequences flowing from these, to which I shall not allude here, as they have no direct bearing on the subject in hand, though it would be extremely interesting if they were observed and tabulated; for not only would these tables enable any one on inspecting a map to calculate approximately the slope of a country, and to estimate the relative importance of every river there delineated, but they would enable the engineer to regulate their courses, and the statistician to predict the result of the changes he sees taking place. To make this clearer, let me take one example. The Austrian engineers have of late years spent enormous sums of money in the attempt to straighten the course of the Danube by cutting off its lateral branches. This has been done by embanking across their mouths with dykes of fascines and piles. For a time this resists, and might resist so long as the river finds some other place where it can readjust its curvature; but, as these are stopped one after the other, it bursts through the barriers and resumes its old course. The fact is, the Austrians are trying to make the whole body of water flow in curves due

¹ The average width of the Nile between Koum Ombos and Memphis is 2,000 feet; the average length of oscillation 8,500 or 4.25. The slope about 6 inches per mile. The following Table gives the approximate extent of the oscillation of the Ganges and the three Kishnagur rivers.

	Distance direct, in miles	Distance per river, in miles	Width of stream, low water, dry season, in feet	Number of oscillations	Length of oscillation in miles
GANGES					
Allahabad to Chunar	62	104	3500	17	3.7
Chunar to Buxar	80	113	4000	20	4
Buxar to Patna	74	96	5000	15	5
Patna to Monghyr	82	106	6000	11½	7
Monghyr to Rajmahal	96	108	7000	10	9.5
Rajmahal to Rajapore	90	100	7000	10	9
Rajapore to Pubna	30	44	4000	6	5
Pubna to Jaffergunge	32	36	3000	8	4
BHAGIRUTTEE					
Chokah to Nuddya	96	120	1200	62	1.5
Nuddya to Chogdah	24	30	2000	9	2.5
Chogdah to Calcutta	34	42	3000	11	3
JELLINGHY					
Jellinghy to Nuddya	50	112	1000	42	1.2
MATABANGAH					
Ganges to Coomar	18	28	1500	9	2
Coomar to Kissingunge	30	50	800	46	½
Kissingunge to Chogdah	24	29	500	47	½

APPENDIX VI

only to a portion, and they have hitherto, as might be expected, found this impossible; had they taken the trouble to calculate the curve due to the whole body, a few simple groins would have sufficed for all their purposes. It is precisely the same question as if it were proposed to make a 10-inch pendulum beat seconds, or one 39 inches long beat once in two seconds. It can be done by main force, but the moment the pressure is removed or weakened the pendulums resume their natural beat; and a clockmaker who constructed his clocks on this principle would fail as certainly as the Austrian engineers.

3. *Elevation of the Banks of Rivers.*—The second point to which I wish to call attention is the tendency of rivers in alluvial soils, especially in deltas, to raise their banks, and so confine themselves in their beds.

This process has been well described by Sir Gardner Wilkinson as regards the Nile, and by Sir Charles Lyell for the Mississippi; but neither of these gentlemen appear to me quite to have caught, or at least explained, the true cause. As regards the Ganges certainly, and the other rivers so far as I can judge, it is owing to the existence of great sheets of still water in the low lands beyond the banks of the rivers. These, being still, have deposited their mud, if they ever had any in suspension; and being too massive to be set in motion by the rivers, they reduce the flowing streams to inaction the moment they leave their beds, and consequently force them to deposit their silt in their immediate proximity.

The first consequence of this is, that water resists water far better than earth does. A river can attack its banks in detail, can eat them away bit by bit, and carry off the spoil; but the still water, seizing the silt, forces the river to deposit it exactly where it is most useful in forming a barrier against further incursions, and so finally repels its advance.

In India these backwaters are called *jheels*, and are large sheets of clear water existing during the cold weather at about the same level as the river. During the rains they rise nearly *pari passu* with the rivers, partly

to leakage through sandy strata, partly to small creeks or openings from the rivers, and partly also from almost all of them being open at their lower ends, so as to feel the reflex of the inundation. From all these causes, when the river is at such a height as to overtop its banks, it meets this body of still water (figure 1) and, not being able to set it in motion, it deposits its silt in the limit between the moving and the still bodies. Even when the *jheel* has not risen so fast as the river, a few days' overflow serves to restore the equilibrium, and then the deposition goes on as before. In most parts of Bengal indigo-planters and others avail themselves of this interval to cut canals, or *khals*, through the banks, in order that the river-water may flow into the *jheels*, and so raise their beds and render them fit for cultivation. Even under the most favourable circumstances, however, the action seldom extends more than 100 or 200 yards from the banks, and, when the equilibrium of water is restored, the silt is deposited in the canal, which requires consequently to be cleared out every year, and after a few years the deposit beyond has raised itself to the height of the bank, so that further progress in that direction is impossible, and the opening in the bank of the river is then soon completely obliterated.

It is extremely difficult to fix the exact point at which this deposit begins to take place; but, as far as I have hitherto been able to ascertain, rivers flowing through a country whose slope is more than 6 inches in a mile have rather a tendency to deepen their channels and abrade their banks, and the land in their immediate proximity is lower than at a little distance.² At 3 inches in the mile, or under this, the deposit always takes place; and its extent is nearly in the inverse ratio to the slope.

The exact turning-point of the two systems still remains to be fixed; but my own impression is, that we are not far wrong in taking 6 inches as the limit at which the deposit begins to take place; in many instances, however, 5 or even 4 inches may be taken as the starting-point.³

² The fall of the Indus from Attock to the sea being on an average 1 foot per mile, it is not a depositing river. The only part of its course where the slope is less, judging from the lateral extent of its oscillation, is between Kyrpore and Sehwan. Between these places it may deposit to some extent, but elsewhere its course is steep and straight.

³ No argument on this subject can be depended upon if derived from observations on the course of the Nile, the slope of whose bed from the cataracts to the sea appears to be about 6 inches per mile, for the reason that, between the bank of the river and the *hajar*, or desert, the natives have at different times constructed numerous causeways, as may be seen in the atlas prepared by the French savants in the beginning of this century and explained by Sir Gardner Wilkinson (*Journ. Royal Geogr. Soc.*, vol. ix, p. 432, *et seq.*). These act as so many dams or silt-traps during the inundation or depositing season. But for these dykes, it is by no means clear that there would have been any deposit in recent times on the plain of Thebes, instead of 7 feet in 1,700 years, which Sir Gardner calculates; and the variation in the thickness of the deposits in different places seems to be almost wholly due to these artificial obstructions.

APPENDIX VI

4. *Secular Elevation of Deltas.*—The only other point to which I will venture to call attention is what is called secular elevation, which I shall endeavour to define.

There was a time, before the formation of the Deltas of the Nile and the Ganges, when the sea or tide extended to Memphis in the one case, and to Rajmahal in the other. If at that time the slope of these rivers had been measured from any fixed point, such as the cataracts in Egypt in the one case, and the rock of Chunar in the other, it would have been found that the slope of both of them was very much greater than it now is, it having been diminished in the exact ratio in which the ground at the apex of the deltas has been raised—about 80 feet at Rajmahal, and 60 feet at Memphis. Little or no silt was consequently deposited in the up-country in early times, but everything was swept to the sea, and the extension of their deltas has consequently been in an immensely more rapid ratio than at present. But, besides this, for every mile that the delta extended seaward, the slopes, as shown on the diagram, would tend to become parallel in a geometric, and not in an arithmetical ratio. And when the elbows at Memphis and Rajmahal were completely obliterated, the secular increase must have been infinitesimally small.

Taking first only the mathematical view of the subject—if we assume a point such as Patna, say 200 miles above Rajmahal, and that the delta is now extended 200 miles below that point, assuming also that Patna is now 200 feet above the level of the sea, and Rajmahal 100 feet, all which figures are sufficiently correct for illustration, it is evident that, if we divide the time since the sea was at Rajmahal into four equal epochs, the level at Rajmahal during the first period of the extension of the delta fifty miles seaward would have risen 40 to 42 feet, during the next 27, during the third 20, and during the last 13 or 14, or less than one-third of what was due to the accumulation during the first period. But this is far from representing the whole truth; first, in consequence of the greater quantity of silt brought down by the river when its slope was 12 inches, which it must have been during the first period, instead of less than 6 inches as it is now. And, secondly, the area or breadth of the delta is necessarily less near its apex than at its base, and, consequently, the area over which the silt had to be deposited much less than at present.

From these and other minor causes I feel convinced that if we assumed the deposit to be 50 feet, or one-half, during the first period, it would be rather under than over the mark; and, say, 25 feet during the second, 12 or 13 during the third, and 5 or 6 during

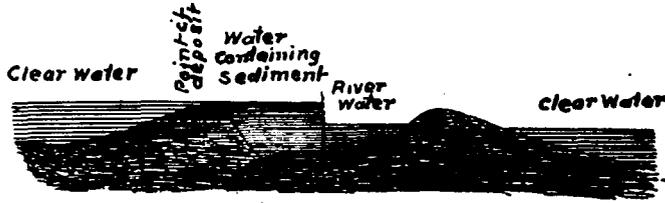
the last of the four periods indicated in the diagram. From the conformation of the ground I should be inclined to assign a higher rate of progression for the rise of the land of Egypt in the neighbourhood of Memphis. But it is difficult to speculate on the phenomena of that river while we remain so ignorant of the physical condition of the country from which the inundation proceeds. But even more uncertainty has been superinduced, as pointed out above, by artificial obstructions.

All this is assuming that the silt is distributed quite evenly over the whole delta. This, however, is practically very far from being the case. The mode in which deltas are raised is by a river, flowing through some low part of the country, gradually embanking itself, and then raising its bed till the body of its water is higher than some neighbouring region; it then falls into this, and, going through the same process, it fills that depression, and then goes on to the next. After a long cycle of years it comes back again to the country it first left, which probably has not risen 1 foot since, while the neighbouring country may have been raised 30 or 40.

From these data it will be perceived how fallacious any conclusions must be which are drawn from borings into the strata of deltas, and calculations formed from local superficial deposits. I myself have seen the bricks which formed the foundation of a house I had built carried away, and strewed along the bottom of a river at a depth of 30 or 40 feet below the level of the country. Since then the river has passed on, and a new village now stands on the spot where my bungalow stood, but 40 feet above its ruins; and any one who chooses to dig on the spot may find my "reliquiae" there, and form what theory he likes as to their antiquity or my age. If we add to this local disturbance the varying degree of elevation just pointed out in the secular increase, it must be seen that the problem is of a much more complex nature than has hitherto been assumed.

5. *Mode in which Deltas are elevated.*—Independently of the changes wrought by the varying quantity of water in the different branches of the deltaic rivers, and the consequent necessity for enlarging or contracting the extent of their oscillations, there is another class of changes superinduced by the accidents to which so complicated a system must always be liable. If one of the tributaries, for instance, which before fell into the hollow side of a curve presses on the convex side, if a sand-bank is formed anywhere, or if any natural or artificial obstruction forces the river to change its bed in any part, the whole system is so rigid that

Diagram Section across the bed of a River



Silt forming the bed of the water

Diagram illustrating the Secular Elevation of Delta

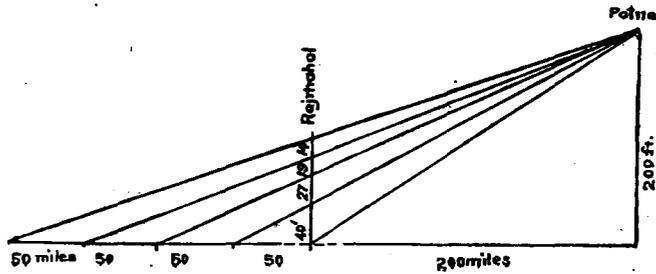
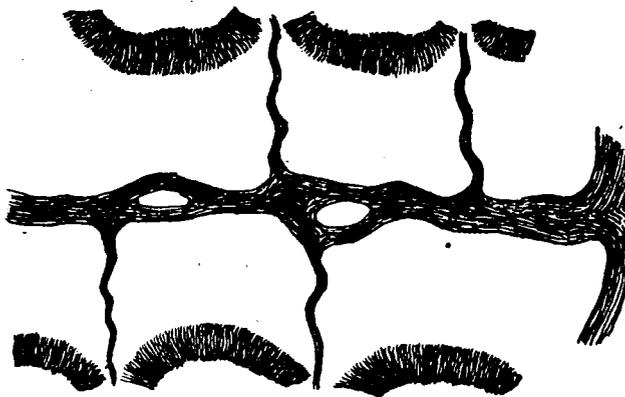


Diagram illustrating the junction of tributary Streams with main Rivers



Fergusson—Delta of the Ganges

Fig. 4

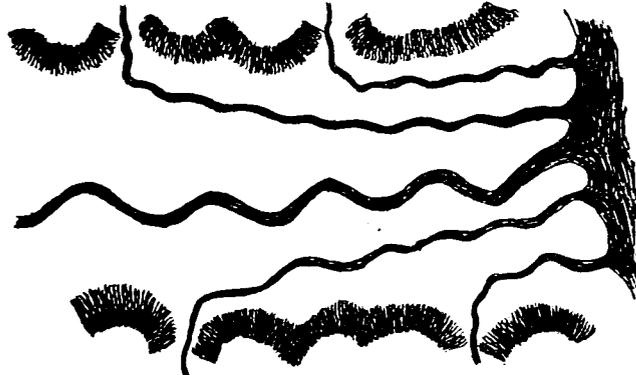
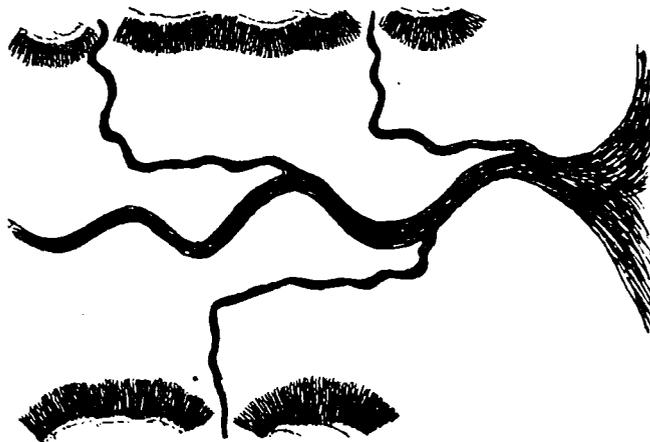
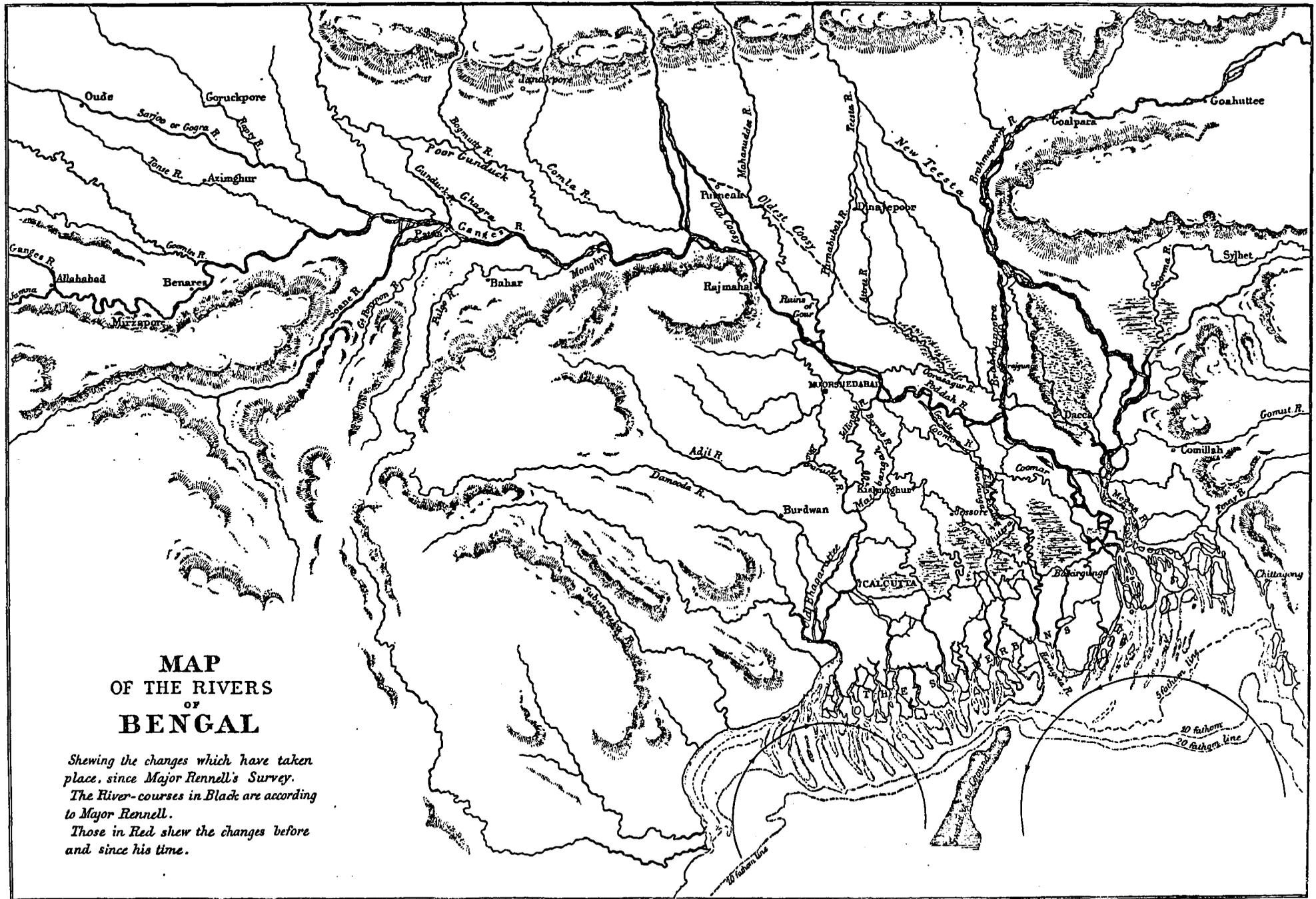


Fig. 5



Fig. 6





**MAP
OF THE RIVERS
OF
BENGAL**

*Shewing the changes which have taken place, since Major Rennell's Survey.
The River-courses in Black are according to Major Rennell.
Those in Red shew the changes before and since his time.*

APPENDIX VI

the alteration is felt in every direction, both above and below, as far as the alluvial plain extends.

One consequence of any such alteration in the course of the main stream is, that the initial or terminal oscillation of any tributary or distributary is continually altering its position, and the oscillations cut their way through the whole plain⁴ of the river, both in an upward and downward direction.

Such a river as the Ganges between Patna and Rajmahal must have eaten through its plain several times since it has occupied its present position. But when the delta is so raised as to reduce its slope from 6 to, say, 3 inches per mile, it is not difficult to foresee a time when the river will so raise its bed as to be obliged to seek a new "plain" further north, and may again resume the position it once occupied in the centre of its valley, but from which it has been forced against the southern hills, by the greater "*vis viva*" which the Himalayan streams derive from the rapid slope of their beds and their preponderating body of water.

None of the rivers of the delta have in historical times, so far as we know, worked their way twice through the same plains. The first operation so raises their plains that they generally find it easier to seek a new course in the lower lands on either hand; and the stream in their old beds consequently becoming sluggish, they gradually silt up and become, after a while, altogether obliterated, except here and there where a reach has been cut off in the process, and remains, like a fossil, to mark the previous existence in that spot of a river of a given oscillation, which may still be measured with perfect certainty in the fragment that is left. It is by this continual shifting of the plains of rivers that the whole delta is gradually raised to a higher level.

This is a curious and complicated process, which I shall now try to make as clear as I can, by describing the phenomena as they have occurred in the valley of the Ganges.

II. Physical Changes in the Valley of the Ganges. 1. *Upheaval of the Madoopora Jungle.*—Although the principal object of this paper is to describe the phenomena resulting from the deposit of silt by the rivers of Bengal, there is one of a contrary nature which has had so marked an influence on the river-systems of the delta that it is impossible to pass it over. The circumstance I allude to is the upheaval of a large tract of country known as the Madoopore Jungle,

which there is every reason to suppose took place in very recent times.

This tract extends for about seventy miles due north from the city of Dacca, which is built on its southern extremity. Its greatest width in the centre is about thirty-five miles. On its western face it has a well-defined boundary, and rises in hillocks to a height of about 100 feet from the level of the alluvial plain along its whole length; in the centre its average height is from 40 to 60 feet above the plain, and it gradually slopes away to the eastward, dipping below the old bed of the Brahmapootra, and losing itself in the Sylhet Jheels.

The surface of the district is a hard ochreous clay, identical, so far as I can judge, with the strata found below the peat and recent deposits at Calcutta, where it exists at a depth of from 70 to 120 feet below the surface of the soil.

There is, at all events no *a priori* improbability again this upheaval having occurred in very recent times. An inspection of the map will show that it occurred in axis of the belt of volcanic action which extends from Narcondam through Barren Island on to Cheduba and Ramree, and thence to Chittagong and Dacca.

Without going further back than the great earthquake which occurred at Chittagong in April 1762,⁵ I may remind the Society that a large tract of land was then submerged, that other parts were elevated, that two volcanos broke out, and the whole settlement was shattered, and that at Dacca the shocks were so violent that the wave from the river swept off a large number of the inhabitants.

It was not then, however, that any upheaval took place, nor at any period subsequent to the foundation of that city in the beginning of the seventeenth century by Jehanguire; for its oldest buildings, though cracked, are not destroyed, as they would have been by such a convulsion. And how long before that time it occurred we can only guess by trying to estimate how long it would take the Brahmapootra to fill up the Sylhet Jheels to the extent it has done, and by the uncertain light of native traditions, some of which will be alluded to in the sequel.

As hinted above, there exists to the eastward of the upheaved region a depressed area of about equal extent. For a description of this I cannot do better than refer to Dr. Hooker's 'Himalayan Journals' (vol. ii.

⁴ By "plain" in this sense is meant the district occupied by the river between the extreme outward edge of its oscillations on either side. With a river 1,000 feet wide, its plain may extend from one to two miles in width, and others in like proportion, varying, of course, according to the slope of the country.

⁵ Phil Trans. vol. liii, p. 251.

APPENDIX VI

p. 256). He sailed for some days among these Jheels, and found by his barometric levellings that they were very slightly raised above the Bay of Bengal. Their bottom generally consisted of accumulations of decaying vegetable matter—incipient peat—through which he could not reach a bottom by thrusting in the boat-poles.

It is not necessary here to insist on this depression being the effect of the upheaval of the Madoopore Jungle, or to inquire whether it pre-existed; but I think there can be very little doubt that the disturbance caused by the upheaval was what turned the Brahmapootra towards the east into these jheels.

A mere inspection of the map is sufficient to establish the probability that this change must have taken place not very long ago; and though the length of the course of the Brahmapootra is only half that of the Ganges (for it is not clear that it has any connexion with the Sampo of Tibet), still the two rivers are quite equal in volume, inasmuch as both enter the deltaic plains of Bengal with a ten mile oscillation before parting with any of their waters through their distributaries below Rajmahal on the one river, or at Rangamutty on the other.

Although equal in volume, the Brahmapootra brings down an immensely greater quantity of silt than the Ganges—probably one-half more; as Buchanan Hamilton phrases it, "It is the dirtiest river I ever saw." This arises, principally, from the fact that the slope of the valley of Assam, from Sudya to Goahuttee, appears to be more than 6 inches per mile. The consequence is, that neither the principal branch of the Brahmapootra nor any of the tributaries deposit their silt, but all is swept onwards; and, owing also to the greater quantity of rain that falls there than falls to the westward, the denudation of the land is much more rapid. This condition of matters will not be changed till the section across the valley opposite Gopalparah has been considerably raised beyond its present level, or in other words, till the land between Goahuttee and Goalparah attains an elevation corresponding to that attained in the valley of the Ganges about Rajmahal. At present the elevation of the river, at Goahuttee, with 350 miles to run, is apparently lower than the Ganges at Rajmahal, within 250 miles of the ocean.*

Until this extra elevation takes place, the physical condition of the valley of Assam will so closely resemble that in which the valley of the Ganges probably was when

the sea was at or near Rajmahal, that few problems connected with this subject would be more interesting than to compare the condition of the two valleys, in so far as materials exist for the purpose.

At that early time the River Ganges must have flowed with greatly increased velocity nearly in the middle of its valley; but as its slope and consequent velocity decreased, it was pushed southward against the hills by the greater energy of the northern streams, and the mass of their accumulations, the only southern stream of sufficient power to keep it off its hills being the Soane.

The Brahmapootra still maintains itself nearly in the centre of its valley for the greater part of its course, but it must be pushed southwards, as the Ganges has been, in the exact ratio in which the quantity of water flowing from the Himalayas exceeds that draining from the southern hills; and, as this takes place, the valley must rapidly be filled up and become habitable, which it hardly can now be said to be in most parts.

Though it is dangerous to descend to particulars in such matters, my impression is that hardly more than 4,000 or 5,000 years have elapsed since the sea, or rather the tide, was at or near Rajmahal; or, to speak more correctly, since the greater part of the province of Bengal Proper was a great lagoon, like those which exist at the mouths of the Brenta or the Po, or the Lakes Mensaleh and Boorlos, at the mouths of the Nile: for there is no reason to suppose that there did not always exist—in historical times at least—a bar or barrier where the tides turned somewhere very near where the Sunderbuns now are; but between this and the apex of the Delta all seems to have been a tidal swamp. When this was the case, the upper valley of the Ganges was in the semi-habitable state in which we now find Assam; and I fancy we can, in history, trace the settlements that were made one after another, proceeding eastward as the Delta extended, and, by its elevation, diminished the slope of the bed of the Ganges to what we now find it.

2. *The Silting-up of the Sylhet Jheels.*—To return, however, to the Sylhet Jheels. When the Brahmapootra was first turned into them, they consisted of an immense tract of submerged country, covered with clean still water of no great depth, and consequently every particle of silt that was brought into them was seized upon and deposited; and the Luckia and Megna, which flowed out of them, must then have been, as they are now, clear and pellucid streams, as compared with the turbid waters of the two great rivers.

* The level of the river at Goahuttee is assumed from a long series of barometric observations, checked by those of the brothers Schlagintweit ('India', vol. ii, p. 103); that at Rajmahal, from the levels of the East Indian Railway, checked by those of the great Trigonometrical Survey.

APPENDIX VI

The first effect of this invasion, that we trace on the map, is that the Soorma and other streams which flowed from Munnipore due westward, along the foot of the Cossya Mountains, were deflected southwards, which it was easy enough for the great river to do, so long as it could take them in detail. It was not until they were all united in the bed of the Megna, and pressed between the Tiperrah Hills and the upheaved tract, that the real struggle began.

In this case, though the Megna was much the smaller river, it had certain advantages necessary to be pointed out in order to appreciate the result.

The first of these is, that the Sylhet rivers depend wholly on the monsoon rains for their supply. The clouds, striking early on the Cossya range, discharge their waters with a violence hardly found elsewhere; and, as is well known, from 500 to 600 inches of rain fall on the slopes of these hills during the three months of the rainy season. It may also be mentioned that, owing either to the nature of the rocks of which these hills are composed, or because the violence of the monsoon has long ago denuded them of every moveable particle, these rivers bring down little or no silt even in the height of the monsoon, and are quite clear in the cold weather.

The Brahmapootra, on the other hand, depends for its floods partly on the melting of the snow, partly on the far more moderate and later rains of the valley of Assam, probably hardly exceeding 100 or 120 inches; having also a longer course to run, it arrived later at the scene of the struggle, and found the country already occupied by the waters of the Megna to such an extent as to be able to dam back its waters for the first month of the rains, and to force it to deposit its silt in its own bed. It could not, of course, have done this with any effect until the large river had reached the higher lands beyond the jheels to the southward, and with its silt had bridged across the whole width of the jheel-country, and, by this process, had embanked itself along the whole extent, so as to make it difficult for it to change its course. So long as the Brahmapootra was only forming an inland delta in the depressed country; the Megna had no hold upon it; but when it came to flow in what was practically an aqueduct, along the top of an embankment of its own making, it was rendered powerless, and the struggle was soon over. Had it not been for the upheaved tract already alluded to, it would, of course, have sidled away westward, and so have avoided the contest with the Sylhet rivers; but that being impossible, we find it retracing its steps nearly seventy miles northwards, and finding a

new channel for itself above Dewangunge in the bed of the Jennai.

3. *Eastern Gap in the Seaward Face of the Delta.*—Before leaving this branch of the subject, it may be well to allude to another geographical fact, which I believe to have been in a great measure the result of this diversion of the Brahmapootra into the Sylhet Jheels. It is the great gap or gulf that exists to the eastward of the Gangetic half of the delta.

From the Hooghly to the Hooringgotta the seaward face of the Sunderbuns is tolerably level and fixed; at all events, it has undergone no sensible change within any period to which our knowledge extends; and, so far as can be ascertained, it shows no tendency to go forward. In that portion of the delta, however, allotted to the Brahmapootra a great deal of work has yet to be done; everything there is so new, and in such a constant state of change, that, even in that climate, vegetation has not been able to settle upon the islands, and these are continually moving and changing their places. A great deal has been done to fill up the gap since the Brahmapootra last changed its course, in the beginning of the present century; but we want a new survey to be quite sure to what extent this has gone. If I am correct in my view, that the gap is mainly the result of the straining of the waters of the Brahmapootra through the Sylhet Jheels, and their consequently reaching the Bay of Bengal deprived of all their silt, it follows that the process of filling up will now be comparatively rapid, and that the eastern face of the delta will assume before long the same fixed character which now marks that of the western portion, and which is due—as will be afterwards explained—to the joint action of the tidal and fluvial forces which meet at that point.

4. *Change in the Bed of the Brahmapootra.*—It would have been extremely instructive if the progress of the struggle between the Megna and the Brahmapootra had been carefully watched and recorded; all we now know is, that when Major Rennell surveyed these rivers in 1785, neither he nor any of his assistants had any idea that the Brahmapootra had not always flowed, and would not always continue to do so, in the channel in which he then found it. We now know that, though a considerable body of water may flow that way in the rains, yet during nine months in the year a creek, or rather chain of ponds, 100 or 200 feet wide, and everywhere fordable, represents the river that a little more than half a century before flowed through that country in seven-mile reaches, and with a breadth of more than a mile and a half even in the dry season.

It is unfortunate that Buchanan Hamilton⁷ did not visit this country when surveying the

⁷ His surveys, in a mutilated form, were published in 3 vols. 8 vo., by Montgomery Martin in 1838.

APPENDIX VI

neighbouring districts in 1807-10, as the change must then have set in; and his greater knowledge of the language and of the customs of the natives would have led him to remark upon the anomaly of the smaller stream (the Megna) giving its name to the Brahmapootra, from their junction at Sonerampore to the sea, proving that the bed belonged to the smaller river, and that it had been invaded by the larger; and roving also—for this class of evidence is very cogent in these regions—that the invasion had taken place after the country had been sufficiently inhabited and settled to have the names of its rivers fixed on the bases they now maintain. So far as we can judge from appearances, this could hardly have occurred very long ago.

When the survey now in progress is completed, it will not be very difficult to estimate this epoch approximately. The first thing to be ascertained is, of course, the quantity of silt brought down by the Brahmapootra; then to estimate the area of the Sylhet Jheels filled up by the great delta formed in them by the waters of the Brahmapootra, checking this with the area of the delta at the mouth of the Megna, which remains to be filled in; and, with a few borings, all this ought not to be very difficult. In the meantime, it certainly is to be regretted, in an economic point of view, that the combined Sylhet rivers prevailed in this struggle. They cannot fill up their own swamps, because they possess no silt; and they shut out the only river that is capable of doing it for them. Now, however, every year must make their condition worse; for, as the delta extends, the land between them and the sea, below Dacca, must rise, and they consequently must deepen, and their water spread, until the whole province may become a submerged peat-factory, from which fate nothing can save it but inviting back the river they have just expelled.

5. *Opening of the R. Jennai.*—The first river the Brahmapootra met which could afford it a means of escape was, as just mentioned, the Jennai. Having no earlier maps than those of Rennell, it is impossible to be certain what the condition of this river was before he surveyed it. He found it flowing due north and south, in one-mile oscillations, with a breadth of between 400 and 500 yards, and flowing so regularly that I cannot help suspecting that it was then a very young river; if I may be allowed to guess, I should say not more than twenty years old. In fact, it seems to have been the first product of the struggle between the Megna and the Brahmapootra, and did not exist till the waters of the latter river had been dammed back so as to flow in this direction.

When Buchanan Hamilton visited this

country in 1810, he merely remarked that the Brahmapootra threatened to "carry away all the vicinity of Dewangunge" (which it has since done), "and perhaps to force its way through the Konnai (Jennai) into the heart of Natore."

It was not, however, till ten years later that it had increased to such an extent as to affect the Jessore rivers; and it was not till about the year 1830 that any reliable information was obtained regarding it. About that time a party of engineer officers was sent to connect Assam with the Great Trigonometrical Survey then in progress in Bengal. They carried a series of triangles up the bed of that river; and it was at the same time attempted to navigate it with steamboats. Nothing, however, was published until the river was laid down on a map of Bengal which I constructed, in conjunction with the late Mr. Tassin, on a scale of eight miles to one inch, in the year 1836. At that time it was flowing through Natore with an oscillation of nearly seven miles, and has continued to do so ever since; for though in its oscillations it sweeps away hundreds of miles of land every year, it is only very lately that it has shown any restlessness, or any tendency to leave its present direction, and whether it will be successful or not in so doing still remains to be seen. In the meanwhile the river is *nearly* where it is shown on the map; but, as it was there in 1850-53, it certainly is not there now, as it never is exactly in the same place for two successive years, being young and active, and roaming through a new and unconsolidated country. It may also be mentioned that the city of Serajunge—the largest and most important mart in that part of the country—is somewhere in that neighbourhood now, but not where marked on the map, of course, as it is annually obliged to accommodate itself to the vagaries of the stream, and change its locality. It may be ten miles further up the stream, or ten miles further down, or five miles further east or west; but it is somewhere thereabout; and that is all the information geographers can hope for, in a country where land can only be classed with floating capital.

6. *Jessore Group of Rivers.*—The first result of this invasion of the Gangetic territory by the Brahmapootra was, that it should seek to re-enact the part which had just been performed on the other side of the Madoopore Jungle and should threaten to shut up the Ganges, and send it back through its own distributaries. It was so nearly successful that, in 1838, the Great Ganges was fordable at several places above the junction. As the Brahmapootra has an oscillation of seven or eight miles while the Ganges has only one of

* Martin, vol. iii, p. 396.

APPENDIX VI.

five miles at that place, and as even that is gradually diminishing, it must have been successful if the Ganges had been able to find another outlet. This, however, was not so easy, the whole of the country to the southward and westward having been traversed repeatedly by powerful rivers, and the country consequently well raised and consolidated.

The Chandna was the first river it met above the junction, from which it could look for relief. This river, however, was old, its oscillation short, and its banks high and consolidated. But, even if it could have been opened, its natural outlet to the eastward, the Coomar, was older still, and less likely to give way; from a two or three-mile oscillation, which can still easily be traced, it had sunk to one averaging half a mile or less. No water runs through it in the dry weather, and during the inundation the flow is so sluggish that all the silt it receives is spread on its own banks; consequently it has raised its district higher than any of the surrounding country.

Proceeding up the stream, the next river was the Goraie. This was more tractable; it was not originally a distributary, but a local stream, draining some jheels—it was consequently only at its head that its banks were at all stiff or consolidated; lower down the land was low, and the river divided into several branches, each of which could be opened out separately. Even its upper reaches were so tractable, that, from a width of 600 feet, at which it stood in 1828, it has increased to 1908, which is now the least width at the lowest season. The next river upwards was the Upper Coomar. It has not been opened to the same extent for the reasons just stated; but, as the pressure the Ganges could bring to bear upon it was infinitely greater than could be effected by the Chandna on its lower division, it has been opened and increased from 330 to 792 feet, and both these rivers are still increasing.

When these three came together above Baboocally, there were several courses open to them; the most natural one—for the Coomar at least—would have been to have opened the Novo Gunga. Though called *new*, this, however, was the next oldest stream of the district, after the Coomar. Its oscillation is only half a mile, and its banks are consolidated and thickly inhabited; and though, no doubt, some of its reaches might have been lengthened, still if, at any one place, two or three oscillations are so stiff that they cannot be extended, they govern the

whole; and as there are several such in this river, its increase was hopeless.

The Barassya looked more favourable, and a part of its bed was actually appropriated and widened; but there were two oscillations opposite Muddenderry Factory which were in such stiff soil that they could not be extended, and, though the river has been somewhat widened and deepened, it remains now practically the same as when Rennell surveyed it.

To any one unacquainted with the habits of rivers, it will immediately suggest itself that the easiest escape from these difficulties would have been to break into that long low range of jheels behind Mahmudpore, and so get to the sea without difficulty. As I have, however, tried to explain above, water resists water better than land. It broke several times into the low land, but was on every occasion repelled, being forced to deposit its silt so as to make a barrier against its own incursions.

The only remaining course, and the one that eventually was adopted, was to seize on a small khal, or creek, called the Ellan Khalee, and widen it for the purpose. This was not difficult, as the land was low and friable, no great river having come that way in recent times.

In Rennell's time the creek was so insignificant that it is not mentioned in his maps, and even in 1818-20 it was so small that it could be easily leaped on horseback; when I first knew it in 1830-33 it was sweeping through the country with two-mile oscillations, as regular as if they had been drawn by hand. It was nearly 800 yards wide, and deeper in proportion than the older rivers, it was, in fact, the only river that all the year round was open for steam-navigation between Calcutta and the upper provinces. After being rejoined by the Novo Gunga and Barassya, it increases its reaches to three miles, and carries this oscillation to the sea—certainly the largest and finest of the delta-rivers after the great Poddah* or Megna.

Since I surveyed it in 1833 it has been getting straitened in its bed, and it evidently has been embanking itself too rapidly. Its reaches have lost their beautiful regularity and have become contorted; and one of them has stretched about two miles to the eastward, so as to cut off the Muddenderry reaches. If it has accomplished this—which I believe it has—it may be able to open out the lower part of the Barassya River, and get into the low country behind; and then, perhaps, joining some of the old branches of

* Poddah, or Padma (the Lotus), is the stream, running nearly east and west, by which the Bhagaruttee, or true Ganges, above Bauleah at some recent time connected itself with the Brahmapootra somewhere above Jaffergunge. The tradition of this junction taking place is quite distinct in the minds of the natives inhabiting its banks, who do not consequently look on the Poddah as a sacred stream. Still it must have taken place before the diversion of the Assam river into Sylhet.

APPENDIX VI

the Ganges which existed in Rennell's time, so get to the sea.

If this should be accomplished, the Goraie and the Upper Coomar, with the Chandna, will practically become the great outlets of the Ganges, and the whole of the eastern half of the delta will then be abandoned to the Brahmapootra. This will certainly be the case if the Ganges' waters find a sufficient outlet in this direction; and the chances are so equally balanced that the struggle is extremely interesting at the present time.

7. *Natore Group of Rivers.*—The Ganges at Jafferunge, united with the Natore rivers at Oorasagur, is so nearly a match for the Brahmapootra, that the latter river is attempting to escape the conflict by cutting off the angle at Attree, and joining the Dallaserrai through the Elamjaneer River. To do this effectually, however, it must open out some eighty miles of tolerably settled water-courses; and this would occupy some twenty years, even if it succeeded eventually. Our knowledge of the country is still too imperfect to enable us to predict the result with certainty. Whether it can accomplish this or not depends more on the success of the Goraie and the Jessore rivers in finding an outlet for the waters of the Ganges, than on the resistance of the eastern country. I may, however, be allowed to remark, in passing, that it will be a great advantage to the delta if the Brahmapootra does maintain its present course, and continues to act as a barrage to the waters of the Ganges. There is a great deal of land to the westward that would be improved by being raised, while it would be an immense benefit to the internal navigation if the Kishnaghur rivers could again be opened, and these objects can only be attained by the persistence of the eastern rivers in their endeavour to confine the western to their own territory.

If the Brahmapootra is able to maintain its present position at Jafferunge, another effect will be, that by continually damming back the waters of the Oorasagur, it will force the Natore rivers to deposit their silt, and to fill up the very low country through which they run. A good deal has already been done in this direction since Rennell's survey; and if the action continues much longer, they must abandon the struggle with the Brahmapootra, and seek an outlet somewhere between Bauleah and Surdah, some eighty miles further up the stream of the Ganges.

It follows from all this that, if the Brahmapootra continues in its present bed, it will almost certainly close the eastern outlet of the Ganges. At present it is kept open by a rather curious process, which it may be worthwhile to describe.

As before mentioned, the principal means by which the Megna defeated the Brahmapootra was by being first in the battle-field; and though the Brahmapootra is slower than the Megna, it is quicker than the Ganges, owing to the length of course of the latter river, and its depending more on the melting of snow than on rain.

The consequence of this is that, for the first month of the inundation, the water in the Ganges above Jafferunge almost flows backwards, and the Echamuttee at Pubna flows into the Ganges instead of out of it; and, during this season, the deposit in its bed is very considerable. But, during the last month of the rains, when the waters of the Brahmapootra have nearly run off, the immense body of water spread over the vast plains of Hindostan rushes into the partially deserted bed of the Brahmapootra, which then acts as a waste-water reservoir, and with a force that, to a great extent, clears out the deposit of the earlier months, and so restores the equilibrium.

This has been so entirely the case of late years that the Ganges has straightened its course very considerably below the head of the Jellinghy. The first result of this was to cut off a great six-mile bend on the right bank, leaving the Koostee station of the Eastern Bengal Railway some two or three miles below the head of the Goraie, instead of two miles above it on the Ganges as it originally was, and was designed to be; and if this sudden rapid rush at the end of the rains can be maintained, it probably will suffice to keep the river open, and so maintain the present status.

It will be easy to perceive how this effect takes place, if we bear in mind that the fall of the country between Pubna and Jafferunge (thirty-six miles) is only about seven feet; and if all the waters were supplied by one river, that would be their slope; but if, at any moment, the waters of the Brahmapootra should be seven feet lower than those of the Ganges, the slope will be doubled; and if ten feet, the scour must be tremendous; and it is believed that this was the difference when the last bend was cut off.

8. *Kishnaghur Group of Rivers.*—After the Jessore rivers just described, the only other great group of distributaries of the Ganges is that known as the Kishnaghur rivers, and consists of the Bhagaruttee, Jellinghy, and Matabangah, which, uniting above Sook-saghur, form the Hoogly.

Of these the oldest is the first-named. Indeed, if we consult either native traditions or internal evidence, it is the Ganges itself, and bears the same sacred name here as it does at its source; the name Ganges, which is applied to the intermediate portion, merely

APPENDIX VI

means Gunga or Gonga—the river “par excellence”.

Whether we look at it from a geological or an historical point of view, there can be little doubt that the original river, after passing Rajmahal, would naturally run southward, parallel, or nearly so, to the course of the Brahmapootra at that time, the distance between the two being probably under ninety miles. The intermediate space would then have been fully occupied by the Coosy, Mahanuddee, Atree, Teesta, and other Himalayan torrents, all of which were probably at that time tributaries to the Brahmapootra; though, in consequence of the extension of the delta, they have most of them seceded to the Ganges.

It is probable that the Bhagaruttee River, or true Ganges, always flowed very nearly in the direction it now does, the extension of the delta on the left being about sufficient to counterbalance the repulsive action of the More, Adjie, Damooda, and Roopnarain, on its right bank. There is, indeed, no improbability in supposing that the original state of things may be, to a great extent, restored before long. All the silt of the two great rivers has been employed for a considerable time in raising the eastern half of the delta, and as that rises it throws the waters westward; and though we can hardly contemplate the Great Ganges flowing again past Moorshebabad, there is every reason to suppose that the body of water flowing through the Kishnaghur rivers will largely and steadily increase.

It is not very easy to ascertain now which were the earliest assistants of the Bhagaruttee in distributing the waters of the Ganges; but, of those which have left any traces, three may be mentioned as the best known. The first of these was the Coomar, mentioned before, and running E.S.E. nearly parallel to the bed occupied by the Ganges fifty years ago; the Boyrub, running south-east; and the Echamuttee, taking an intermediate course between the last-named and the Hooghly, whose course is due north and south. As mentioned above, the lower part of the first-named river was cut off by the Chandna, and it then dried. The upper half long remained moribund, but was revived by the late invasion of the Brahmapootra. The second was extinguished, probably some 300 or 400 years ago, by the Jellinghy, which, when the slope of the delta towards the east became less, turned its waters from the south-east to south by west, and with them joined the Bhagaruttee at Nuddea, the Nyadwipa of olden times—a new island when the neighbourhood was a sea, or at least a tidal swamp. The third was nearly meeting a like fate from the Matabangah, which, appropriating a part of the bed of the Coomar, and then a part of the Echamuttee, opened out the Chhoornee nullah

of Rennell, and joining the Hooghly above Sooksaghur, it promises, if not checked, to play an important part in the fluvial history of the delta.

The cause of the recent increase of the Matabangah is, of course, the action of the Brahmapootra on the lower Ganges, and its inability to open up the Coomar suddenly, or the Echamuttee, which is an old and thoroughly settled river, with high consolidated banks and very short oscillations. Its success, however, will mainly depend on whether it can so open out the Hooghly as to admit of its taking off the extra supply of water it may bring down. Whatever the ultimate result may be, it began vigorously. At Sooksaghur there was a noble country-house, built by Warren Hastings, about a mile from the banks of the Hooghly. When I first knew it in 1830, half the avenue of noble trees, which led from the river to the house, was gone; when I last saw it, some eight years afterwards, the river was close at hand. Since then, house, stables, garden, and village are all gone, and the river was on the point of breaking through the narrow neck of high land that remained, and pouring itself into some weak-banked nullahs in the low lands beyond; and, if it had succeeded, the Hooghly would have deserted Calcutta. At this juncture the Eastern Bengal Railway Company intervened. They were carrying their works along the ridge, and they have, for the moment at least, stopped the oscillation in this direction. If they are able to do so in future, it will remain to be seen whether the Matabangah has the power to open out the reaches of the Hooghly so as to take off the water; but this I doubt. The river is old, its banks are high and much built upon, and great sums of money would be spent in groins and embankments to stop its encroachments. These may be successful; in which case it must open up the Echamuttee, or break through somewhere and get behind Calcutta. This might not be a serious misfortune for that city; indeed, the Hooghly becoming a mere tidal estuary like those of the Sunderbuns, without any silt-bearing streams flowing into it, would be an advantage, were it not that lower down there are two rivers, the Damooda and the Roopnarain, which would probably, during the rains, be able to shut it up if there was not a very heavy counterbalancing pressure from the Kishnaghur rivers to keep it open.

Not very long ago, if we may trust tradition, the Damooda joined the Hooghly at Satgong, above Hooghly; and even in Rennell's time the old bed was open, and is marked in his maps; but it was bent back, and was evidently, in his time, losing its grip on that stream. It has now, like the Sylhet rivers, been bent south, and, like the Megna, lies in wait further down, prepared, in conjunction

APPENDIX VI

with the Roopnarain, to retaliate if any accident or moment of weakness should come over its old antagonist, the Hoogly.

According to the natives, the great change took place only in 1757-1762¹⁰, when the Damooda burst into what had been the old channel of the Bhagaruttee and joined the Hoogly—the new name of the new stream—close to the mouth of the Roopnarain, which the natives persist in asserting is an old mouth of the Ganges; and they are probably right, though Major Rennell, in his atlas, takes the trouble of denying it.

If the time when this great change is said to have taken place in the navigability of the Hoogly than can be derived from any silting-up of the Kishnaghur rivers, which seem to have remained unaltered at least since Tavernier travelled in India in 1666, when these rivers seem to have been pretty much in the state they now are. But if the land is rising rapidly in the eastern half, especially about Jaffergunge, which there seems no reason to doubt, while there has been no change of level in recent times in the western half, it follows, almost as a certainty, that the western rivers must go on gradually but steadily increasing in volume, and with them the quantity of water flowing through the Hoogly.

On the whole, therefore, it seems fortunate for Calcutta that the Hoogly did not break through at Sooksaghur; and this circumstance will be a benefit to a large portion of the delta if it forces either the Echamuttee or the Boyrub again to open its oscillations. As mentioned above, both these rivers were cut off by the Jellinghy and Matabangah when this part of the delta had been so raised that the inclination was rather to the west than the east or south. When the town of Jessore was built on the Boyrub, some 350 years ago, it is said that it was situated on the sea-shore, though this probably only means that the country to the southward of it was a tidal swamp, which, so far as we can judge, was the condition of a great portion of the delta as that period, though the seaward face of the Sunderbuns was probably the same as it now is.

It must have been immediately after this that the Kishnaghur rivers cut across the Boyrub, and deprived it of its supply of Ganges water; for at a distance of about six miles below the town of Jessore it ceases to be a "depositing" river. Up to that point its banks are high and firm, its oscillations quick, and it has all the appearance of an active river. For twenty-five miles from that point it runs to Culna, and beyond it, as straight as a canal, through an immense tract of jheel-land. It has had no silt to form banks, or to raise the country, for nearly

forty miles in length and some twenty to thirty in breadth; while, as the more active rivers on either hand have raised theirs, this remains an immense half-inhabited tract, which is yearly getting relatively lower, and will become absolutely uninhabitable unless some active silt-bearing river turns in that direction. Whether it will be from the westward or the eastward that the succour will come remains to be seen. My impression is that it will be in the latter direction. Already the Ellankhally has sent the Chittra in a south-westerly direction across the Boyrub at Kulna; and it has done a great deal of good in raising the depressed country. This stream is not marked in Rennell's maps. When I knew it, it was narrow and crooked, but deep and navigable. It has now one-mile oscillations, with a width of about 1,200 feet, and is increasing. Its only defect is, that it strikes the Jheel-country too low. What is wanted is that the Ellankhally should send off a branch a few miles below the junction of the Novo Gunga, which would enter the heart of the swamps. If it does not find an opening to the eastward, across the Barassya (which, as mentioned above, it is now seeking), it will probably turn in this direction, as it affords an opening which, though not so promising, is yet probably more easily accessible than the other.

9. *Changes in the Course of the River Teesta.*—Before leaving the rivers of the Delta, there is one that exhibits phenomena of so different a class that it may be well worthwhile noticing them, in order fully to understand the subject.

The largest tributary to the delta-streams, east of the Coosy, is the Teesta. It rises in the Sikkim Mountains not far from Darjeeling; and when surveyed by Major Rennell, it took a course due south after passing Julpigoree, joined the Attree, and, after flowing past Dinajpoor, joined the Natore rivers, and thence, passing through the Oorasagur, joined the Ganges at Jaffergunge. In the year 1787, either one or two years after Major Rennell's survey was completed, an unusual flood occurred; the river brought down from the hills a sufficient quantity of sticks and stones to throw a dam across its junction with the Attree, and, taking a south-east course, it joined the Brahmapootra above Dewangunge.

The curious part of the matter is that, on looking into Rennell's original MS. surveys, a chain of ponds is marked in this direction as "the old bed of the Teesta", too insignificant to be marked in his Atlas; but at their junction with the Brahmapootra he does mark "Teesta Creek". To those who know how permanent the names of rivers are, this is proof positive that the river once before flowed in this direction; but, un-

¹⁰ Capt. Sherwell's Report on the Rivers of the Ganges, 1858.

APPENDIX VI

fortunately, we have no knowledge when it deserted this bed and became a confluent of the Attree. Since the separation, however, it has shown no tendency to go back, but runs steadily in the direction it took seventy-six years ago, and in which it now flows with an oscillation of two miles, and a width, even in the dry weather, of some 2,000 feet.

One thing, however, may be remarked, namely, that it certainly was not any change in the level or the course of the Brahma-pootra which induced the change. Julpigoree, where the alteration took place, is 200 feet above the level of the river at its mouth, and it flows for the first forty or fifty miles with a fall of 3 feet per mile; for a like distance further on the fall is 2 feet, and the slope gradually sinks to 6 inches, or it may be less; but nowhere is it a depositing river or, consequently, influenced by back-waters; and it therefore appears to have been merely an accident which caused the change, though being so, it is as likely to go back any day as to remain in its present position.

10. *Retrocession of the Junctions of tributary Streams with main Rivers.*—There still remains one class of phenomena to which I must direct attention before concluding, namely, the shifting upwards of all the mouths of the tributaries of the Ganges along the main stream. This is, perhaps, the most generally interesting of the alterations that are taking place, not only from the magnitude of the changes it superinduces, but because of its forming the best chronometric scale for estimating the extension of the delta and the recent sequence of events.

Although I am not aware that they have been anywhere alluded to before, the causes that lead to the changes appear to be tolerably obvious when pointed out.

In order, however, to make myself perfectly understood, let me first refer to what I said about secular elevation in an early part of this paper, and then assume two hypothetical cases, which I trust will make the matter quite clear.

First let me assume hypothetically that the Ganges, from Allahabad to Rajmahal, was a perfectly horizontal canal or arm of the sea, running due east and west. It is evident that the slope formed by the rivers bringing down detritus from the hills on the north and south would dip north and south—but their plains would, equally be horizontal in a direction east and west—and consequently that all the tributary streams would join the assumed Ganges-canal at right angles, as shown in the diagram, Figure 3.

For the second hypothesis, let me assume that the sea, or canal, extended from somewhere below Rajmahal to the Himalayas, due north and south, and that the dip of

the plain was west and east, say from Cawnpore or Fyzabad to this canal or sea, as shown in Figure 4. It is evident that all the streams, on issuing from the hills, would tend to turn eastward, and to run parallel to the Ganges. Neither of these, of course, truly represents the facts of the case. The valley or the basin of the Ganges, like that of almost all rivers, is compounded of these two plains, varying in slope according to circumstances; and the course of the tributaries is along the diagonal or mean of these two intersecting plains.

Thus, if we assume that when the sea was at Rajmahal the slopes of the two plains were about equal, as shown in Figure 5, all the tributaries would join the main stream at about an angle of 45°; but the extension of the delta has now raised the land about this place to nearly 80 feet above the sea-level. This has been equal to tilting back the valley of the Ganges to that extent, without materially affecting the slopes of the lateral plains, as they are shorter, and start from much higher fixed points at the foot of these hills. The consequence is, that the angle of 45° is always tending to increase, and must eventually reach 90°, or nearly so, in all cases.

There are only slight indications in Bengal of the state of affairs represented in Figure 4, but it can be traced in parts. The upper part of the valley of the Ganges, from Allahabad to the mouth of the Gogra, is in the state represented in Figure 5, with a tendency rather towards that shown in Figure 4. The lower part is fast assuming the form represented in Figure 3. But there is still a fourth form which the rivers must all ultimately assume, and which more resembles Figure 4 than any of the other diagrams. It is this: as soon as the slope of the principal stream has been so reduced by the elevation or extension of the delta, or other causes, that it becomes a depositing river, it will then so raise the level of its plain above the surrounding country that the tributaries cannot flow directly into it.

The form they will then take is shown in Figure 6: having been reduced to joining the main river at right angles, as in Figure 3, they will be turned at right angles on reaching the edge of its plain, and, flowing parallel to it, join it at some point lower down, where the tributary may have acquired sufficient elevation to force its way into the bed of the great river.

We have already examples of this in the way the Soorma was deflected by the Brahmopootra, the Damooda by the Hooghly, the Attree by the Poddah, and all the minor South Behar streams by the Ganges. The Coosy too is fast assuming this shape, and eventually it will become the normal condition of all the tributaries of the Ganges.

NOTE—For diagrams mentioned on this page see pp. 251-52.

APPENDIX VI

The first river to feel the effect of the tilting backward of the plane of the Ganges, by the elevation of the land at Rajmahal, was the Coosy, as the nearest to the delta. The consequence is, that when Rennell surveyed Purneah, he saw, and recorded in his memoir in the 'Philosophical Transactions',¹¹ as well as in his Atlas, that the Coosy had at no distant date flowed past the station at Purneah, and joined the Ganges forty-five miles further down than its present junction. Buchanan Hamilton not only confirms this, but adds: "This tradition is not only supported by the above-mentioned appearance, but by the opinion of the Pundits, or natives of learning, who inhabit its banks. These, indeed, go still further, and allege that in times of remote antiquity the Coosy passed south-east by where Tajpore now is situated, and thence towards the east till it joined the Brahmapootra, having no connexion with the Ganges;" and he adds, "this opinion seems highly probable"¹². Indeed, an attentive study of the successive changes that have taken place renders this almost certain; and it is probable that the Oorasagur is the mouth by which the combined waters of the Coosy, the Mahanuddee, and the Attree were originally discharged into the Assam river.

Were it possible, it would be extremely interesting to know when this was the case. We may certainly assert that it was before the Madoopore jungle was upheaved—and when, consequently, the course of the Brahmapootra was very nearly what it now is—and also at a time when the tide, or at least very low land, extended to Pubna or thereabouts; and that this should have occurred within the very limited range of the traditions of Lower Bengal induces me to suppose that the beginning of the Christian era is the highest antiquity that can be ascribed to such a state of things. It may be much later.

The present course of the Coosy is so nearly perpendicular to that of the Ganges, that its direct junction can hardly travel more than a mile or two further up stream. The first result of any further rise in the level of the Ganges will be that of decreasing the radii of its curves, making it more winding, and converting it into a depositing stream, which it hardly is at present.

The rising of the deltaic plain has already produced another effect since Rennell's survey was made, the middle, or the belly, of the river having travelled westward some four or five miles throughout the greater part of its course; and it shows a great tendency to go further in this direction—in fact, to emulate the example of its old confluent, the Mahanuddee, which forms a curve

extending thirtyfive miles to the westward of the straight line in which we may reasonably suppose it reached the Ganges at no very distant date.

As just mentioned, its junction with the Ganges tends to assume the rectangular form explained in Figure 6; and though its main course is steadily travelling westward, its mouth may travel eastward; and, before many years are over, it probably will again join the Ganges as low down as it did when its main stream flowed past the station of Purneah.

The principal river of the Tirhoot district is the Bogmutty, which presents exactly the same phenomena as those last described. It has an old bed to the eastward, much more perpendicular to the course of the Ganges than that it now occupies. It has now been deflected so far westward that it joins the old bed of the Gunduck, and, in our careless nomenclature, actually gives its name to the lower part of that stream, and in Rennell's maps is so called at its junction with the Ganges opposite Monghyr.

The next river to feel the effect of these changes was the Gunduck. In this instance the evidence is as clear as could be desired. A river marked on our maps as the Little Gunduck—sometimes, but very improperly, as just mentioned, called the Bogmutty, from the name of its principal tributary—joins the Ganges opposite Monghyr; and there can be little or no doubt that it was what it is styled in the maps of the recent Survey, the Boor Gunduck, or old bed of that river.

Judging from the height of its banks and that of the land in its neighbourhood, and the extreme sinuosity of its course, this old river must long ago have ceased to flow with any vigour. A date might possibly be found for the time when this was the principal river; but, with the information at present available, all we can say is that it was so at a time when the country was sufficiently inhabited for the nomenclature of the rivers to be fixed.

At the earliest period to which anything like authentic history reaches, this river seems to have been distant from its present channel about twenty-two miles to the north of its present mouth, near Bakhra, or the site of the famous city of Vaisali, celebrated as the place where the second convocation of the Buddhists was held, 300 years before Christ, and to have joined the Ganges some thirtythree miles further down than at present. It is now so nearly perpendicular, that it will probably be a long time before it travels much farther westward.

Proceeding upwards, the next river of any importance we meet is the Soane. Here,

¹¹ Vol. lxxi, p. 87.

¹² Martin, vol. iii, p. 15.

APPENDIX VI

fortunately, we have more precise information. Arrian, Strabo, and Pliny—or rather Megasthenes—tell us that Palibothra, the great capital of this country, was situated at the junction of the Erranaboas and the Ganges. Recent antiquarian discoveries have left no doubt that Patna—"Palibothra"—is the city designated, and that the Hyranya Bahu—the Golden-armed, or, popularly, the Sona, or Golden—is the river; and, fortunately, an old branch of the Soane can still be traced, from a spot about twelve miles up the stream to near the west end of the present city. In Rennell's time the Soane joined the Ganges at Moneah, twenty-two miles further west, by a single mouth. Since his survey it has formed a delta, and the upper mouth is the more important; so that, practically, it may be said to have receded four miles since that time. If in eighty years it has progressed so much, in 2,000 it ought to have gone back 110 miles, instead of only twenty-five or twenty-six; the probability consequently is, that the delta was not then sufficiently extended or raised to affect rivers so far up the stream; indeed, it may have been 1,000 or more years after the fact was notified to us that the elevation of the delta was first felt so high up as Patna; and, if so, we may expect that the retrocession will now go on at a rapidly increasing rate. Whether our railway-works and bridge may be able to prevent this or not remains to be seen. If they do so, it can only be at an enormous annual expenditure for embanking and repairs. In fact, had the engineers been aware of this physical fact, they would probably have placed their bridge very much further up the stream than they have done. But be this as it may, it will be extremely interesting to watch now the progress of the stream; and having two surveys separated by an interval of eighty years, and the old indications of the Greek geographers, we may from these data obtain a tolerable index by which to measure the progress of the delta seawards, or its progressive elevation above the sea-level at Rajmahal.

The next stream that ought to be affected is the Sarjoo, or Gogra. It does not, how-

ever, seem to have been affected at all; indeed, at first sight, it seems to have been moved downwards since Rennell's survey. This arises, however, only from the Ganges having cut off a sharp bend at this point of its course, and the river Gogra flowing through the arm thus left unoccupied. It does not appear probable, however, that it can remain much longer uninfluenced by these changes; but, until it is so, it may be taken as the fixed point beyond which the extension of the delta has not in recent times affected the slope of the bed of the Ganges.

The only indication I have been able to obtain of the Gogra, or Ghagra, having travelled westward, in historical times, is the following:

There is an old bed of an old river which leaves the present Gunduck at a point somewhere between Bakhra and Lalgunge, and joins the Ganges opposite Bar. This branch, I have just stated, was probably an old bed of the Gunduck; but it still bears the name of Ghagra; and those who know how permanent Indian names are will hardly hesitate to believe that it may have been an old channel of that river. The evidence cannot be considered as conclusive, however, as I have been unable to trace the course of that river across Sarun. Nothing can be more probable than that, when the Gunduck joined the Ganges opposite Monghyr, the Ghagra should have joined opposite Bar; or that the Gunduck should have cut across that stream at Bakhra and occupied its lower portion, just as the Bogmutty has cut into the old Gunduck should have broken through and sought an independent opening into the parent stream. The Bogmutty will certainly do this one day; at present it is too small and weak a stream to act with the energy of the Coosy or Gunduck, but it must eventually come to this.

The next move must be that the Ghagra will seek a junction with the Tonse, and join the Ganges either through its bed or further west. I am not aware, however, that any tendency in that direction has yet been observed.

III. Historical Evidence of Changes in the Delta of the Ganges

Having now run through all the principal phenomena to which I wished to call attention, describing them from a topographical point of view, allow me to recapitulate, as briefly as I can, the historical events connected with them, in order that their approximate dates may be judged of; for as all the events to which I have alluded appear to me to have occurred within historical times, and after the rivers had received their names from the Aryan races inhabiting their banks, we may, without difficulty, connect history with topography in this instance at least.

With the first dawn of history or tradition, about 3,000 years B.C., we find the immigrating Aryan Hindoos traversing the Punjab, and settling, so far as India is concerned, exclusively in the tract of country between the Sutledge and the Jumna. Their rivers were the Sareswati, the Caggar, and the Markandya, which must then have been far more important streams than they are now. Whether their decay arose from neglect of cultivation, after breaking up the soil, or from their raising beds so as to spill towards the Jumna, or from what other cause, is by

APPENDIX VI

means Gunga or Gonga—the river “par excellence”.

Whether we look at it from a geological or an historical point of view, there can be little doubt that the original river, after passing Rajmahal, would naturally run southward, parallel, or nearly so, to the course of the Brahmapootra at that time, the distance between the two being probably under ninety miles. The intermediate space would then have been fully occupied by the Coosy, Mahanuddee, Atree, Teesta, and other Himalayan torrents, all of which were probably at that time tributaries to the Brahmapootra; though, in consequence of the extension of the delta, they have most of them seceded to the Ganges.

It is probable that the Bhagaruttee River, or true Ganges, always flowed very nearly in the direction it now does, the extension of the delta on the left being about sufficient to counterbalance the repulsive action of the More, Adjie, Damooda, and Roopnarain, on its right bank. There is, indeed, no improbability in supposing that the original state of things may be, to a great extent, restored before long. All the silt of the two great rivers has been employed for a considerable time in raising the eastern half of the delta, and as that rises it throws the waters westward; and though we can hardly contemplate the Great Ganges flowing again past Moorsheadabad, there is every reason to suppose that the body of water flowing through the Kishnaghur rivers will largely and steadily increase.

It is not very easy to ascertain now which were the earliest assistants of the Bhagaruttee in distributing the waters of the Ganges; but, of those which have left any traces, three may be mentioned as the best known. The first of these was the Coomar, mentioned before, and running E.S.E. nearly parallel to the bed occupied by the Ganges fifty years ago; the Boyrub, running south-east; and the Echamuttee, taking an intermediate course between the last-named and the Hooghly, whose course is due north and south. As mentioned above, the lower part of the first-named river was cut off by the Chandna, and it then dried. The upper half long remained moribund, but was revived by the late invasion of the Brahmapootra. The second was extinguished, probably some 300 or 400 years ago, by the Jellinghy, which, when the slope of the delta towards the east became less, turned its waters from the south-east to south by west, and with them joined the Bhagaruttee at Nuddea, the Nyadwipa of olden times—a new island when the neighbourhood was a sea, or at least a tidal swamp. The third was nearly meeting a like fate from the Matabangah, which, appropriating a part of the bed of the Coomar, and then a part of the Echamuttee, opened out the Chhoornee nullah

of Rennell, and joining the Hooghly above Sooksaghur, it promises, if not checked, to play an important part in the fluvial history of the delta.

The cause of the recent increase of the Matabangah is, of course, the action of the Brahmapootra on the lower Ganges, and its inability to open up the Coomar suddenly, or the Echamuttee, which is an old and thoroughly settled river, with high consolidated banks and very short oscillations. Its success, however, will mainly depend on whether it can so open out the Hooghly as to admit of its taking off the extra supply of water it may bring down. Whatever the ultimate result may be, it began vigorously. At Sooksaghur there was a noble country-house, built by Warren Hastings, about a mile from the banks of the Hooghly. When I first knew it in 1830, half the avenue of noble trees, which led from the river to the house, was gone; when I last saw it, some eight years afterwards, the river was close at hand. Since then, house, stables, garden, and village are all gone, and the river was on the point of breaking through the narrow neck of high land that remained, and pouring itself into some weak-banked nullahs in the low lands beyond; and, if it had succeeded, the Hooghly would have deserted Calcutta. At this juncture the Eastern Bengal Railway Company intervened. They were carrying their works along the ridge, and they have, for the moment at least, stopped the oscillation in this direction. If they are able to do so in future, it will remain to be seen whether the Matabangah has the power to open out the reaches of the Hooghly so as to take off the water; but this I doubt. The river is old, its banks are high and much built upon, and great sums of money would be spent in groins and embankments to stop its encroachments. These may be successful; in which case it must open up the Echamuttee, or break through somewhere and get behind Calcutta. This might not be a serious misfortune for that city; indeed, the Hooghly becoming a mere tidal estuary like those of the Sunderbuns, without any silt-bearing streams flowing into it, would be an advantage, were it not that lower down there are two rivers, the Damooda and the Roopnarain, which would probably, during the rains, be able to shut it up if there was not a very heavy counterbalancing pressure from the Kishnaghur rivers to keep it open.

Not very long ago, if we may trust tradition, the Damooda joined the Hooghly at Satgong, above Hooghly; and even in Rennell's time the old bed was open, and is marked in his maps; but it was bent back, and was evidently, in his time, losing its grip on that stream. It has now, like the Sylhet rivers, been bent south, and, like the Megna, lies in wait further down, prepared, in conjunction

APPENDIX VI

It is not, of course, meant to be asserted that the valley of the Ganges was filled up, geologically speaking, within that period, but only that it became fit for man's occupation within the limits of the historical period, as hundreds of square miles of the Delta have become since Rennell's survey was made.

The greater part of the valley of Assam still remains—what the plains of Bengal may be conceived to have been 2,000 or 3,000 years ago—uninhabitable swamps,

with occasional spots where cities have existed or do now stand. But if the principles enunciated above are to be depended upon, the recent changes in the course of the Brahmapootra ought rapidly to affect the level of the land in that valley; and it cannot possibly require a thousand, or half that number of years, before the swamps opposite Goalparah and Goahuttee become as dry and habitable as the plains of Purneah in Tirhoot.

IV. Increase of the Delta seaward

1. *Silt held in suspension in Ganges' Water.*—It will have been observed that, in the previous part of this paper, I have said nothing about the quantity of silt contained in the water of the rivers I have been describing, nor attempted to calculate its influence either in extending the delta seaward, or in raising it upwards. I have refrained from alluding to this simply because I know of no data on which any reliance can be placed.

To base any calculation on this agent, the experiments ought to be continued for, at the very least, one whole year, on some one at least of the larger rivers. But this has not yet been done; and, even if it were done for the Ganges, it must be nearly useless unless we had the same knowledge as regards the Brahmapootra, which I believe to be an infinitely more important stream in this respect than the Ganges itself. And we ought also to know what is brought down by the Mahanuddee, and the group of Natore streams debouching through the Oorasagur.

The latter rivers run through so low a country that they probably deposit most of their silt *en route*; but the Mahanuddee and its tributaries are swift, and strongly embanked. The Sylhet rivers may probably be disregarded; they never possess much silt, and what little they have they deposit at home, so they contribute little or nothing to the delta. Supposing, however, all this were ascertained for every river just as it enters the delta, another very important question arises—How much is deposited on the plains of the delta, and how much carried to sea? During the cold weather, when the rivers are low, almost all their silt will be carried to sea; but then the quantity of water is small, and that little comparatively clear. At the height of the inundation, when the river is overflowing its banks, at least one-half is deposited inland. As the rivers fall, the greater part will again be carried away; but as the force of the current slackens, there is a great tendency for rivers to deposit their mud in their own beds, and to heal the wounds that have been made in their banks; so that even during that period it is doubt-

ful if more than half is carried off. For instance, careful simultaneous experiments were made, two years ago, as to the quantity of solid particles held in suspension in the waters of the Matabangha,—first, at leaving the Ganges, when it was found to be 1 in 294 parts, while nearly at its junction with the Hooghly the quantity was only 1 in 884, proving that two-thirds had been deposited *en route* in that short distance¹⁵

Sometimes an acre or two of a bank will fall in a single night, and, consequently, the stream will be unusually turbid for the next twenty-four hours; but, in such an abnormal instance, one-half at least probably never leaves the local stream, but is deposited again a few miles further down; and, in fact, every stream and every locality has its peculiar regimen in this respect, and until they are more carefully examined than they have hitherto been, it will be safer to look to such indications as history affords us, and to our charts. These last show that little or no change or extension seawards has taken place, during the last 100 years, between the Hoogly and Horringtona, or about halfway across the seaward face of the delta. But the eastern half is in a state of rapid change, having remained behind, I believe, principally in consequence of the absorption of the Brahmapootra's silt by the Sylhet Jheels; but probably in little more than a century or two from this time the gap may be repaired, and the Sunderbuns bounded by a nearly straight line east and west.

As regards the elevation of the delta, by far the safest test is the progress of the junction of the tributary streams, such as the Soane and Gogra. If the former is carefully surveyed from time to time, and the retrocession of the tributaries carefully noted, we shall gather far more satisfactory evidence of the gradual elevation of the delta than can be obtained by dipping tumblers from the sides of 'Budgerows', which operation has hitherto been supposed to be sufficient to gauge the growth of continents.

2. *Swatch of "No Ground"*.—There is still one other phenomenon which it is necessary to allude to, in order to understand the

¹⁵ 'The Ganges and the Hooghly', by F. Prestage, Calcutta, 1861.

APPENDIX VI

present or prospective condition of the seaward face of the delta of Bengal. This is the existence of a great depression, or hole, in the middle of the Bay of Bengal, known in the charts as the "Swatch of No Ground". Its exact position is shown on the map accompanying this paper (Plate XII), and its sides are so steep and well defined that it affords mariners the best possible sea-mark—the lead suddenly dropping, especially on its western face, from 5 and 10 to 200 and even 300 fathoms, with "no ground".

It seems quite impossible to ascribe this sinking to volcanic action, inasmuch as we know that no such violent convulsion has taken place in Lower Bengal, during the last 200 years, as could have caused such a chasm; and it is not conceivable that so large and so sharply defined a depression could have existed in so muddy a sea for even a fraction of that time without being obliterated or smoothed over, unless there was some tidal or fluvial action always at work tending to keep it open; nor does it appear difficult to explain where this action is.

If we turn to the authorized chart of the mouths of the Hoogly, we find the following description of the action of the tides in that side of the delta. "The tides in the channels have a rotary movement with the sun, first quarter-flood, W. N. W., round by N. to the last quarter E. N. E., to first quarter-ebb E. S. E., round by S. to the last quarter W. S. W."

The same description applies to those on the other side, with the difference that the larger portion of the tidal wave comes from the eastward—following the course of the sun. The circle there is considerably larger, as shown in the two black circles on the map. The action is, in fact, strictly analogous to that of the phenomenon known as the "Bore", which exists to a greater or less extent in all funnel-shaped tidal estuaries. The flood-tide, coming up the contracting bay from the southward, is accelerated on the shelving shore on either hand, and reaching the face of the delta at its eastern and western extremities before it touches the centre, this rotary motion ensues. The consequence seems to be that the two circular tides, meeting somewhere in the centre of the bay, must do one of two things—either they must throw up a bar or spit between them, or they must scoop out a depression: The first would be the action of two rivers, the velocity of whose currents was diminished or stopped by contact with the ocean. The latter seems the probable action of two tides whose motion is continuous and uniform.

It is quite reasonable to assume that the action of these tides might not have sufficient force to scoop out such a canal as this, if they found the delta perfectly formed and

uniform across the whole head of the bay; but, as the tides certainly existed before the delta had been formed by the deposit of the silt of the rivers, there is no reason for doubting that their daily action is quite sufficient to sweep out and keep clear any channel which may be necessary for the efflux of these waters; and such, I feel convinced, is the true explanation of the phenomenon. It must also be borne in mind that there is every reason to suppose that the action of these tides has been constant and uniform ever since the Bay of Bengal took its present shape, and, consequently, it is probable that there may have always existed a bar or spit on the neutral line between the oceanic and river forces, somewhere not far from where the Sunderbuns now are. If this were the case, the deltaic plains would then have been, as hinted above, a great lagoon or inland sea—a circumstance which would tend very considerably to accelerate the deposition of mud in them and thus to account for the rapidity of some of the changes, which might otherwise seem strange.

As the case now stands, the western tidal wave has had sufficient strength to sweep out the Balasore Roads, and to keep open the estuary of the Hoogly, known as Saugur Roads. Thence turning eastward towards the Swatch, it seems to have sufficient force to fix the seaward limit of the western Sunderbuns as certainly as the current that passes eastward has fixed the seaward boundary of the Delta of the Nile.

The eastern half of the delta is by no means so fixed in its regimen, principally, I am convinced, owing to the cause pointed out in a previous part of this paper—in consequence of the Brahmapootra being diverted into the Sylhet Jheels, in which its waters were filtered, and its consequently bringing no silt seaward. We learn, however, from Lloyd's survey, made in 1836, that great progress had been made in filling up the gap since the beginning of the century; and if we had a new survey now, we might prophesy approximately how long it would be before the eastern face of the delta would assume a form as fixed as the western half.

The true base of the delta to seaward is the neutral ground between the 5- and 20-fathom lines, which there is no reason to suppose has altered, or will alter, in any time of which we can take cognizance; for, the whole of the silt brought down by the ebb being swept away to the depths of the ocean through the Swatch, there is no reason to suppose that any sufficient portion of it is brought back by the flood to alter so marked a boundary in any appreciable degree.

In land there is another neutral line parallel to this, in the tract of high land

APPENDIX VI

extending from Calcutta to Bakirgunge, and when the delta is complete it will reach Seetacond; this marks the boundary where the tidal forces are stopped by the river's action, and where, consequently, a certain deposit takes place. Behind this inland barrier there still exists an immense tract of jheel-country, in the districts of Jessore and Fureedpore; but, judging from the extraordinary changes which have taken place since Rennell's survey was made, there seems no reason to doubt that, in the course of

another century, if the rivers are left alone, there will be very little jheel-country left in the western half of the delta; and the task of the Ganges will then be completed, with the exception of a little smoothing and filling here and there. But it will take several centuries before the Brahmapootra will have rendered its domains, especially in Assam and Sylhet, as habitable and as fertile as the whole of the valley of the Ganges is, even at the present day.

V. Appendix

The following Table, though constructed on the best available data, can only be regarded as an approximation to the truth, no surveys having been undertaken with reference to the objects in view; and though certain levels may be absolutely correct, they do not give either the average height of the land or of the water, or they give that only at exceptional periods.

The first two are from Col. Cautley's survey for the Ganges-canal; the next three from that for the East Indian Railway, and may be depended upon except as regards the correct representation of the true level of the mean high water or of the land at the places mentioned. The remaining levels are from the survey for the Eastern Bengal Railway, and may be depended upon within fractional quantities, both as regards accuracy and levels of water.

The whole is based on the assumption that the highest level of the floods represents the highest level of the land, and that this datum

at Calcutta is 27 feet above the Howrah Dock Sill.

	Height in feet	Dis- tance, direct miles	Slope per mile inches
Hurdwar	974	—	—
Cawnpore	402	350	19.3
Allahabad	269	122	13.0
Patna Moneah	161	200	6.5
Rajmahal	68	185	6.0
Calcutta	0	168	4.8
Kooshtee	27	100	3.2
Serajgunge	30	54	0.8
Dacca and Naraingunge	4	76	4.1

This last would make the level of high water and of the land at Goahuttee about 100 feet, at a distance of 350 miles from the sea, which accords very tolerably with that of 70 feet given by Schlagintweit for the low-water-level above mean sea-level.

APPENDIX VII
Progress of Electricity Supply in West Bengal
MANORANJAN DATTA, PH.D., M.I.E.E.

[Electricity Development Directorate, West Bengal]

INTRODUCTION

The avowed primary object of the present-day Government is to raise the standard of living of the people as a whole. It is easier said than done. But the Government of this State has rightly laid great stress on the expansion and development of projects for economical generation and wider distribution of electricity even in remote parts of this State.

Electricity (Power) is a basic requirement of all improvement. The use of electricity for domestic lighting and heating in some fashionable town-areas is about the least important aspect of the value of this modern source of power. Electricity harnessed to industry and agriculture, can very rapidly change the face of a country.

Cheap electricity, made available to remote parts of the country, is bound to promote the rapid growth of small industries. That means useful and profitable employment to a vast body of people without the danger of overcrowding in slum areas of factory towns. The growth and maintenance of large scale industries also depend a good deal on cheap power resources. In all Western

Countries, a policy of industrial decentralisation is followed by building Trading Estates in thinly populated areas and developing planned and compact industrial units, which can be economically served with electricity by means of transmission lines and substations.

It is in the field of Agriculture that cheap power will play its most useful role in this country. Cheap power will make it possible to undertake the more ambitious schemes of irrigation both by pumping up the underground flow and by distributing the existing water resources of big rivers. Cheap power is thus an inevitable prerequisite of an improved and stable agriculture, widespread and varied manufacture, and an easier and more efficient transport system.

What the Government has been lately doing to improve this basic power resource is of some interest. A concrete step has already been taken in the shape of a recent legislation, *viz.*, Electricity (Supply) Act of 1948 and much progress is expected from it by way of development and expansion.

PRESENT POSITION IN WEST BENGAL

Heretofore the only function the Government exercised was to issue a license to the most eligible concern which projected for the supply of electricity to some industrial or semi-industrial town. This was under the provision of the Indian Electricity Act of 1910 which has been re-inforced by the Act of 1948. Under that Act the Government had no choice either in the selection of the area, or co-ordination between different producing units, or the manner of distribution of the energy within or outside the jurisdiction covered by each individual license.

During this period between 1910 and 1948, the country has seen the uncontrolled growth of self-contained or autonomous units of power-production in selected areas of Bengal.

There are in West Bengal 24 Public Supply Undertakings working with a Licence or Sanction. Of these, only one is owned and run by a Municipality, namely, Darjeeling, and the rest are owned and run by private companies. Nine of these 24 undertakings again obtain supplies from the bigger Steam Generating Stations of the following undertakings, *viz.*:—(1) The Calcutta Electric Supply Corporation, Ltd., (2) The Gourepore Electric Supply Co., Ltd., (3) The Dishergarh Power Supply Co., Ltd., and (4) The Associated Power Co., Ltd. Of the remaining, ten undertakings generate their own energy mostly with small diesel plants and two are run by hydro-electric power.

Besides the above, the Barrackpore Undertaking which was previously run as a Company-owned undertaking, was taken over by the Government on the expiry of the tenure of its licence and it is now being run as a State-owned enterprise.

The State Government has also taken up the responsibility of supplying energy in some of the towns and semi-rural villages, such as Ranaghat, Santipur, Kalna, etc. Pending supply of power from the North Calcutta Grid Scheme, small diesel engine generating sets were installed in these places with a view to developing loads in those towns which later on have been transferred to the North Calcutta Grid of the State Government.

After the merger of the Cooch Behar State, the Cooch Behar and Dinhatra undertakings are being run as State-owned undertakings by the Electricity Development Directorate. Thus a total of 42 towns are being supplied now with electricity in the State of West Bengal.

The individual undertakings vary in size from those having an area of supply of a few hundred acres and only selling a few thousand units per annum to an undertaking having an area of over 500 square miles and selling 1,000 million units per annum.

A short resume of the power-position of this province is being given to show how meagre has been the development during the 10 years before 1948 (Tables I and II).

TABLE I.—Energy Supplied to Consumers from Public Systems 1938 & 1948

Electricity sold to Consumers (in MWH)	By all authorised undertakers in the State		By the Calcutta Electric Supply Co. only		By the Gourepore Electric Supply Co. only		By the Associated & Dishergarh Power Co. only		The rest of the towns in the State	
	1938*	1948	1938	1948	1938	1948	1938	1948	1938*	1948
For Lights and fans	56,794	124,583	54,803	118,481	—	—	477	46	1,514	6,056
For Power	360,895	700,685	294,674	574,033	33,451	63,240	31,611	56,546	1,159	6,866
For public lighting	5,270	5,791	4,334	4,844	—	—	—	—	936	947
By special contract	11,307	—	10,904	—	—	—	—	—	403	—
Total	434,266	831,059	364,715	607,358	33,451	63,240	32,088	56,592	4,012	13,869

* Refers only to West Bengal.

273

TABLE II.—Energy Supplied to Consumers from Public Systems 1949 & 1950

Electricity sold to Consumers (in MWH)	By all Authorised undertakers in the State		By the Calcutta Electric Supply Co. only		By the Gourepore Electric Supply Co. only		By the Associated & Dishergarh Power Co. only		The rest of the towns in the State	
	1949	1950	1949	1950	1949	1950	1949	1950	1949	1950
For Lights and fans	139,896	146,713	132,850	139,519	—	—	43	50	7,003	7,144
For Power	715,853	742,641	586,950	614,227	59,804	55,510	61,733	65,979	7,357	6,925
For public lighting	6,177	7,311	5,137	6,220	—	—	—	—	1,040	1,091
By special contract	45	—	—	—	—	—	45	—	—	—
Total	861,971	896,665	724,946	759,966	59,804	55,510	61,821	66,029	15,400	15,160

NOTE.—The figures refer only to the public supply, but a considerable proportion of national electricity supply is provided from private industrial power stations direct to the works which they serve.

Details of such supplies are furnished in Table IX.

APPENDIX VII

PROGRESS OF ELECTRICITY SALES IN WEST BENGAL

Tables I and II give a review of the growth of electricity supply in the province between 1938 and 1950. Figure I shows the progress by line curves of units generated and sold.

It also shows the relative growth of requirements of the main classes of consumers divided under under the heads

Domestic and Commercial lights and fans, industrial power public lighting and special contract.

For a comparison of the rate of growth in West Bengal with that of the other progressive countries, the Table below is appended.

TABLE III
Energy supplied to consumers from public systems, in West Bengal compared with some foreign countries, 1939 & 1949

Country	Amount KWH		Percentage of increase (1939-1949)
	1939	1949	
U. S. A.	105.8 X 10 ⁹	248.5 X 10 ⁹	135
Switzerland	3.300	6.400	94
Great Britain	22.600	41.400	83
India	..	4.200	..
West Bengal	0.469	0.862	84

It will be seen from Table III that the growth in public supply in the State of West Bengal during the ten-year period 1939-1949 represents an increase of 84 per cent., a figure similar to that for Great Britain.

The consumption of energy for 1950 given in Table II shows an increase of 4.4 per cent. on the year 1949. Compared with the previous year the domestic consumption has increased by

5 per cent. and industrial consumption by nearly 4 per cent.

The proportion of the total consumption attributable to different categories of load for 1950 is shown in Table IV, from which it will appear that about four-fifths of the sales were attributed to industries and only a fifth to domestic consumers. This low level of domestic consumption gives an indication of the poor standard of living of the people.

TABLE IV
Comparative Table of the Proportion of Total Supply from Public Systems taken by the various consumers' groups in 1950

Load Categories	Percentage of the total for the year 1950				
	West Bengal	India	U. S. A.	U. K. 1949	Switzerland 1949
Lights & Fans	21.8	20.0	40.0	40.0	44.0
Industrial Power	77.3	78.5	59.0	59.0	56.0
Public Lighting	0.9	1.5	1.0	1.0	..

It will appear from Tables I & II and also from the Circle Chart in Figure II that the Calcutta city area accounts for the bulk of the consumption in the State in all load categories. The Gourepore Electric Supply Co. caters for industrial power in a certain portion of the area situated about 20 miles north of Calcutta. The Associated and Dishergarh Electric Power Cos., who have two stations, viz., at (Seebpore and Radhanagar) in the coalfield areas of Raniganj, supply mostly the mining load of the Raniganj collieries. Besides, they give energy in bulk to the Asansol, Raniganj and Barakar undertakings.

The rest of the undertakings, totalling about twenty are all of small output, mainly catering for domestic loads. Except for the two hydro-electric stations at Darjeeling and

Kurseong, all the other plants are on thermal base, run mainly on crude oil.

The low demand for electricity in the interior had, in the past, led to the suggestion that the possibilities of development in West Bengal are likely to be centred on Calcutta and industrial areas only, and that there was hardly any scope for development elsewhere in the State, even if a cheap supply of electricity were available. On the other hand, public discussion on future industrial planning created an impression that industrial development was being discouraged in mofussil area, where at present electricity sells at a higher rate. It is, however, felt that both the above conclusions are erroneous and the significance of electricity supply, as a location factor for industries is not properly understood.

APPENDIX VII

The influence of the cost of electricity on the location of industries depends largely on the ratio which the former bears to the total cost of production. While it is true that industries in West Bengal have developed mostly in the Calcutta area, it should be remembered that this development has been due largely to such factors as Calcutta's importance as a port and its command of good communications.

In Calcutta, industrial and electrical developments have helped each other and, while

it is true that in the initial stages the prospects of industrial development gave an impetus to electricity development in this region, it is also true that, later it was the prospect of obtaining cheap power that led to the setting up of more factories and industries around Calcutta.

The consumption of electricity per head of population in this State as compared with other advanced countries of the world as shown in Figure III to be disproportionately smaller.

ELECTRICITY PRODUCTION

The Table below shows the total number of units sold in the State of West Bengal for the year 1948.

TABLE V
West Bengal Energy Sales for 1948, (Population, 1941 Census plus 10%, 24,500,000)

Load	Total MWH	Per capita
		KWH (approx.)
1	2	3
Domestic & Commercial (Lighting, Heating and Fan loads)	124,583	5.10
Industrial Power and Traction	700,685	28.60
Public Lighting	5,791	0.24
TOTAL	831,059	33.94

The population of West Bengal, according to the 1951 census, is 24.8 million. The urban population is 6.2 million, chiefly centred at Calcutta (2.5 million) or aligned on either bank of the Hooghly, opposite, above and below the city. This district accounts for 4.6 millions, so that the "Hooghlyside" accommodates more than two-thirds of the urban population of the State.

The rural population is 18.6 millions, so that the State is predominantly rural, in spite of the vast concentration around Calcutta.

The average rural density is 610 persons per square mile.

Statistics showing the extent to which electricity has been sold by the authorised undertaker in the city of Calcutta, is given in Table VI below.

TABLE VI
City of Calcutta : Analysis of Energy Sales

Year	**Population in Million	Units sales per annum Million of KWH			Average consumption per head of population	
		Total	Power	Lighting and fans	Average consumption per head of population	
					All purposes	Lighting
1938	3.012	364.70	294.70	54.80	121	18
1948	3.313	697.40	574.00	118.50	210	36
1950	4.6	759.97	614.20	145.70	170	30

** 1938—Population as per 1941 census

1948—Population plus 10% assumed increase

1950—Population as per 1951 census

The development in these areas gives a clear indication as to the location of the principal industries in the State. Calcutta is the State Capital, a large sea-port, an industrial town and the centre of all communication. The Table shows the general effect of large industrial consumers on the average consumption per head of population, and also emphasises the value of large industrial loads in the development of electricity. The demand in most of the other places is ridi-

culously low. Generally speaking, the progress of electrification is mainly concentrated in the industrial areas of the State, i.e., Calcutta, Gourepore and the coalfield areas in Raniganj.

Table VII below shows the published figure of electricity output for 1950 of the United States of America, the United Kingdom and India. The figure for West Bengal, Bombay and Madras are also listed for comparison.

APPENDIX VII

TABLE VII

Energy supplied to consumers from Public Systems per head of population in 1950

Country	Area in thousand square miles	Population in million (approx.)	Installed capacity in MW	Electricity production per yr. in million KWH	Units consumed per capita per annum
U. S. A.	3,620	149	69,509	329,028	2,207
U. K.	94	50	15,085	55,008	1,100
India	1,220	362	1,713	5,106	14
West Bengal	29.5	24.7	522.3	1,046	36
Bombay	115.6	36.0	416.2	1,612	38
Madras	127.8	57.0	168.0	644	9

If we are to solve our problems of poverty and unemployment, we must organise our power resources on a cheap and efficient basis. A wider outlook and a bolder policy will be necessary, if the consumption per capita in this country is to approach anything near the standard attained in many parts of Europe, America and the United Kingdom.

Cheap and adequate supply of electricity is an indispensable public service, destined to play a major role in raising the standard of living. Indeed, the consumption of electricity per head of population like the consumption of steel is a good index of a country's industrial progress and efficiency.

POWER POSITION IN WEST BENGAL

So far reference has been made only to supplies of energy (KWH) as distinct from supplies of power (KW). In the post Second World War period, the position of power supply in West Bengal has not been quite satisfactory and there have been some serious power shortages. By the end of 1951, however, the shortage was to some extent eliminated due mainly to the efforts of the Calcutta Electric Supply Corporation Ltd. by their commissioning more plants. They have since increased their generating capacity (i) by building a new station at Cossipore adjacent to the old station on which work was started as early as 1944 to provide an additional 110 MW. of generating capacity, and (2) by the expansion of the Mulajore Station to provide a further 60 MW. At the new Cossipore Station, 2-30 MW. and 1-50 MW. Turbo-alternator sets and six 250,000 lbs./hour boilers have been installed. The generating sets and the boilers have already been commissioned and are now in commercial service. The distinctive features of this Power Station are: (i) it has, at the moment, the largest installed generating capacity of any single power station in India, (ii) the 50,000 KW. generating set in the station is the largest single unit so far erected in the country, (iii) the voltage of generation at the station is 33 KV and (iv) this is the first power station in India to be operated at 600 PSIG and 850° F. steam condition.

The Mulajore Station was commissioned in January, 1940 (steam conditions 350 PSIG and 700° F.). Extension to the Power Plant has been effected by the installation of two 30,000 KW sets and eight 125,000 lbs./hour boilers.

The Southern Generating Station has an installed capacity of 111 MW but it is esti-

mated that if the expected load is to be met, further extensions are urgently required.

They have proposal, therefore, to build a new station and instal two 30 KW sets to start with.

The generating capacity in the Calcutta Power System is now adequate to meet the power demand in the area. With all the additions effected up to the end of 1951, the total installed generating capacity of the C.E.S.C. Ltd. has been brought to 460,000 KW. In fact, the largest power stations at the present time in India are those belonging to the Calcutta Electric Supply Corporation Ltd.

The Gourepore Electric Supply Co., Ltd. has in the year 1950 installed a new Generating Set with a capacity of 18.75 MW. Their total generating capacity at the present moment is 47,000 KW. The Associated Power Company's station at Seebpore has been commissioned to supply an additional load of 1,875 KW, bringing their total generating capacity to 8,375 KW. The other major public utility power station in the area is that of the Dishergarh Power Supply Co., Ltd. which possesses a power station with an installed capacity of 16,000 KW.

Besides these power stations, there are several privately owned power plant installations belonging to railways, collieries and other industries, which supply power to the respective installations. Among the largest of such power stations are those belonging to the Steel Corporation of Bengal (46,675 KW) and the Aluminium Corporation of India Ld. (15,300 KW).

In addition to the above, the unified development of the Damodar Valley Corporation is being actively prosecuted by the Central Government and the State Governments of Bihar and West Bengal.

APPENDIX VII

There is, therefore, a further alternative means of meeting the future load demands in the State, as the Damodar Valley Corporation will transmit power over their transmission lines for distribution to collieries and other industries in this State.

The Government of West Bengal have fur-

ther decided to instal two 2,000 KW hydro-electric generating sets at the foot of the Mayurakshi Reservoir, which is now under construction.

The power position up to and including 1951 in the State of West Bengal is shown in Table VIII below:

TABLE VIII

Electricity Undertakings Owning Generating Stations in West Bengal

Serial No.	Name of Supply Authority	Type of Generating Plant	No. and individual capacity	Total Installed Capacity KW	Firm Capacity KW	Maximum Demand KW
1	2	3	4	5	6	7
1	Calcutta	Cossipur . Steam . Southern . Steam . Mulajor . Steam . New Cossipur . Steam .	$\left. \begin{array}{l} 3 \times 12,500 \\ 2 \times 7,500 \\ 2 \times 18,750 \\ 1 \times 2,500 \\ 4 \times 7,500 \\ 4 \times 20,000 \\ 1 \times 1,250 \\ 5 \times 30,000 \\ 1 \times 1,000 \\ 2 \times 30,000 \\ 1 \times 50,000 \end{array} \right\}$	467,250	345,000	246,000
2	Gourepure	Steam .	$\left. \begin{array}{l} 1 \times 6,250 \\ 1 \times 18,750 \\ 1 \times 2,000 \\ 2 \times 5,000 \\ 1 \times 10,000 \end{array} \right\}$	47,000	28,250	23,000
3	Dishergarh	Steam .	$\left. \begin{array}{l} 2 \times 3,000 \\ 2 \times 5,000 \end{array} \right\}$	16,000	11,000	9,200
4	Krishnagar	Diesel .	$\left. \begin{array}{l} 2 \times 75 \\ 2 \times 32 \\ 2 \times 115 \\ 1 \times 293 \end{array} \right\}$	737	444	384
5	Burdwan	Steam .	$\left. \begin{array}{l} 3 \times 200 \\ 1 \times 250 \end{array} \right\}$	850	600	307.7
6	Berhampur	Diesel .	$\left. \begin{array}{l} 2 \times 62 \\ 1 \times 55 \\ 1 \times 145 \end{array} \right\}$	324	179	235
7	Kurseong	Hydro .	$\left. \begin{array}{l} 2 \times 200 \\ 1 \times 400 \end{array} \right\}$	800	400	340
8	Malda	Diesel .	$\left. \begin{array}{l} 1 \times 30 \\ 1 \times 47 \\ 2 \times 100 \end{array} \right\}$	277	177	154.5
9	Midnapur	Steam (Recipro)	$\left. \begin{array}{l} 1 \times 48 \\ 1 \times 96 \\ 1 \times 144 \end{array} \right\}$	288	144	265
10	Darjeeling	Hydro & Diesel	$\left. \begin{array}{l} 5 \times 200 \\ 2 \times 430 \\ 1 \times 200 \\ 1 \times 187 \end{array} \right\}$	2,347	1,867	1,642

APPENDIX VII

TABLE VIII—concl'd.

Serial No.	Name of Supply Authority	Type of Generating Plant	No. and individual capacity	Total Installed Capacity KW	Firm Capacity KW	Maximum Demand KW
1	2	3	4	5	6	7
11	Jalpaiguri	Hydro & Diesel	$\left\{ \begin{array}{l} 2 \times 512 \\ 1 \times 80 \\ 1 \times 100 \\ 1 \times 242 \end{array} \right\}$	524.4	282.4	315.9
12	Kalimpong	Do.	$\left\{ \begin{array}{l} 1 \times 140 \\ 2 \times 40 \end{array} \right\}$	220	80	156
13	Santiniketan	Do.	$\left\{ \begin{array}{l} 1 \times 50 \\ 1 \times 75 \end{array} \right\}$	125	50	98
14	Seebpur	Steam	$\left\{ \begin{array}{l} 1 \times 1,500 \\ 1 \times 2,000 \\ 1 \times 3,000 \\ 1 \times 1,875 \end{array} \right\}$	8,375	5,375	5,000
15	Bankura	Steam	$\left\{ \begin{array}{l} 1 \times 48 \\ 1 \times 96 \\ 1 \times 144 \end{array} \right\}$	288	144	275
16	Cooch Behar	Diesel	$\left\{ \begin{array}{l} 2-90 \text{ KW} \\ 2-50 \\ 2-55 \end{array} \right\}$	390	300	D. C. 128. A. C. 67
17	Dinhata	Do.	$\left\{ \begin{array}{l} 1-25 \text{ KW} \\ 1-18 \\ 1-15 \end{array} \right\}$	58	33	33.2
18	Suri	Do.	2-25 KW	50	25	30

The capacity of all electricity generating stations in the State of West Bengal covering a total area of 30,774 square miles, was only 5,45,903 KW, of which the generating plant in the Calcutta stations accounted for 467,250

KW, i.e., about 85 per cent. of the total. The output of energy in West Bengal amounts to 1,217.32 million units of which the Calcutta power stations accounted for 1031.89 million units which is 85 per cent. of the total.

CALCUTTA AREA LOAD

The Calcutta Electric Supply Corporation Ltd., a public limited company incorporated under the British Companies Act, is by far the largest undertaking in the State. Starting in 1897 with a capacity of only 1,000 KW, it gradually expanded to 420,000 KW at the end of 1950.

From time to time after it started business in the city of Calcutta under the original licence, the area of its business activities was extended by the granting of licences for additional areas outside the city, until it was found to be operating fourteen different licences with varying dates, each of which the Government of Bengal had the option of terminating by purchase. By the Consolidated Licence of 1946, all these licences were brought together, with the Government of Bengal having the option to take over the

Company's whole undertaking with all current contracts, as from the 1st January 1950, or thereafter at intervals of twenty years. Two years' notice of intention to exercise the option is necessary.

The area covered by the Company's activities includes the city of Calcutta, Howrah on the opposite side of the river Hooghly and a strip of industrial and residential area on either side of the river extending above and below Calcutta, a length of some 45 miles and comprising a total area of some 540 square miles, with a population of eight million.

Within the above area, the company supplies electrical energy to approximately 188,000 domestic consumers, and approximately 6,000 high and medium-voltage consumers for industrial purposes.

APPENDIX VII

The total connected load on the system was 549,675 KW at the close of 1950. The maximum demand of the high voltage consumers aggregated 146,500 KW in 1948. This demand rose to 234,000 KW in 1951.

The Company also supplies energy for public lighting purposes to the Calcutta Corporation, to Howrah Municipality, and to some 30 other Municipalities, Union Boards and Public Bodies. The Calcutta Tramways Co., Ltd., which operates the main system of public transport in Calcutta and Howrah, is a large consumer whose service is entirely dependent on the supply. The Calcutta Corporation also uses electricity for the major portion of its public water supply service.

The Gourepore Electric Supply Co., Ltd. is the next largest undertaking in this State. Its area of supply, which is about 40 square miles, extends on both sides of the river Hooghly about 20 miles north of Calcutta. It supplies energy in bulk to about a dozen industrial consumers as also three distributing

licences, i.e., Naihati, Hooghly-Chinsurah and Bansberia. The main industries connected to their system comprises 3 jute mills, 1 Rubber Works, 1 Paint Works, 1 Paper Mill, 1 Bone Mill and the Railway Workshop. The present station's maximum demand is about 23,500 KW.

The two other large undertakings operating in this State are the Dishergarh Power Supply Co., Ltd. and the Associated Power Co., Ltd. They cover a large area of the Raniganj coalfields and about 200 square miles are served by these two companies. Almost all the consumers totalling about forty obtaining their supply from them are collieries. Besides, the towns of Raniganj, Asansol, Jamuria and Barakar are also supplied in bulk by these two undertakings.

The details of the system of supply, population, number of consumers, etc., in electrified areas in West Bengal are given in Table VIII below.

TABLE IX
PUBLIC ELECTRICITY SUPPLY UNDERTAKINGS IN WEST BENGAL.
Undertakings with own Generating Stations and/or receiving bulk supply as at 1951

Town or area served	Total Capital expenditure upto 1950 Rs.	Units generated/ purchased	Units sold	System of Supply		In case of receiving bulk supply from	Population	Total Area served (Square miles)	No. of consumers
				Voltage	No. of phases and frequency A.C. or D.C.				
1	2	3	4	5	6	7	8	9	10
Asansol	5,79,371	1,747,477	1,509,572	400	3 ph. A.C. 50 Cy.	Dishergarh Power Supply Co., Ltd.	75,370	6.5	1,888
Bankura	5,11,896	1,038,431	838,793	3,000	3 ph. A.C. 50 Cy.	..	48,654	6.00	982
Bansberia	99,245	632,578	520,274	400	3 ph. do.	Gouripore Electric Supply Co., Ltd.	28,707	2.55	266
Barakar	1,38,842	532,601	449,275	400	3 ph. do.	Dishergarh Power Supply Co., Ltd.	10,390	6.00	308
Barrackpur	4,64,134	1,940,130	1,593,111	440	D.C. 3 Wire.	Calcutta Electric Supply Corp., Ltd.	41,178	..	735
				220	D.C. 2 Wire.				
				400	3 ph. A.C. 50 Cy.				
				230	1 ph. do.				
Berhampur	5,00,392	513,461	414,527	6,000	3 ph. do.	..	52,606	7.00	735
				440	D.C. 3 Wire.				
				220	D.C. 2 Wire.				
Bhatpara	6,89,086	1,292,892	1,000,676	400	3 ph. A.C. 50 Cy.	Calcutta Electric Supply Co., Ltd.	138,035	5.00	1,192
				230	1 ph. do.				
Burdwan	7,17,112	1,265,519	1,111,164	2,200	3 ph. A.C. 50 & 60 Cy.	..	73,815	8.50	1,143
				400	3 ph. do.				
				230	1 ph. do.				
Calcutta	35,59,12,333	1,031,898,290	881,989,720	33,000	3 ph. A.C. 50 Cy.	..	..	540.00	1,55,440
				20,000	do.				
				6,000	do.				
				3,300	do.				
				400/230	A.C.				
				450/225	D.C.				
Darjeeling	15,41,097	5,106,620	4,208,907	6,000/6,600	3 ph. A.C. 50 Cy.	..	33,365	..	2,400
				400/440	do.				
				230/250	1 ph. do.				
Dishergarh (Radhanagar)	69,63,269	57,512,400	49,840,367	11,000	3 ph. A.C. 50 Cy.	..	..	61.50	28
				3,000	3 ph. do.				
				525	3 ph. do.				
Gourepore	1,30,54,373	76,063,675	69,646,982	6,000	3 ph. do.	..	..	40	14
				550	3 ph. do.				
Hooghly Chinsurah	6,50,870	1,581,624	1,214,489	400	3 ph. do.	Gouripore Electric Supply Co., Ltd.	55,433	5.79	2,391
				230	1 ph. do.				

TABLE IX—concl'd.

Town or area served	Total Capital expenditure upto 1950 Rs.	Units generated/ purchased	Units sold	System of supply		In case of receiving bulk supply Bulk supply from	Population	Total Area served (Square miles)	No. of consumers
				Voltage	No. of phases and frequency A.C. or D.C.				
1	2	3	4	5	6	7	8	9	10
Jalpaiguri . . .	4,58,385	670671	571188	400	3 ph. Do	..	39,137	4.00	856
Kalimpong . . .	2,08,471	248785	196162	230	1 ph. Do	..	16,677	6.50	489
Kalna . . .	59,520	118249	105074	3,000	3 ph. Do	..	17,233	6.26	286
Krishnagar . . .	5,83,435	1282253	1071335	400	3 ph. Do	..	47,481	6.40	919
Kurseong . . .	9,03,858	1082710	763480	230	1 ph. Do	..	11,603	2.00	843
Maldah . . .	2,94,213	378289	352920	400	3 ph. Do	..	4,333	2.00	713
Midnapur . . .	4,70,156	910123	731470	230	1 ph. Do	..	45,233	4.50	1,158
Nabadwip . . .	1,03,888	377033	309875	3,000	3 ph. A.C. 50 Cy.	..	55,485	4.50	674
Naihati . . .	4,95,744	1808532	1442362	400	Do	Krishnagar Electric Supply.	53,778	10.18	1,685
Ranigunj . . .	2,30,299	634980	501348	300	1 ph. Do	Gouripore Electric Supply.	25,656	1.85	637
Ranaghat . . .	1,45,669	174861	153884	400	3 ph. Do	Associated Power Co., Ltd.	..	0.68	382
Santiniketan . . .	..	220088	205903	230	1 ph. Do	Calcutta Electric Supply Corpn. Ltd.	27,271	5.00	86
Seobpur . . .	41,49,920	27313500	23785226	400	3 ph. Do	..	..	1.48	52
Santipur . . .	1,05,037	81599	71425	10,000	Do	..	42,014	7.2	280
Cooch Behar . . .	..	445169	380262	3,000	Do	Calcutta Electric Supply Corpn. Ltd.	32,038	..	726
Dinhata . . .	..	53003	46614	525	Do	..	4,878	..	115
Suri . . .	..	..	..	400	1 ph. Do	..	18,135	..	170
				230	D.C. Wire.	..			
				440	3 ph. A.C.	..			
				230	1 ph. A.C.	..			
				400	3 ph. A.C.	..			
				230	1 ph. A.C.	..			
				400	3 ph. A.C.	..			
				230	1 ph. A.C.	..			

APPENDIX VII

PRIVATE GENERATION OF
ELECTRICITY

The statistics given before refer only to public supply, but a considerable proportion of the national electricity supply is provided from private industrial power stations direct to the works which they serve.

Table X gives a list of private generating station in this State. The installed capacity, and total energy generated, maximum demand in respect of each of the Stations are also given.

The requirements of different classes of industries met by private generation is tabulated below:

Classes of Industries	Private Generating Capacity
Iron & Steel	51,945 K.W.
Jute	46,775 K.W.
Paper	26,325 K.W.
Coal	6,366 K.W.
Railway	2,748 K.W.
Cotton	2,255 K.W.
Cement	1,370 K.W.
Sugar	522 K.W.
Aluminium	15,300 K.W.

TABLE X

PRIVATE GENERATION IN WEST BENGAL: STATISTICS FOR THE YEAR 1951

Serial No.	Name of Company	Installed Capacity	Maximum Demand in K.W.	Total K.W.H. generated in thousands
1	2	3	4	5
	A—Jute			
*1	Hukumchand Jute Mills Co., P. O. Haxi-nagar, 24-Parganas	6620 K.W.	..	5,225-9
2	Angus Jute Works, P. O. Angus, Dist. Hooghly	890 K.W.	465	1,707-2
3	Belvedere Jute Mills Co. (Andrew Yule & Co., Ltd.)	880 K.W.	..	550-0
4	Budge Budge Jute Mills Co. (Andrew Yule & Co., Ltd.)	2825 K.W.	1153	2,846-4
5	Caledonian Jute Mills	340 K.W.	171	251-0
6	Champdany Jute Co., Ltd., 2, Netaji Subhas Road	4488 K.W.	1848	..
7	Dalhousie Jute Co., Ltd., Champdany	240 K.W.	106	171-3
8	Fort Gloster New Mill, P.O. Fort Gloster, Howrah	270 K.W.	120	31
9	Fort Gloster Old Mill, P.O. Fort Gloster, Howrah	360 K.W.	138	1-4
10	Fort Gloster North Mill, P.O. Fort Gloster, Howrah	210 K.W.	176	69-5
11	Gagalbhai Jute Mills Ltd., P.O. Ulubaria, Dist. Howrah	775 K.W.	700	500-4
12	Gondalpara Mill (Gillanders Arbuthnot & Co., Ltd.), 8, Netaji Subhas Road	2180 K.W.	1750	3,518-4
13	Ludlow Jute Co., Ltd., 7, Royal Exchange Place	7500 K.W.	3500	13,162-0
14	Orient Jute Mills Co., Ltd. (Andrew Yule & Co., Ltd.), Budge Budge	240 K.W.	136	317-6

APPENDIX VII

TABLE X—contd.

Serial No.	Name of Company	Installed Capacity	Maximum Demand in K.W.	Total K.W.H. generated in thousands
1	2	3	4	5
A—Jute—contd.				
15	Premchand Jute Mills Ltd., 81, Sovabazar Street, Calcutta	960 K.W.	1644-A.C. 1056-D.C.	3,156·1-A.C. 634·9-D.C.
16	Standard Jute Co., Ltd.	525 K.W.	160	0·1
17	Samnuggur Jute Factory Co., Ltd., 3, Clive Row	265 K.W.	106	..
18	Victoria Jute Works, P.O. Telinipara. Hooghly	270 K.W.	75	..
19	Birla Jute Manufacturing Co., Ltd., Birlapur	7,605 K.W.	3,440	10,148·0
20	Lothian Jute Mills, Budge Budge	335 K.W.	..	206·2
21	Delta Jute Mills Co., Ltd. (Andrew Yule & Co., Ltd.) P.O. Sankrail, Dt. Howrah	570 K.W.	2130	513·1
22	National Co., Ltd.	590 K.W.	281	569·38
23	Albion Jute Mills Co., Budge Budge	447 K.W.	120	352·2
24	Kinnison Jute Co., Ltd., Titagarh	490 K.W.	200-D.C. 1000-A.C.	768·0 (Gen) 3,195·1 (Pur)
25	Hastings Jute Mills Ltd., Rishra, 24-parganas	5,500 K.W.	3,000 K.W.	6,504·0
B—Coal				
26	Guzdar Kajora Coal Mines Ltd., M/A. Ojha Brothers, P.O. Kajoragram, Burdwan	5 K.W.	5	2·4
27	New Beerbhoom Coal Co., Ltd., M/A. Andrew Yule & Co., Ltd., P.O. Dishergarh, Burdwan	1000 K.W.	600	3,000
28	Pure Sitalpur Colliery, M/A. Amritlal Ojha & Co., Ltd., P.O. Ukhara, Burdwan	90 K.W.	75	1·4
29	Samla Collieries Ltd. (Ramnagar) M/A. Jaipuria Sons Ltd., P.O. Pundaveswar, Dist. Burdwan	400 K.W.	300	..
30	Do. (Kendra)	400 K.W.	300	..
31	Samla Govindpur Collieries Ltd., M/A. H. Prasad & Co., P.O. Pandaveswar, Burdwan	324 KVA.	112	64·3
32	Londa Colliery Co. (1920), Ltd., M/A. Turner Morrison & Co., P.O. Box 68, Calcutta-1	2500 K.W.	1000	6,194·8
33	New Damagoria Coal Co., Ltd., P.O. Salanpur, Dt. Burdwan	81·5 K.W.	..	19
34	Ghusick & Muslia Collieries Ltd., Ghusick, P.O. Kalipahari	500 K.W.	480 to 500	1,085·9
35	Samla Manderboni Colliery, M/A. Hindustan Investment Corporation Ltd., P.O. Pundaveswar, Burdwan	550 K.W.	220	645·8

APPENDIX VII

TABLE X—concl'd.

Serial No.	Name of Company	Installed Capacity	Maximum Demand in K.W.	Total K.W.H. generated in thousands
1	2	3	4	5
B—Coal—concl'd.				
*36	Victoria West Colliery, M/A: Andrew Yule & Co., Ltd.	500 K.W.	200(G) 110(P)	899·8 (G) 728·9 (P)
C—Paper				
*37	Titaghur Paper Mills Co., Ltd., (No. 1 Mill) M/A: F. W. Heilgers & Co., Chartered Bank Buildings, Calcutta-1	9,000 K.W.	3,000	26,380·6
*38	Titaghur Paper Mills Co., Ltd. (No. 2)	9,350 K.W.	..	13,341·8
39	Bengal Paper Mill Co., Ltd., M/A: Balmer Lawrie & Co., Ltd., Raniganj	4,600 K.W.	2,850	..
40	India Paper Pulp Co., Ltd., M/A: Andrew Yule & Co., 8, Clive Row, Calcutta-1	3,375 K.W.	1,250	8,610·1
D—Iron & Steel				
41	Indian Iron & Steel Co., Ltd. (Burnpur), M/A: Martin Burn Ltd., 12, Mission Row, Calcutta-1	46,650 K.W.	23,300	1,21,090·7
*42	Indian Iron & Steel Co., Ltd. (Kulti Iron Works), M/A: Martin Burn Ltd., Kulti	5,000 K.W.	4,335	8,257·8(G) 8,922·5(P)
*43	Burn & Co., Ltd., Howrah Iron Works, M/A: Martin Burn Ltd., Howrah	295 K. W. (Stand by)	1,200	2,081·2
E—Sugar				
44	Ramnugger Cane & Sugar Co., Ltd., M/A: Anderson Wright Ltd., 7, Wellesley Place, Calcutta	522 K.W.	350	509·5
F—Cement				
45	Burn & Co., Ltd., (Raniganj) & (Lalkoti), Refractory & Ceramic Works, M/A: Martin Burn Ltd., Raniganj	1,100 K.W.	784	1,183·6
46	Burn & Co., Ltd. (Durgapur).	270 K.W.	100	88·8
G—Cotton				
47	Siddheswari Cotton Mills, P. O. Anantapore, Howrah	520 K.W.	75·5	144·2
*48	Dunbar Mills Ltd., M/A: Kettlewell Bullen & Co., Ltd., 21, Strand Road, Calcutta-1	604 K.W.	1,180	166·0
49	Bowreah Cotton Mills Co., Ltd., M/A: Kettlewell Bullen & Co., Ltd., 21, Strand Road, Calcutta-1	1,066 K. W., A. C. 65 K. W., D. C.	700	15
H—Railway				
50	Chittaranjan Locomotive Works, Chittaranjan	2,178 K.W.	1,390	635·3
51	Eastern Railway Office of the Electrical Supdt., Asansol	570 K.W.	303·6 K.W.	2,280·9
I—Aluminium				
52	Aluminium Corporation of India Ltd., Jaykaynagar, Raniganj	15,300 K.W.	7,840 K.W.	47,017·0

*Asterisk before the name of any Company indicates that the energy is partly generated.

APPENDIX VII

NATIONAL POLICIES

In all progressive countries power resources are regarded as national assets, and organisations are set up for their conservation, development and proper working. Beneficent legislation is framed and amended from time to time to ensure to the public a cheap and abundant supply of energy, safeguarding at the same time the interests of consumers. Legislation is an essential part of the development of electricity supply.

The Indian Electricity Act of 1910 was originally drawn up in line with the earlier Electric Lighting Acts of Great Britain and has not been modified in any essential point. But Britain has passed through a long period of evolutionary development, the principal features of which will be evident by a reference to her legislative history.

CONDITIONS IN BRITAIN AND THE U.S.A.

With the cessation of hostilities in 1945, the then Labour Government in Great Britain advocated the nationalisation of electricity supply. The structure of the industry, based upon companies with a limited tenure and upon companies and municipal undertakings with an indefinite tenure, was changed and electricity supply is run as a nationalised industry since April, 1948.

The country is now cut up into fourteen areas and sub-areas. These areas run with some degree of autonomy. Generation and grid transmission (which is really an inter-connection between stations) is operated by the British Electricity Authority, and distribution by local electricity boards.

In America, by far the most advanced country in the world so far as electrification is concerned, nationalisation is not favoured. However, for extension of lines to rural areas, loans have been advanced from the Federal Treasury by the Rural Electrification Administration.

ADVANTAGES AND DRAWBACKS OF STATE OWNERSHIP

There are still two very distinct schools of thought regarding the best means of supply development. The first school maintains that by encouraging existing or new licensees with either cheap loan or outright subsidies to expand into subeconomic and rural areas, the work could be carried out expeditiously, because private enterprise is better equipped than Government departments to undertake such work. The other school maintains that the Government itself should carry out the expansion and derive any profits which may eventually accrue therefrom. The exponents of this policy maintain that the State's ability to borrow money at "cheap" rates and its acceptance of a small return must lessen the cost of the

service. It also maintains that the control of a public necessity by a small group of private individuals is not in the public interest.

The reasons which are usually advanced against nationalisation or State ownership are lack of incentive, absence of the 'profit motive' and the system of promotion by seniority rather than by merit. Further, under 'departmental' operation the control of finance and consequently expansion are not in the hands of those in charge of the technical side of the enterprise. But this is characteristic of any large scale organisation.

A means of combating these disadvantages of State ownership adopted in some countries is to set up semi-autonomous bodies in the form of Statutory Commissions or Boards to operate Public utilities. The Government of India, considering this the best way, has lately enacted the Electricity (Supply) Act, 1948, which makes it possible for any State to establish such a Board.

GENERAL FEATURE OF THE INDIAN ELECTRICITY (SUPPLY) ACT, 1948

Electrical development in India is mostly limited to the local areas of a few municipalities with the result that the production of electricity is extremely low. It is with a view to remedying the present defects that legislation has recently been brought into effect which envisages the creation of State Electricity Boards to plan regionally co-ordinated schemes of electrical development. These will be corporate bodies required to operate like private concerns free from Government control, but subject to Government supervision. One of the fundamental principles laid down in the Act is that the Board shall not be operated at a loss.

The State Electricity Board will perform a two-fold function. In the first place, it will be charged with the duty (1) of promoting the all-round development of electricity in the most efficient and economical manner, with particular reference to areas not yet served, and (2) to effect the rationalisation of the supply. The Board may establish new generating stations or control existing ones, inter-connect stations by means of transmission lines. The Board may also buy energy in bulk from the owners of controlled stations or sell it to them and to other licensees. In short, by ensuring that electric generation is concentrated in the most efficient stations distributed over the entire region and that the bulk supply is centralised under its own direction, the State Board will have the power to develop a grid system not only in new areas but also in the areas of old licensees by controlling their operations. It is not, however, contemplated that the

APPENDIX VII

existing statutory rights and obligations of a licensee, under the Indian Electricity Act, 1910, shall be derogated by a Board unless a licensee is not himself carrying out his development duties satisfactorily.

It is intended that the Board will exercise a form of financial control over privately-owned undertakings with a view to ensuring the investors a reasonable return and, at the same time, securing to the consumer as much reduction in the cost of electricity as possible.

The Act does not set out entirely to 'nationalise' the industry, but only to control it and extend the scope of Government operation of electrical service.

The Board may receive financial assistance from the Government during the early years of its existence. This assistance is not in the form of grants, but of advances from the treasury subsequently consolidated into loans, the Board being obliged to pay interest and repay the principal in a specified period of time.

Profits from the operation of the Board are to be retained in part for expansion and other purposes beneficial to electrical development of the State, and the remaining part is to go towards repayment of interest-free loans and to State revenues.

GENERAL PROPOSAL FOR WEST BENGAL

To accelerate electrical development in the State it has been decided that development should be actively pursued in areas outside the existing licensed areas. The Electricity Development Organisation has been started for planning schemes of electrification in the State in an economical manner, and for the execution of such schemes as are approved by the Government. The intention of the Government is to proceed actively with the installation of plant in all large unelectrified towns and undertake rural distribution schemes, where such will assist in the development of rural economy. It has further been proposed that the towns which have no prospect of coming under State regional schemes may be allowed to be developed by private enterprise, and applications for the grant of licences for the supply of electricity in such towns have been invited. The aim of the Government is to encourage expansion by the existing licensees within the area of their supply but the Government's policy is to exercise its option to acquire the licences as they fall due.

PLANNING DETAILS

This State has been divided into three zones. Of these, zone 'C' comprises Jalpaiguri, Darjeeling and Cooch Behar and will be fully supplied when some of the hydro-electric projects erected at the foot of the

hills near the river Teesta or Jaldhaka materialise. Such hydro-electric projects would afford supply of electricity throughout North Bengal, including the Doars and Cooch Behar. Such projects will necessarily take some years. Meanwhile, these places must be fed by isolated stations. Zone 'B' comprising Malda and West Dinajpur must also be developed by some individual stations for the time being. Zone 'A' comprising the Burdwan Division and the Presidency Division south of the Ganges may be supplied from Calcutta and from the Damodar Valley Corporation's transmission system (Figure IV).

With regard to the supplies of electricity to the small towns, it is obvious that separate generating units will not be economical so long as the prices of capital goods rule so high. It is, therefore, proposed to develop, at present, approximately 70 miles around Calcutta.

THE NORTH CALCUTTA ELECTRIFICATION SCHEME

As a first step, therefore, the Government has accepted a scheme for transmission and distribution of electricity in the North of Calcutta areas with the object of supplying electricity at a moderate rate in the towns and semi-rural villages. (Drawing No. AX/72).

Energy will be purchased in bulk from the Calcutta Electric Supply Corporation Ltd. at Mulajore at 33 KV and transmitted at 66 KV from Chord Road Receiving Station up to Behrampur via Ranaghat, Santipur, Krishnagar, Debagram and Beldanga.

This scheme in its first stage has been put into operation and supplies both for domestic and industrial purposes have been made available at Ranaghat, Santipur, Krishnagar, Nabadwip as from December 1951. A 66 KV overhead transmission line connects Chord Road (Mulajore) with Kanchrapara, Ranaghat, Santipur, Krishnagar, Debagram, Beldanga and Berhampur.

From Kanchrapara supplies will be given to Habra, Haringhatta Agricultural Firm, River Research Institute, the T. B. Hospital at Kanchrapara, Ionosphere Laboratory of the University of Calcutta and Kalyani.

Provision has been kept at Habra for extending the line to Bongaon and Gobardanga.

11 KV spur lines from Santipur supply energy to Fulia, Birnagar, Badkulla and also to Kalna which is on the eastern bank of the river Bhagirathi.

At Ranaghat although supply is given to the town at present but provision has been kept for extension of the line to Chakda.

Under the Community Development, arrangement has been made for supply for power for tubewell irrigation in the area.

APPENDIX VII

11 KV overhead transmission lines will connect (i) Debagram with Katwa, (ii) Beldanga with Kandi (at a future date), (iii) Berhampur with Jiaganj and Azimganj. The installations at all these places will be State owned.

THE SONARPUR-ARAPANCH DRAINAGE SCHEME

The Central Government has recently sanctioned a project called the Sonarpur-Arapanch Drainage Scheme for draining out and reclaiming a vast water-logged area measuring about 36 square miles by means of electrically driven pumps located on the river Piyali at a place called Uttarbhag, situated at a distance of approximately 20 miles to the south of Calcutta. The estimated power requirement for the pumps is about 3,000 KVA. Power will be obtained from the Calcutta Electric Supply Corporation Ltd. at a point in Tollygunj at 6 KV and stepped up to 33 KV at the Government outdoor substation and transmitted to Uttarbhag by overhead transmission line. The transmission line and the substations have been energised. It is anticipated that the Sonarpur-Arapanch Drainage Scheme will be put into operation early in 1953. The route of the transmission line will be through the semi-urban area of Garia, Sonarpur, Rajpur and Baruipur which will be benefited from the scheme. At Uttarbhag power will be stepped down to 6 KV to supply the pumps (Figure V).

Land drainage by pumping is done in foreign countries, particularly in Holland, Italy and England, but in India the Sonarpur-Arapanch Drainage Scheme is the first project in West Bengal and perhaps, in India, under which good cultivable lands turned swampy are proposed to be reclaimed and brought under the plough once again by means of pumping.

Advantage is being taken of this transmission line to supply bulk power at a cheap rate to the towns of Garia, Sonarpur, Rajpur Baruipur lying on its route, and also to the towns of Joynagar-Mazilpur and Diamond Harbour. The electrification of the townships may be entrusted to private licensees. At Baruipur supplies will be given to the Community Development block.

This area has recently been influxed with a huge Displaced population. The availability of electricity will help to settle them in small-scale industries with electricity. Further the amenities of electricity may also serve to draw out some population from the congested city of Calcutta.

THE RANIGANJ COALFIELD ELECTRIFICATION SCHEME

The Raniganj coalfield area enjoys great industrial activity interspersed with agri-

cultural areas. The area coincides closely with the outline of the Associated and Dishergarh Power Supply Co. Ltd.'s supply area. The area outside the 'Supply Cos.' licensed area of supply has also attracted to itself large industries which require power.

Besides, of the large number of coal mines in West Bengal in the Raniganj area only about a quarter of these use electric power from the local public supply. A large portion of the colliery plant, which is steam driven, is old and it is expected that replacement by electrical plant will result. There are also certain collieries which are operated by individual stations owned by the collieries themselves. The adoption of a national scheme for distribution in the area will induce the owners of private generating plants to change over to public supply; such a transfer would constitute a most substantial increase in the national consumption of electricity.

The Government of West Bengal have therefore decided to develop the area outside the licensees' area of supply as a State-owned enterprise and distribute power by obtaining bulk supply from the Damodar Valley Corporation. There is also the possibility of obtaining the surplus power from the Mor Project in the near future (Figure VI).

As a first step, it is proposed to supply electricity in Pandaveswar area which is a fairly important coal producing area and is situated on the south bank of the Ajay river. A large portion of this area comes under the high flood level of the river. The seam running through this area is highly liable to spontaneous combustion. As such, depilaring on a large scale without sand stowing is full of risk from fire and inundation. In all coalfields in West Bengal, subterranean water pressure is generally high and electricity offers by far the cheapest way of pumping water. Besides, sand stowing is not possible without electricity.

The industrialists in the area are willing to consider favourably the establishment of electrically driven plant and develop electrical mining by obtaining power supplies from the Government of West Bengal.

It has been planned that supply of energy to the coalfield which are outside the area of supply of any licensee will be made by Government. Supplies at 33 KV will be obtained from D. V. C. near Pandaveswar railway station and stepped down to 11 KV for distribution to the various collieries in the area.

By taking power supply the industrialist would avoid the incurring of capital expenditure over separate generating plant with

APPENDIX VII

its necessary quota of spare plant and the capital so saved can be invested to greater advantage in producing machinery in his own factory. In other words, the industrialist can earn a greater return upon capital by investing in productive machinery rather than on generating plant. There is also the added advantage of freedom from responsibility for operation and maintenance and from anxiety as to the continuity of electricity supply.

Coal mining offers, by reason of its extent and by the nature of the load offered, by far the best prospect of extensive consumption of electric power. The change taking place in regard to the transfer of industrial demands to public supply and the transference from primary steam power to electric power, with a consequent rapid increase in the degree of electrification in industry, will, it is hoped, lead to significant increase in the consumption of electric power.

THE MAYURAKSHI HYDRO-ELECTRIC SCHEME

The main purpose of the scheme is to collect and utilise water resources of the river Mayurakshi to irrigate nearly the whole of the Mayurakshi basin in West Bengal. To serve that purpose a concrete dam 2,170 ft. long and 113 ft. high, is now under construction across the river at Messanjor in Bihar with a large reservoir behind it to collect the water for controlled distribution throughout the year.

The catchment area of the reservoir is about 718 square miles with a storage capacity of 0.50 million acre feet. Besides supplying water for irrigation, the scheme envisages the use of the available water for generation of hydro-electricity. A steady discharge of about 300 cusecs of water is expected to be available from the dam throughout the whole year for power generation with an additional discharge of 300 cusecs of water during the monsoon, i.e., July to October. The power from the above additional discharge will almost entirely be used for pump-irrigation schemes of both the States of West Bengal and Bihar.

A large number of rural towns is intended to be electrified from this Scheme by means of 130 miles of 33 KV and 11 KV transmission lines. The requirement of power for town electrification will be about 2,000 KW and that of pump-irrigation about an equal amount.

Two 2,800 H.P. 2,000 KW turbo-generating sets will be installed at the power station at Messanjor with hardly any stand-by. Normally one set will run for town electrification while the other will be kept for irrigation pumping. In an emergency,

irrigation power will be temporarily suspended to supply the town loads.

Due to the limited availability of water from the Mayurakshi reservoir, the output of the Messanjor generating station is restricted to 4,000 KW only with no chance of further extension in future. To meet the growing demand of various towns under this Scheme in subsequent years and also to have a stand-by source of power in a year of exceptional drought, provision has been made to interconnect the Mayurakshi system with that of the Damodar Valley Grid at Pandaveswar Substation (Drawings Nos. MOR/11 and MOR/10B).

The turbines will operate under a normal gross head of 100 ft. and will be fed by two penstock pipes each of 100 ft. in length and 6 ft. in diameter.

Power will be generated at 11 KV, 50 cycles and through the Station-busbar it will be supplied to two 2,500 KVA 11/33 KV step-up transformers at the Messanjor switch yard. A double circuit 33 KV line will transmit power from the above transformers to various towns under this scheme for retail and bulk distribution. Power for pump irrigation will be supplied direct from the Station busbar and from the 11 KV transmission lines to various neighbouring places.

There will be a double circuit 33 KV overhead transmission line from Messanjor to Suri and from Suri along Dubrajpur to Pandaveswar. There will be a single circuit 33 KV overhead transmission line from Suri, Sainthia, and from Sainthia to Bolpur via Ahmadpur in the south, and from Sainthia to Rampurhat via Mollarpur in the north. There will be 11 KV overhead transmission lines connecting Suri with the Mor Barrage; Rampurhat with Nalhati; Bolpur with Gushkara; Dubrajpur with Illambazar besides connexions to irrigation pumping substations in the Dubrajpur, Illambazar and Bolpur areas.

THE KALYANI ELECTRIFICATION SCHEME

The Government of West Bengal has undertaken to establish a model town at Kalyani on the Eastern Railway, north of Kancharapara Railway Station. The town will possess all the amenities of a modern town, including electricity, water supply, underground drainage, schools, parks, recreation centres and hospitals. It is estimated that the town will have on the fifth year of its establishment an area of about 1.54 square miles and a population of about 37,000.

It has been proposed to give supply of electricity from the North Calcutta Grid belonging to the Government of West Bengal by running two 11 KV lines and installing six 11/0.4 KV substations. Total length

APPENDIX VII

of L. T. line will be about 42 miles.

About 2 miles of 11 KV line from the Kancharapara Irrigation Pumping Station to the centre of the town has already been erected. Another 11 KV line from Kancharapara T. B. Hospital is now under erection.

It is estimated that the entire cost of electrification will be about Rs. 17,00,000 and the work is expected to be completed in 1953-1954.

THE BARRACKPORE EXTENSION SCHEME

With the termination of the tenure of its private licence, West Bengal Government took over the management of the Barrackpore Electric Supply Undertaking on December 2, 1947. The area of supply is really a pocket inside the existing licensed area of the Calcutta Electric Supply Corporation Ltd. The area of supply is about 4 square miles with a population of 50,000. The present maximum demand is 640 KW with a monthly load factor of 51 per cent. The financial position of the undertaking is sound and the demand is growing steadily. The area of supply has been extended to Talpukur, Monirampur and Khardah.

The consumers at Talpukur are usually industrial, but those at Monirampur and Khardah are mostly domestic. The total cost of these extensions worked out to about Rs. 3,00,000. All extensions have been carried out departmentally thereby economising on the construction costs. It has been decided that all new extensions will be done in A.C. instead of the present D.C. supply system.

The energy for distribution is purchased from the Calcutta Electric Supply Corporation Ltd. at 6.0 KV at the Government owned Barrackpore Power Station and is converted to D.C. for distribution in the central part of the area. All new extensions are, however, being supplied on A. C.

THE SODEPUR ELECTRIFICATION SCHEME

This scheme was proposed for giving supply to the Sodepur Cotton Mills and Messrs. H. B. Industrial Development Co., Ltd. The latter firm have been given a licence by the Government for retail distribution in the area east of the Railway under Panihati Municipality. Some other industrial consumers are expected to be supplied from the Government substation at Sodepur. The All-India Radio, has tentatively selected a site near Sodepur Railway Station for the location of a 50 KW medium wave transmitter, and it is expected that it will take its supply from the Government.

The supply at Sodepur will be taken from the Calcutta Electric Supply Corporation Ltd. at a receiving station outside the area

covered by their licence. The scheme sanctioned by the Government of West Bengal was put into operation early in 1952. The scheme will be self-supporting even from the very start.

THE BARASAT ELECTRIFICATION SCHEME

This scheme was proposed with the object of electrifying the town of Barasat and the surrounding area.

At present the supply is being taken from Barrackpore. For this, about 10 miles of 6.0 KV transmission line have been erected. Moreover to cater for the needs of certain important loads on the way, H. T. spur lines have been drawn to Jaffarpur and to other areas en route. In addition, arrangements for giving supply to the Indian Jute Research Institute at Nilganj and Keventer's Dairy Farm have also been made. The total capital expenditure involved is approximately Rs. 2,00,000.

It is expected that the growth of demand will be rapid resulting in financial success much earlier than anticipated.

THE HYDRO-ELECTRIC DEVELOPMENT

PROGRAMME OF DARJEELING MUNICIPALITY

The Municipality of Darjeeling at present owns three Hydro Power Stations and one Diesel Station at Lebong. After the disaster owing to the landslides in 1950, the whole installation was thoroughly repaired and supply commenced in full swing for the last one year.

The Municipality has been suffering from shortage of power for a considerable time and the position has lately worsened. Although endeavour was made to ease the supply position by augmenting the Diesel Station, the subsequent growth of load made further expansion of it prohibitively costly. The Municipality is, therefore, considering some new hydro-electric projects as a "Development Programme" to meet the present shortage of power and also to extend its supply to adjoining non-electrified areas.

Owing to the financial stringency of the Municipality, the implementation of any such scheme will require the help of the State Government either in the form of a grant or loan on a long-term repayment basis. The Municipality has, therefore, lately put forward to the Government two major hydro-electric schemes for necessary approval so that arrangement for a loan from the Government may be settled at an early date. The Electricity Development Directorate is studying in detail the financial and technical aspects of these schemes and will shortly suggest to the Municipality the best course for implementing the schemes by stages.

APPENDIX VII

The present maximum demand during the driest period is about 1,300 KW and during the monsoon, 1,750 KW including a power demand of 450 KW for tea drying factories.

Two schemes have been put forward by the Municipality for scrutiny: these are the Chongton Scheme and the Little Rungeet Scheme.

With the help of these two Schemes, the Municipality hopes that the shortage of power of the Municipality will be solved for the next 7 to 10 years.

Brief descriptions of the Schemes are given below:

THE CHONGTON SCHEME

The Scheme envisages the use of the tail water discharge of the Singtom Power Station and to carry it by an open flume line, about 1½ miles long. The head available about 300 feet and the waterflow will be sufficient to generate about 250 KW in winter and 500 KW in monsoon. The total cost of the Scheme including the installation of another power station, machinery, reservoir, etc., will cost about Rs. 6,00,000. With the implementation of the scheme the Municipality hopes to save considerable sums of money over fuel oil by closing down the diesel generating station and keeping it as a stand-by. The whole output of this scheme will be utilised to meet the present shortage of power in the town proper and to maintain the declared voltage of the system.

THE LITTLE RUNGEET SCHEME

This Scheme is much bigger than the previous one and mainly intends to supply power to the hitherto non-electrified areas and also bulk supply to tea gardens and other neighbouring licensees. The Scheme proposes to tap the river Little Rungeet at a point about 4 miles off from the generating station site. The Power Station building of the Chongton Scheme will be designed to house the machinery of this Scheme as well, thus saving the cost of building a separate power house. The available head for power generation will be about 600 feet.

The water resources of this Scheme will be sufficient to enable the Scheme to generate about 800 KW in winter and 2,000 KW during the monsoon.

With the completion of both Scheme which will cost about Rs. 18,00,000, the Municipality will be able to meet the load increase of the area for the next 7 to 10 years.

THE COOCH BEHAR DEVELOPMENT SCHEME

The Electricity Department of Cooch Behar State started functioning about the year 1915 and was owned by the State Government. After the merger of Cooch Behar with the State of West Bengal the Electri-

city Department of Cooch Behar came under the Electricity Development Directorate of the Govt. of West Bengal.

With a view to investigating the present load and plant capacity at Cooch Behar and Dinahata and to study the feasibility of extending supplies to Mathabhanga and Tufanganj, a thorough survey was made by this Directorate soon after taking over.

Development Schemes covering the above mentioned four towns have been worked out in detail and submitted to the Government for approval. The details of the Schemes are given below:

Cooch Behar.—There are at present 3 Diesel Generating Sets with a total plant capacity of 230 KW and two A.C. Diesel Generating Sets of 110 KW. The sets have considerably deteriorated and are hardly fit for reliable and continuous service.

The proposal embodied in the Development Scheme of the Cooch Behar Electric Supply undertaking may be summarised as follows:

(1) Extension of Power House Building, (2) Installation of two 300 KW and one 150 KW A.C. Diesel Generating Sets, (3) Gradual conversion of existing D.C. supply system to A.C., (4) Extension of mains to non-electrified areas and (5) Adequate extension of L.T. distribution mains. The total cost of the Scheme works out at Rs. 10,50,000.

In view of the persistent demand for electricity in Cooch Behar, it is expected that the Development Scheme will be self-supporting from its very start. Arrangements have already been made to purchase generating sets, transformers, switch gear, etc., the construction of which will start shortly.

Dinahata.—This town is situated 16 miles south of Cooch Behar and was electrified in 1941 with 3 diesel generating sets. The existing L. T. mains are in a very decayed condition and need wholesale replacement. The Scheme proposes to change the D. C. supply system to A. C. with new and extended distributing mains.

With the completion of this Development programme, it is expected that a few industrial consumers will be connected to electric supply resulting in prompt financial stability.

Mathabhanga and Tufanganj.—A thorough survey and estimate of the cost involved in the development of these towns revealed that to make any scheme for them self-supporting it would take at least 7 to 10 years, and as such the idea has been abandoned for the present by the Government.

THE POTENTIAL LOAD IN WEST BENGAL

It has been noted before that industrial load outside the immediate vicinity of Calcutta, the capital of the State, is inconsider-

APPENDIX VII

able except for the mines in the Raniganj coalfields. The major agricultural areas of the State do not enjoy even primary urban amenities.

The Raniganj coalfield area corresponds closely to the outline of the Associated and Dishergarh Electric Power Company's supply areas and is the centre of many industries. Together with the coal measures, especially in the neighbouring State of Bihar, iron ores have been worked out and, in conjunction with coal, have initiated the iron works industry in Bihar (Tata Iron & Steel Co., Ltd.) and in Bengal (The Indian Iron & Steel Co., Ltd.). These are, however, operated by individual large power stations owned by the industrial groups themselves. The whole area is served adequately by a network of railway lines, roads and rivers. All this activity has given birth to a number of subsidiary industrial activities, together with a vast trade to serve the needs of the population.

Turning now to industries that could be further developed, the following are suggested.

COAL

There are about 200 coal mines in West Bengal, and only about a quarter of these use electric power. The majority of colliery plants are steam driven and old and with a return to normal conditions extensive replacements by electrical plants will be necessary. Many of the good thick seams are exhausted in this area, leaving thin seams of good quality but costly to mine, and thick seams of poorer quality. A most promising prospect for the difficult areas is the gradual evolution of machine mining with the help of coal cutters, face and truck conveyors together with extensive mechanical haulage, all of which are particularly suited to the working of these seams. The future of these seams depends entirely on electrical mining. If all the coal were electrically recovered, the requirements of the industry would be enormous. Further, it is certain that machine mining will increase and also that greater attention will be paid to the preparation of coal for the market.

The Pandaveswar area is a fairly important coal producing area and is situated on the south bank of the Ajay river. A large portion of the area goes under water at high flood. The seam running through all this area is liable to spontaneous combustion. As such, large scale depillaring without sand stowing is full of risks from fire and inundation.

Coal mining offers, by reasons of its extent and the load offered, by far the best prospect for extensive consumption of electric

power. Privately-owned steam plants in collieries are no longer economical over purchased electrical energy. The cost of power supply per ton of coal is not an important factor from the mining engineer's point of view, in fact it is relatively unimportant compared to mining and labour costs. But any proposal for the development of electrical power raises the question of power resources and their availability. The erection of the Damodar Power System will make it possible to proceed expeditiously with the electrification of coal mines—an essential factor in stepping up coal output and lowering unit cost. Besides, the development of the pulverised fuel plant at Bokaro will enable relatively cheap coal to be utilised showing thereby a marked economy over the burning of good quality coal.

IRON AND STEEL

Some of the largest steel works in India are located within the State and adjacent to coalfield areas. The future of the steel industry is, to a certain extent, bound up with that of the coal and coke industries.

TINPLATE

The tinsplate and galvanised sheet industry operates in this State and Bihar. Several concerns are now utilising electricity in preference to the older and more laborious method of solder baths. The nature of a tinsplate works load is a good one from the point of view of electricity supply, having the relatively high load factor of 40—50 per cent.

CEMENT

These works are confined to the neighbourhood of suitable limestone quarries. The current and future extension of roadways will ensure a long period of intensive working for limestone quarries and crushed stones, these being required in large quantities for this work.

CHEMICALS

Large blocks of energy can be supplied at good load factors for driving machinery for electro-chemical processes such as the production of caustic soda, chlorine, hydrochloric acid, and hydrogen for hydrogenation of oil and fats, production of soda ash, etc. Factories for fertiliser production are in contemplation in India, and one has now been constructed at Sindri for the supply of fertilisers. There are also a number of factories producing glass and ceramic products.

OTHER INDUSTRIES

West Bengal has 27 cotton textile mills with over 2,600 looms and 110,000 spindles.

APPENDIX VII

Most of these are consuming electricity from the public systems.

TEA

The tea industry, established in the districts of Jalpaiguri, and Darjeeling, may offer quite an amount of load development.

CONCLUSIONS

The industries of West Bengal have many natural advantages. The agricultural raw materials of many industries are easily available. The best tea and jute in the world are grown in this State. Besides, there are abundant supplies of coal, tobacco, sugarcane, oil seeds, lac, raw hides, timber and bamboo. Although West Bengal lacks in some of the necessary mineral resources, there is no dearth of mineral deposits in the states of Bihar and Orissa. West Bengal is a big exporting centre for hides and skins and has an extensive seaboard in the Midnapore region, in the Sundarbans, which offer great scope for utilisation of brine for salt manufacture, as well as for the alkali industries. There is also scope for the development of cement and chemical fertiliser industries.

Any electricity supply scheme which provides for high voltage transmission and retail distribution to different parts of the State, will thus make possible the dispersal

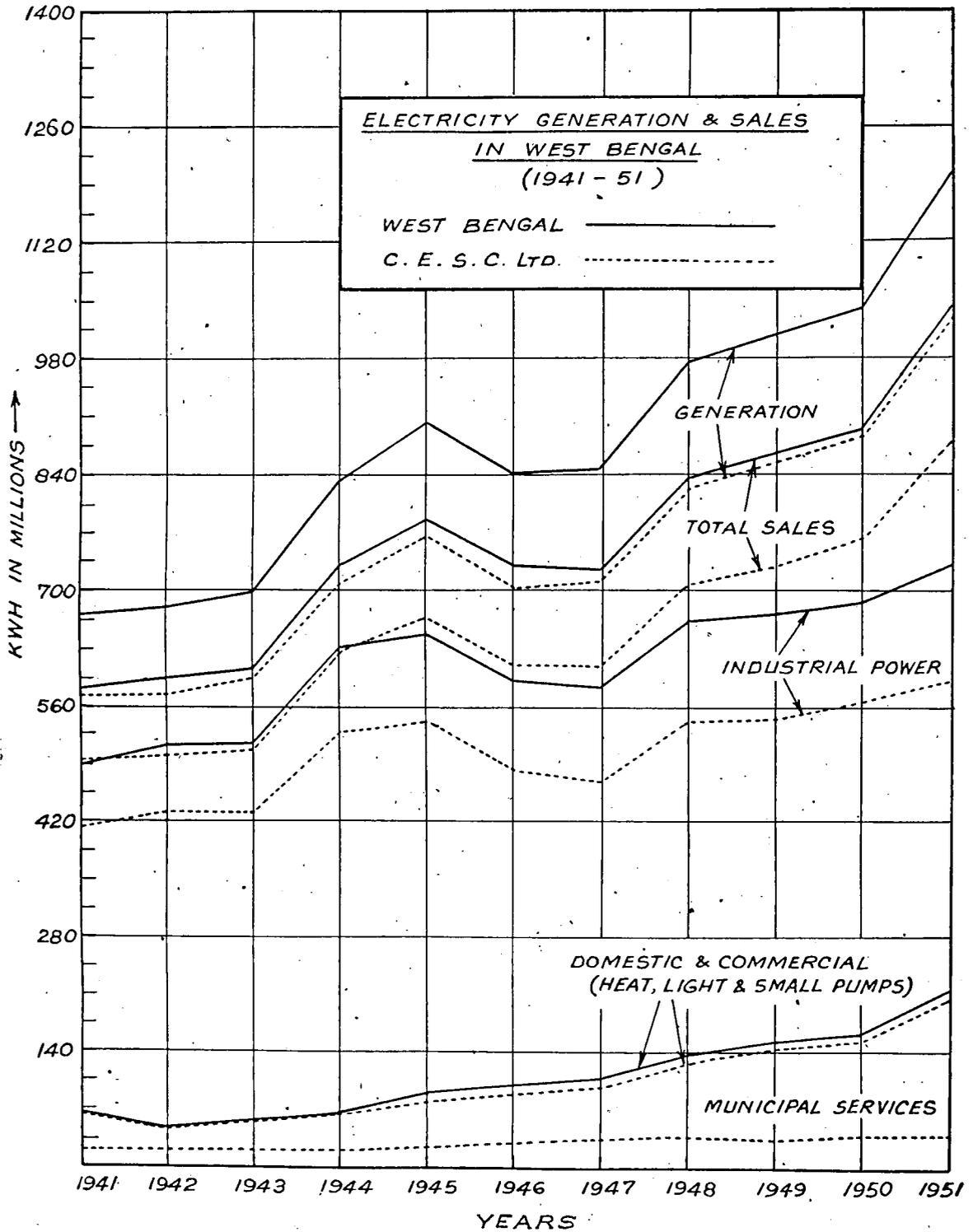
of industry over wide areas. Besides, the provision of cheap power, the possibilities of obtaining factory accommodation, cheap labour, water, transport and other facilities, etc., at a cheaper rate would induce capitalists to move to rural areas. It is, therefore, necessary that a National Industrial Council and the Electricity Development Authorities should work in close co-operation. If necessary, an appropriate legislation should be passed creating a Board with power to develop trading estates on suitable sites, with the main object of providing employment to agricultural labour during their enforced idleness for the greater part of the year.

A rational location of industry in relation to raw material, transport, labour and power supply will make it possible to realise the highest economy in production.

Of the basic industries, production of electricity deserves the first priority. In the Bombay plan of 1944, the first place was very rightly given to the development of electricity.

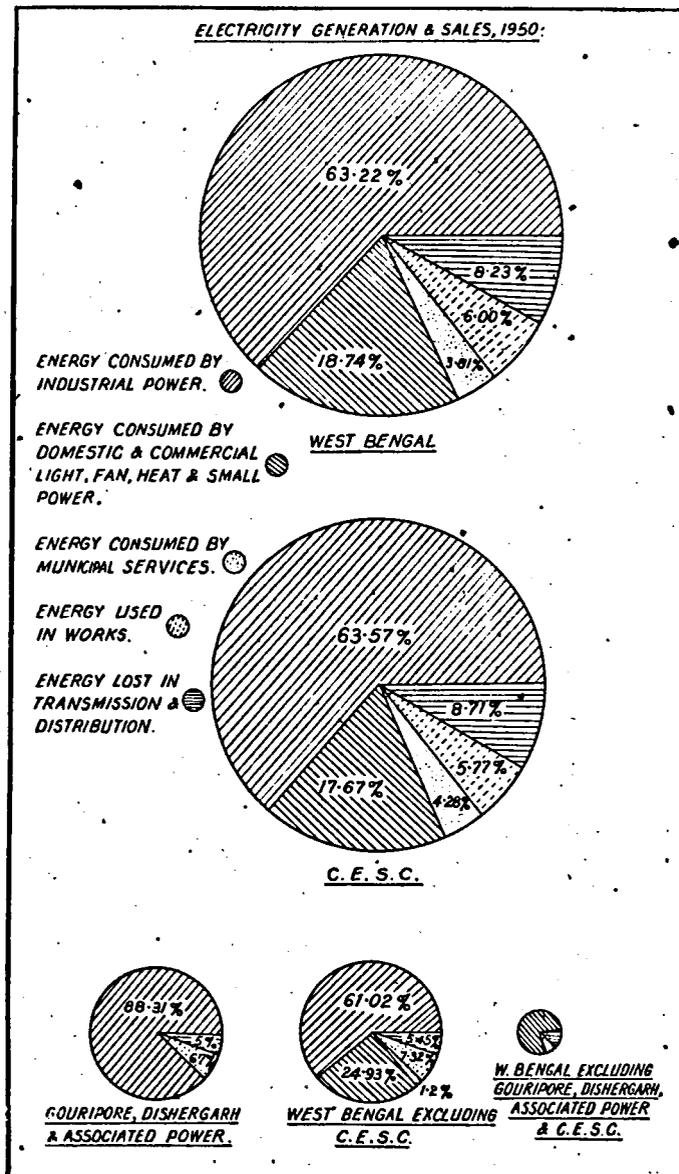
It is well known that the remarkable achievements of Soviet Russia in the field of industrialisation were mainly due to the success of their schemes of electricity development. This also holds good for Canada in recent years. It is, therefore, fit and proper that this country should follow suit.

I

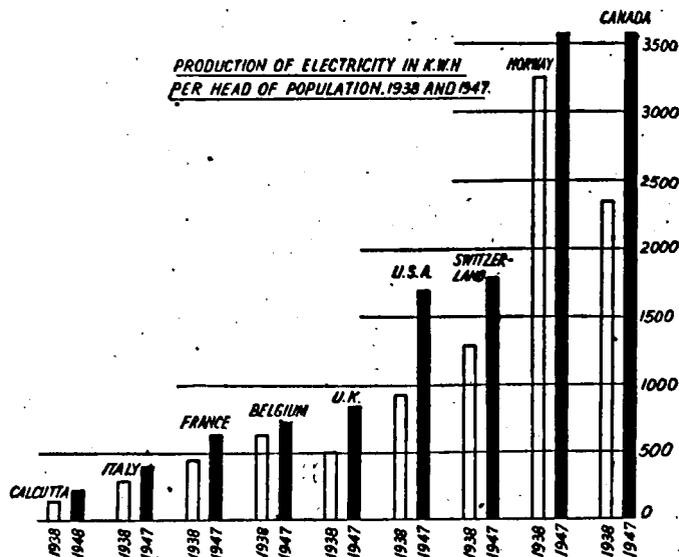


II

ELECTRICITY GENERATION & SALES, 1950:

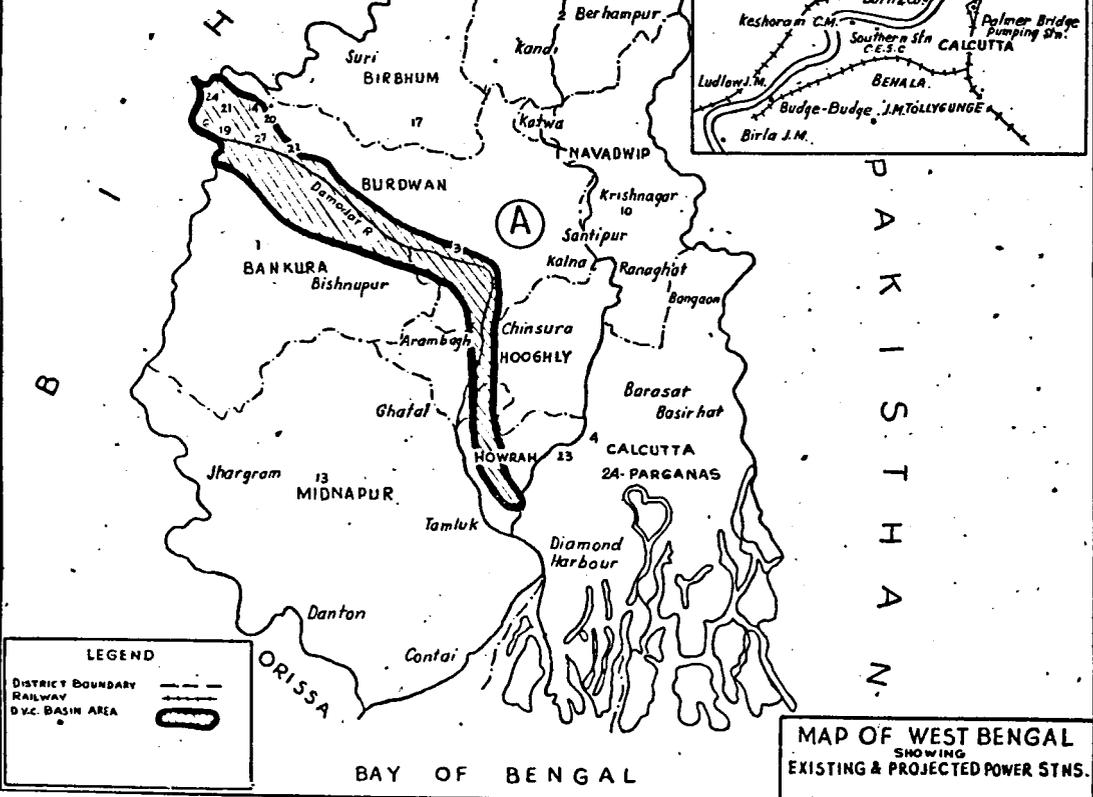
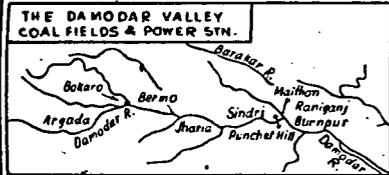


III

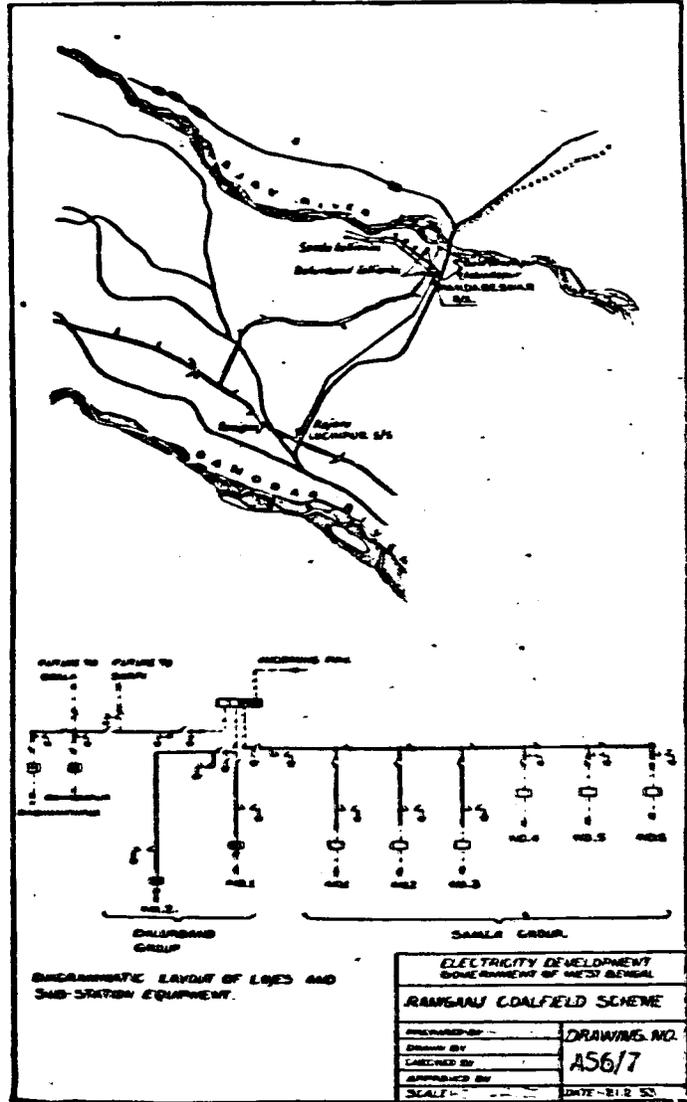
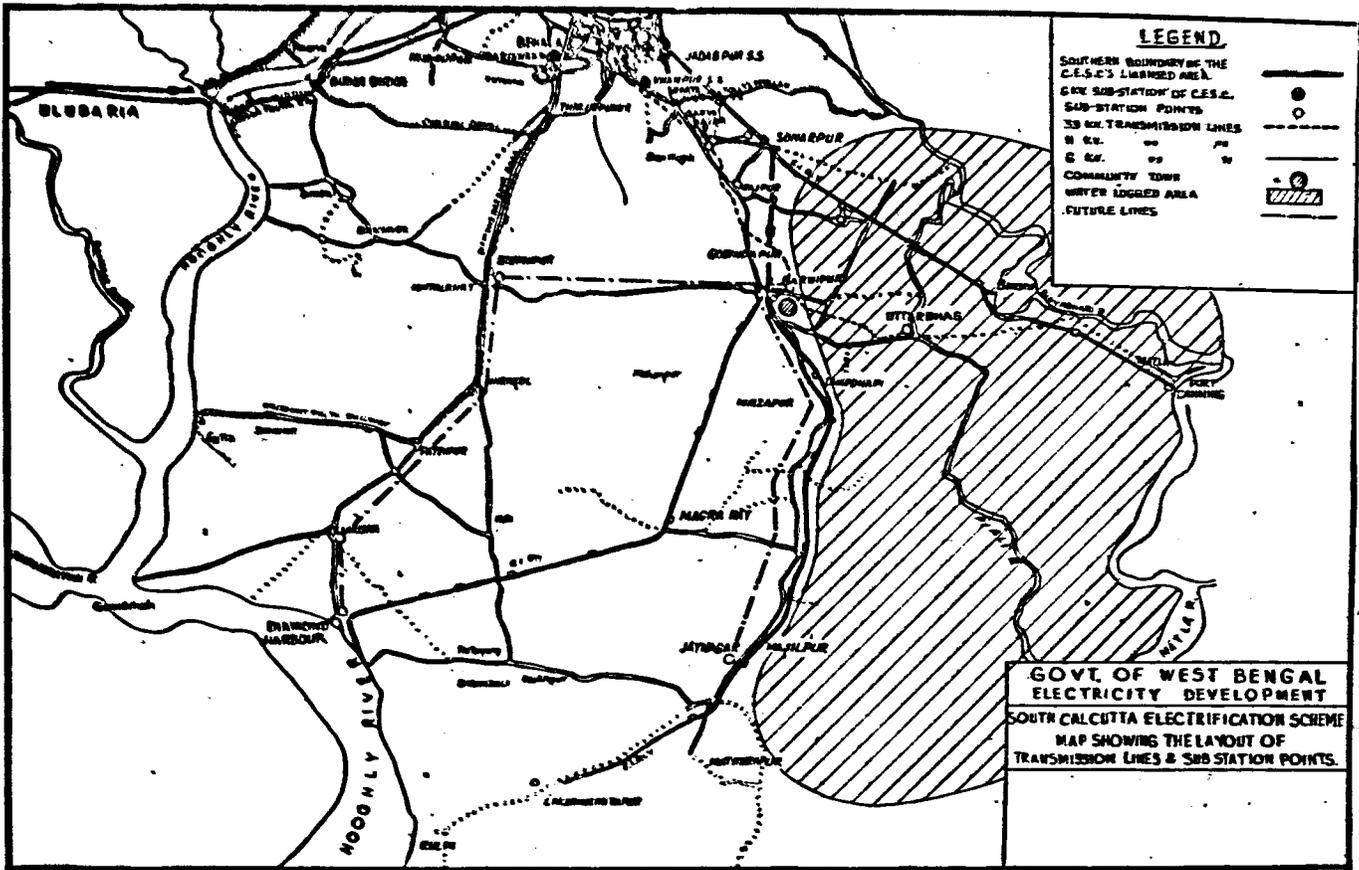


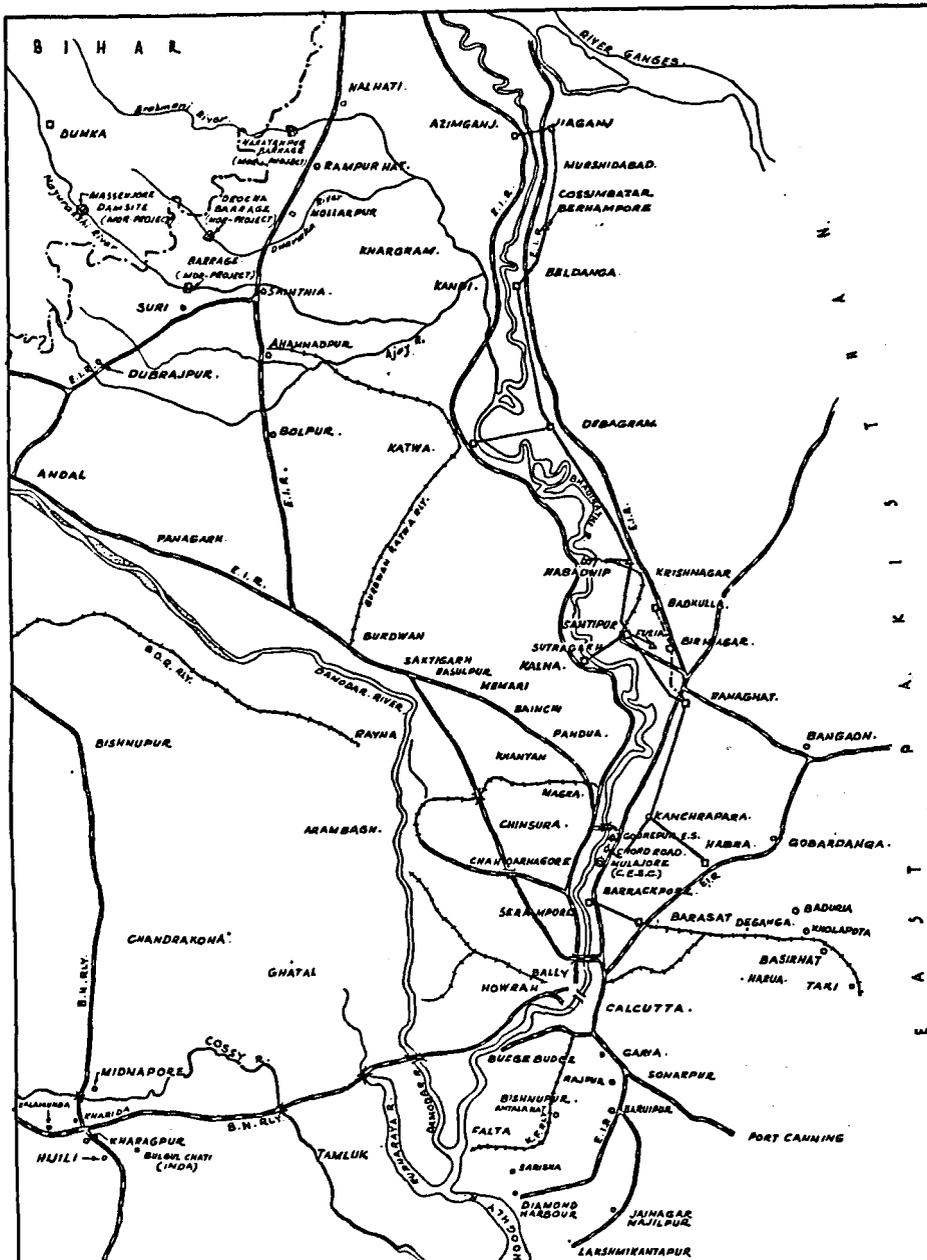
INSTALLED PLANT CAPACITY OF THE LICENSEES IN WEST BENGAL 1951	
NAME OF LICENSEES	CAPACITY, IN KW.
1 BANKURA	288
2 BERHAMPURE	324
3 BURDWAN	700
4 CALCUTTA	460000
5 DARJEELING	2360
6 DISHERGARH	16000
7 GOURIPORE	47000
8 JALPAIGURI	524
9 KALIMPONG	220
10 KRISHNAGAR	737
11 KURSEONG	800
12 MALDA	277
13 MIDNAPURE	288
14 SEEBPUR	8375
15 COOCH-BEHAR	390
16 DINHATA	58
17 SANTI-NIKETAN	125
PRIVATE GENERATION	
18 ANUPNAGAR	15,000
19 BURNPUR	46,675
20 KALIPAHARI	2,500
21 KULTI	5,750
22 RANIGANJ PAPER	4,600
23 BIRLA JUTE	7,605
24 VICT. COLLY.	1,500

N.B. OTHER PRIVATE GENERATION SHOWN IN THE INSERTION.



MAP OF WEST BENGAL
SHOWING
EXISTING & PROJECTED POWER STNS.





LEGEND

66 KV. OVERHEAD TRANSMISSION LINE	=====
33 KV. " " "	=====
6/11KV " " "	=====
CABLE	-----
FUTURE	-----
STATE OWNED UNDERTAKING	□
DISTRIBUTING LICENSEE	△

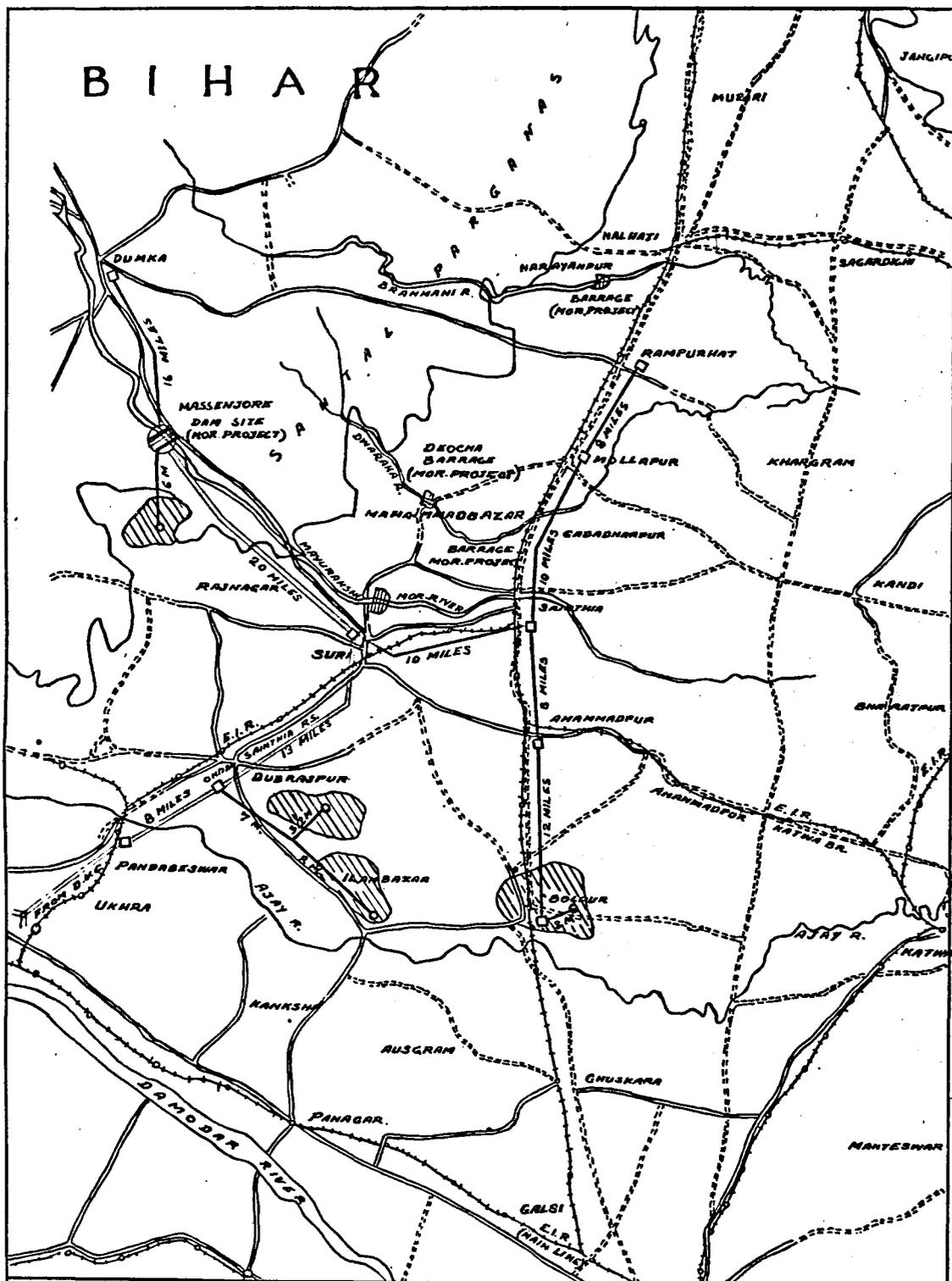
**GOVERNMENT OF WEST BENGAL
ELECTRICITY DEVELOPMENT**

**MAP SHOWING STATE ELECTRIFICATION SCHEMES
IN PART OF
WEST BENGAL**

PREPARED BY	
DRAWN BY	
CHECKED BY	
APPROVED BY	

**DRAWING NO.
AX/72**

SCALE: 1 INCH = 25 MILES. DATE: 28.3.51.



LEGEND		ELECTRICITY DEVELOPMENT GOVERNMENT OF WEST BENGAL	
33 KV O.H.T. LINE		MAYURAKHI HYDRO-ELECTRIC SCHEME	
11 KV O.H.T. LINE		ROUTE DIAGRAM OF HT LINES	
FUTURE		DRAWN BY:-	DRAWING NO
AREA TO BE IRRIGATED BY PUMP		CHECKED BY:-	MOR/II
SUB-STN. (OF THIS DEPTT.)		APPROVED BY:-	DATE: 3.6.52.
SUB-STN. (OF IRRI. DEPTT.)		SCALE: 1/28 MILES	

APPENDIX VIII

Land Utilisation in West Bengal during the Last Thirty Years

BIMALCHANDRA SINHA, M.A.

Any close analysis of the pattern of land-utilisation will at once reveal two things. The first is that the different states in India are not only at different levels of development, but they also reveal peculiar—and sometimes curious—patterns of development. This point will be clear from the note given in the Annexure. As has been noted there, these peculiar features warn us not to attempt any explanation of the phenomena in terms of any single cause. No single factor can explain these different types of development. For instance, population alone has no straight correlation with land-utilisation. Bombay has a comparatively low density but a very high utilisation figure. Nor can the relative importance of non-agricultural occupations in the economic structure of the state explain the situation. West Bengal has the highest proportion of non-agricultural population, but her land-utilisation also is very high. In fact, in West Bengal's case, the history of her economic development has rendered this pattern inevitable; when the population could no longer accommodate itself within the four walls of the land structure it tried to overflow in other channels. It is however to be seen that when these overflow channels were not big enough to carry the volume of overflow, there has been again a flow-back to the original channel with all its consequential evils.

This brief analysis of the situation leads us to the second point. The pattern of land-utilisation therefore cannot be explained without a plurastistic approach and that too in the context of the dynamics of change. The various individual factors, such as the pressure of population, fertility of the land, rate of yield, value of the produce, structure of the land-system, possibilities of employment in the non-agricultural sector and so on, have to be considered all together. But the dynamics of social change is never a process of simple addition; it is always a process of complex multiplication. All the factors act and react on one another and the result thus becomes a complex whole. Any variation in this complex process leads to different results. For instance, the Uttar Pradesh has a higher pressure of population and less opportunities for employment in the non-agricultural sector than Bombay; still her land-utilisation figure is lower than that of Bombay.

Confining our analysis only to West Bengal, it is necessary to divide her history of land-utilisation into four broad periods. The first period extends from 1770 to 1870. This

again should be subdivided into two distinct periods, one extending from 1770 to roughly 1825 and the second extending from 1825 to 1870. The second broad period carries us from 1870 to 1914. The third period brings us from the beginning of the first World War to the termination of the second World War. The fourth period begins from the date of the Partition. A close study of the statistical and descriptive materials available for these periods reveal the following broad features.

1. *First Period, 1770 to 1870.*—The year 1770 marked the culmination of a long process of disintegration. It is the year of the great famine (হিয়াতরের মনুষ্য). The Moghul rule had been disintegrating, the high principle of sticking to the Pergunnah rate was being practically set at naught through the imposition of *abwabs*; the acquisition of Dewanny by the Company in 1765 and the stark exploitation of those days, particularly through high land revenue assessments, the imposition of unnatural commerce together with the destruction of handicrafts completely destroyed the economic life of the people. The famine of 1770 was the culmination of that process—indeed, a terrible culmination, which according to Sir W. Hunter, reduced the population by 50 p.c. and the area under cultivation by one-third. There was eventually a change of policy, the most notable instance of such change being the Permanent Settlement of 1793. But we are now able to see that the Permanent Settlement was not only not able to undo the mischief done earlier, but neither did it grant any relief in the period just following it, nor was it able to direct economic forces along proper lines of development. Be that as it may, we find from all available evidence that the population substantially recovered from the shock of 1770 by 1825. By this time the handicrafts were gone and the entire population had become dependent on agriculture. It is therefore easily understandable that any increase in the pressure of population in this situation, would, unless there were special reasons to the contrary, lead to an extension of agriculture, more so when there were considerable waste lands. By 1870 we find that the effects of the pressure of population on land were making themselves fully felt (the district of Hooghly had at that time an over-all density of more than 1,000 persons per sq. mile). During the first quarter of the century, the landlords had to seek for tenants. Now the tables were completely turned. The chief factor, if not the only factor, responsible for land-utilisation during the period was population pressure, though

APPENDIX VIII

latterly the continual rise of prices also had its effects.

2. *The Second Period, 1870 to 1914.*—In the context of West Bengal this period has several very important, distinguishing features, viz., (a) The density of population had risen sufficiently high and there was an effort to seek outlet in non-agricultural channels. (b) The development of communications, specially the construction of railways, opened up the countryside, broke the insularity of the villages and connected them with distant markets and made it possible for the interior areas to produce for those distant markets instead of being forced to produce only for the immediate environs. (c) The result was a greater commercialisation of agriculture, more specialisation of crops in certain areas, greater susceptibility of agriculture to international factors and greater possibilities of price-variations. (d) This period also marked the beginning of organised factory industries in West Bengal—as a matter of fact, all over India. The American Civil War gave a fillip to the cotton industry and trade in Bombay, the Crimean War to the jute trade and industry in Bengal by cutting off the supply of Russian flax. (e) Various complex factors began to influence land-utilisation during this period. It was no longer a direct correlation between density of population on the one hand and the extent of land-utilisation on the other. New and important variables, such as the growth of modern non-agricultural occupations, price fluctuations, the growth of towns and industrial areas and the impact of international disturbances came into play along with the pressure of population. By the time the first World War broke out, we find that though conditions were by no means good, yet a precarious ecological balance was being maintained somehow, land-utilisation had practically reached its limit, specially at the technological level of that period, and conditions of stagnation were in evidence. A complex balance had developed in the occupation-structure as a whole.

3. *The Third Period, 1914 to 1946.*—As we shall see from the detailed analysis given below, the most important feature of this period is the break-down of the precarious ecological balance, somehow maintained during the previous period. The reasons are not far to seek.

The devastating effects of the First World War on world economy as a whole had its effects also on the economy of India. The changing pattern of world trade, the crisis in the currency and exchange systems all

over the world, the impact of industrialisation in the East on world affairs, the Great Depression of the thirties, the slump in agricultural prices at that time, shrinkage in the export of primary commodities, breakdown of the international monetary standard and emergence of the dollar as the strongest currency in the world, fundamental changes in the terms of trade, physical restriction of output, various controls over exchange, currency and trade, the growing importance of bilateral agreements and the growth of different trade blocks—all these profoundly affected India's economy and India's agriculture. The Bengal peasant had also to bear his full share of misery. Rural indebtedness was on the increase, price-slumps continued for a fairly long period, there were severe restrictions on jute, the growth in the number of *bargadars* was phenomenal and the loss of occupancy rights equally so. The Second World War came on the top of all this with greater devastating effects. The trail of famine, destitution and debilitation it left behind very seriously affected agriculture and the agricultural classes of Bengal. Various quantitative and qualitative estimates have been prepared for measuring the extent of this devastation. It is not necessary to examine them in detail.¹ But it can be briefly said that during this period. (1) The real agriculturists were severely hit. They had not only lost in vitality but a very large number suffered economic degeneration. (2) Land was passing out of the hands of real agriculturists and there was growing concentration of ownership of land. (3) Debts had not increased very much, but that was only because there had appeared a tendency to sell off outright the land for meeting the liabilities instead of mortgaging the land. (4) Capital was scarce, practically the only source of rural credit being a new class of a few rich agriculturists who had managed somehow to add money-lending to their business. (5) Pressure of population also had increased very rapidly during the period in question—an inevitable feature of a semi-starved population.² (6) For this reason there was a heavy increase in the degree of dependence, particularly amongst the agricultural classes, and (7) there was an over-all regression towards agriculture. (8) The middle classes showed tendencies of fast disintegration.³ Thus there was not only a sharp decline in leadership and enterprise in the countryside, but a substantial source of rural credit and capital for new development was practically lost. The precarious balance was therefore fundamentally upset.

¹ I have tried to discuss some facts of the problem in three articles published in the *Modern Review*, Calcutta, January to March 1953.

² See J. De Castro: *Geography of Hunger*.

³ For detailed discussion on each of these items, see Part IA of this Report—A. M.

APPENDIX VIII

We shall deal with the characteristic features of the fourth period later.

The Facts of Land Utilisation during the Last Thirty Years

Having regard to the socio-economic background of the period in question, it is not

logical to expect any advancement in land-utilisation. In fact, statistical evidence fully confirms the logical conclusion. Let us first take the area under cultivation. The following figures, received from departmental sources,* make the picture clear:

Land Utilisation in West Bengal

(Acres)

	Current fallow	Net Cropped Area	Area under Rice		
			Bhadoi	Aman	Boro
TOTAL WEST BENGAL					
1905-6	1,408,388	7,166,800	..	..	..
1914-15	2,307,652	9,918,900	1,649,600	6,615,100	51,500
1920-21	3,103,456	9,177,600	1,743,700	6,479,800	65,300
1930-31	3,621,984	8,556,600	1,894,500	5,984,100	41,000
1940-41	3,595,103	8,787,000	1,772,300	5,622,600	36,500
1949-50	932,500	11,280,800	1,272,600	8,135,200	37,500

NOTE—The Area not the same in 1949-50.

As will be seen, the figures for 1949-50 are not comparable with the figures for earlier years, for the figures for 1949-50 are based on the present area of West Bengal while the older figures are based on the undivided districts of Nadia, Malda, Dinajpur and Jalpaiguri, besides the rest. Nevertheless, they present the broad features well enough for the purpose of the present study. A further check on the basis of the figures in the Agricultural Statistics 1938-39 reveals the same pattern, which is as follows:

	Current fallow	Net area sown
Total West Bengal (With undivided Districts)		
1937-38	2,985,951	8,452,300
1938-39	3,389,782	9,212,800
Total Burdwan Division		
1937-38	1,246,578	3,989,100
1938-39	1,624,095	3,744,500
Total Presidency Division (With undivided Districts)		
1937-38	1,739,373	4,463,200
1938-39	1,765,687	5,468,300

	Current fallow	Net Cropped Area	Area under Rice		
			Bhadoi	Aman	Boro
Total Burdwan Division					
1905-6	676,076	4,716,000	..	..	..
1914-15	789,177	4,510,200	387,500	3,770,700	13,700
1920-21	998,205	4,427,200	524,500	3,712,100	28,000
1930-31	1,227,673	4,205,600	618,900	3,519,600	13,500
1940-41	1,803,866	3,467,000	475,300	2,850,400	17,100
1949-50	423,400	5,986,600	477,000	5,037,900	8,800
Burdwan					
1905-6	242,350	970,600	..	..	..
1914-15	385,540	828,700	120,100	760,000	1,100
1920-21	508,940	705,300	113,100	677,700	400
1930-31	558,869	547,100	58,400	609,500	300
1940-41	634,733	433,400	34,800	434,900	500
1949-50	58,300	1,180,500	54,900	1,031,600	2,300

* For more detail, see *An Account of Land Management in West Bengal, 1870-1950*, West Bengal Government Press, 1953 by A. Mitra.

APPENDIX VIII

	Current fallow	Net Cropped Area	Area under Rice		
			Bhadoi	Aman	Boro
<i>Birbhum</i>					
1905-6	193,760	700,600	..	..	..
1914-15	2,600	786,300	144,100	604,600	..
1920-21	5,806	730,300	125,000	563,000	..
1930-31	19,200	619,000	45,100	585,400	..
1940-41	334,426	299,600	16,000	267,400	..
1949-50	23,500	796,800	114,000	677,500	..
<i>Bankura</i>					
1905-6	56,240	622,200	..	..	..
1914-15	179,400	525,400	12,900	481,500	600
1920-21	142,800	562,000	5,500	525,000	800
1930-31	112,700	743,300	253,000	440,000	400
1940-41	360,451	593,900	151,600	398,100	100
1949-50	220,100	858,100	171,100	646,200	200
<i>Midnapur</i>					
1905-6	57,300	1,943,700	..	..	..
1914-15 . . . . .	..	1,872,100	67,000	1,574,900	1,000
1920-21	88,660	1,966,100	242,300	1,617,400	19,300
1930-31	284,822	1,935,700	234,800	1,592,200	8,000
1940-41	334,392	1,633,000	249,000	1,303,000	3,000
1949-50	102,000	2,304,900	110,200	2,023,900	1,300
<i>Hooghly</i>					
1905-6	79,716	267,200	..	..	..
1914-15	107,225	354,300	32,300	246,400	5,000
1920-21	140,187	317,500	29,200	209,300	5,100
1930-31	174,982	254,000	22,200	197,000	4,700
1940-41	119,445	281,300	21,000	251,000	1,500
1949-50	11,900	593,800	24,600	444,500	3,000
<i>Howrah</i>					
1905-6	46,700	211,700	..	..	..
1914-15	114,412	143,400	11,100	103,300	6,000
1920-21	111,812	146,000	9,400	119,700	2,400
1930-31	77,100	106,500	5,400	95,500	100
1940-41	20,419	225,800	2,900	196,000	12,000
1949-50	7,600	252,500	2,200	214,200	2,000
<i>Total Presidency Division</i>					
1905-6	732,312	2,450,800	..	..	..
1914-15	1,518,475	5,408,700	1,262,100	2,844,400	37,800
1920-21	2,105,251	4,750,400	1,219,200	2,767,700	37,300
1930-31	2,394,311	4,351,000	1,275,600	2,464,500	27,500
1940-41	1,791,237	5,320,000	1,297,000	2,772,200	19,400
1949-50	509,100	5,294,200	795,600	3,097,300	28,700

NOTE—The Area not the same in 1949-50.

APPENDIX VIII

	Current fallow	Net Cropped Area	Area under Rice		
			Bhadoi	Aman	Boro
<i>24-Parganas</i>					
1905-6	43,425	1,052,600	..	..	..
1914-15	154,225	941,800	60,700	785,100	..
1920-21	269,907	834,900	64,200	813,900	400
1930-31	349,726	738,500	42,900	687,800	500
1940-41	223,275	910,400	46,000	873,000	..
1949-50	71,000	1,482,000	83,900	1,213,200	200
<i>Nadia</i>					
1905-6	457,500	466,700	..	..	..
1914-15	379,930	738,700	466,400	134,600	400
1920-21	388,636	689,300	491,400	160,900	1,100
1930-31	583,319	496,000	516,500	134,400	800
1940-41	212,648	987,600	590,000	300,000	500
1949-50	109,000	670,300	285,500	231,000	400
NOTE—The total area of the district dropped from 1,847,552 acres in 1945-46 to 965,700 acres in 1946-47.					
<i>Murshidabad</i>					
1905-6	203,887	750,500	..	..	..
1914-15	382,387	582,000	180,500	315,900	4,200
1920-21	433,807	529,300	192,800	296,500	2,200
1930-31	195,493	712,600	212,000	355,700	600
1940-41	134,186	843,600	250,900	395,000	1,900
1949-50	34,000	1,005,200	215,800	444,700	4,200
<i>Malda</i>					
1905-6 . . . . .	..	..	..	..	..
1914-15	41,130	767,000	248,000	300,000	33,000
1920-21	91,920	650,600	212,600	242,400	33,300
1930-31	94,952	610,100	219,900	232,000	24,000
1940-41	387,888	455,100	153,400	109,100	15,500
1949-50	85,400	657,400	129,000	277,800	23,600
NOTE—The total area of the district dropped from 1,275,039 acres in 1945-46 to 890,900 acres in 1946-47.					
<i>Dinajpur</i>					
1905-6 . . . . .	..	..	..	..	..
1914-15	466,780	1,291,600	139,900	900,800	200
1920-21	623,880	1,134,500	121,300	819,400	300
1930-31	694,280	1,064,100	131,000	736,600	1,600
1940-41	632,232	1,137,100	113,700	720,000	1,500
1949-50	77,100	633,800	52,600	521,900	300
NOTE—The total area of the district dropped from 2,537,768 acres in 1945-46 to 931,500 acres in 1946-47.					
<i>Jalpaiguri</i>					
1905-6 . . . . .	..	..	..	..	..
1914-15	72,677	914,900	166,600	408,000	..
1920-21	255,268	753,500	136,900	434,600	..
1930-31	436,961	571,800	153,300	318,000	..
1940-41	200,604	799,200	143,000	375,100	..
1949-50	98,800	629,500	28,800	408,700	..
NOTE—The total area of the district dropped from 1,957,155 acres in 1945-46 to 1,519,600 acres in 1946-47.					

APPENDIX VIII

	Current fallow	Net Cropped Area	Area under Rice		
			Bhadoi	Aman	Boro
<i>Darjeeling</i>					
1905-6	27,500	181,000	..	..	..
1914-15	21,346	172,700	..	..	..
1920-21	41,833	158,300	..	..	..
1930-31	39,580	157,900	..	..	..
1940-41	404	187,000	..	..	..
1949-50	33,800	216,000	..	..	..

Even granting all the inaccuracies of our agricultural statistics, it will have to be admitted that the picture that emerges out of these figures is clear enough. That picture is one of more or less static conditions till the partition. The absolute figures as also the proportions of current fallow and net area sown have been remarkably steady for West Bengal as a whole in spite of heavy regional fluctuations in certain cases. Thus the area under current fallow was 2.3 million acres in 1914-15, 2.9 million acres in 1937-38 and 2.6 million acres in 1940-41. The net area sown was 9.9 million acres in 1914-15, 8.4 million acres in 1937-38 and 8.7 million acres in 1940-41.

It is however true that the extent of cultivation is not the only measure of land utilisation. The question of yield is also another equally important factor. Any substantial increase in the rate of yield will have just the same effect as an extension in the area cultivated. It might be theoretically argued that as the pressure of population increased during this period, including the pressure of population on land, the problem was sought to be solved not by extension of cultivation but by more intensive cultivation. But, unfortunately, that has not been the case. Accurate statistical surveys about yield are not always available, but all published material seems to indicate that there has been rather a tendency towards decline rather than increase in the yield. In its Appendix V, the Report of the Grow More Food Enquiry Committee, appointed by the Government of India, discusses the question of yield. Unfortunately, there is no mention of the rates of yield in West Bengal. We find, on the other hand, the following remarks in Appendix 'A', to the *Agricultural Statistics for British India, 1938-39*, published by the Government of India:

"As a result of the experiments conducted or investigations made during the present quinquennium, several revisions have been made in the figures of standard out-turns previously adopted In the case of Bengal, the out-turn has also been reduced in respect of all the three varieties (of rice) viz.,

the autumn, winter and summer rice (from 1,023, 1,111 and 1,238 lbs. to 914, 1,030 and 1,181 lbs. respectively)" (*Agricultural Statistics, 1938-39*, p. 314).

It may be mentioned in this connection that, according to the *Report of the Famine Enquiry Commission (1945)*, Final Report, p. 129-30, the area under irrigation in Bengal increased by 95,000 acres in Bengal on Government account, but the area under irrigation from private works in Bengal during the same period recorded a decrease of 97,000 acres, thus recording a slight overall decline. If we add to this the tremendous disruption caused by the famine and inflation, it is easily understandable why there was no real advance in the matter of land-utilisation during the period. On the contrary, there was a decline.

We deliberately refrain from discussing the complicated question of prices, which undoubtedly constitutes another important factor. It is true that prices of agricultural commodities, specially of foodstuffs, have recorded remarkable increase, particularly during the latter part of the period in question. But an over-all increase in prices indicates nothing whatsoever. It is not possible to assess the economic effects of price-rise without detailed stratified statistical data, which are unfortunately not available. But it may be noted in the first place that the number of people who are not producers themselves and have to purchase their food is very large, even in rural Bengal. In fact the Food Department has consistently refused to raise the procurement price of paddy on this ground. Secondly, it is also very doubtful how far the producers gain by any price-rise, as it is common knowledge that they have no holding capacity and are forced to sell out their produce at the earliest possible opportunity. Thus the benefit of price-rise is reaped not by the actual agriculturist but by a few middlemen. Thirdly, it has also to be remembered whether the producers, even if they have the requisite holding capacity, can benefit from price-rise when there is a corresponding or even higher rise in the price of the articles they consume. In that event, their expenditure would

APPENDIX VIII

increase relatively more than the income, this resulting in a net loss. Fourthly, the actual facts do not leave much scope for optimism. The loss of occupancy right has been rapid; the proportion of *bargadars* is increasing; debts are being incurred even by the comparatively well-off agricultural classes mostly for the purpose of meeting the expenditure on food. (See Report of *Enquiry into Rural Indebtedness 1952*.) In this context, it is futile to expect that any benefit has accrued to the agriculturist classes as a result of price-rise.

During this period therefore we first find signs of stagnation and then signs of degeneration. Calculating on the basis of 1937-38 figures and taking the area what now roughly comprises West Bengal (i.e., taking undivided districts of Nadia, Malda, Dinajpur and Jalpaiguri in addition to the rest) we find that only 68 per cent. of the available land was utilised, or 49.1 p.c. of the total land. It was pretty high, but not so high as at the present moment.

Let us now examine the other side of the picture and scrutinise the development of the occupation pattern. This period marked a high growth of population in spite of the temporary set-back due to the influenza epidemic. Both rural and urban densities increased remarkably, though urban density increased much faster than rural density, as will be clear from the Census Tables.

About the occupation pattern, it will be observed from the following table that though the absolute number supported by non-agricultural occupations increased, still there has been an over-all regression towards agriculture, if we take the whole population and not merely the workers. I have shown elsewhere that the percentage of workers in each group to total workers developed in the following manner:

	1921	1931
	Undivided Bengal	Undivided Bengal
1 Agriculture and Minerals	72.33%	68.63%
2 Industry	10.00%	8.80%
3 Trade	6.43%	5.91%
4 Transport	2.22%	1.93%

	1931	1951
	W. Bengal only	W. Bengal
1 Agriculture and Minerals	57.97%	47.7%
2 Industry	12.04%	21.5%
3 Trade	7.14%	10.0%
4 Transport	2.68%	4.2%

But if we take the population as a whole (that is, workers and dependents) we get the following percentages:

	1931
	Undivided Bengal
1 Agriculture and Minerals	49.05%
2 Industry	6.1%
3 Trade	5.1%
4 Transport	1.4%

	1931	1951
	W. Bengal only	W. Bengal
1 Agriculture and Minerals	51.4%	57.21%
2 Industry	10.4%	15.36%
3 Trade	6.6%	9.32%
4 Transport	2.5%	3.05%

The picture is clear enough. Growth of the non-agricultural sector has been outpaced by the growth of population. In fact, it has been brought out in the present Census Report (Part IA) that our agriculture has not been able to support roughly more than a density of 500 persons per sq. mile. Wherever rural density has exceeded that figure, the proportion of persons dependent on agriculture has fallen. This shows the extent of over-pressure of population on soil.

THE LAST FEW YEARS

It will be noticed that there has been a perceptible change since the partition. Not only has there been a high increase in density, but land utilisation figures have also gone up very much. As will be noticed from the figures already quoted, the total area sown has gone up to 11.28 million acres in 1949-50 against 8.7 million acres in 1940-41. The percentage of total land utilised to total land available has now reached the high figure of 85.1 per cent. Yield rates have also increased and there has been more double cropping. From all available evidence, it appears that it is the last desperate effort, though, at a very low technological level, of an over-populated state to exploit to the extreme possible limit the meagre resources of agriculture. This spurt of activity must be taken as the forced result of over-congestion, not of any positive planning in an era of plenty. This extension of cultivation has been following congestion and not preceding it. The work of the Planning Commission in this state should begin from this stage. The figures for many other provinces show that they have not yet reached this stage. The task of developing them should therefore be comparatively easy.

* See my article in *The Modern Review*, January 1953: "Two Recent Indications of West Bengal's Economic Decay".

ANNEXURE

A Statistical Note showing the Pattern of Land Utilisation

From the available statistical data, two sets of correlations can be prepared to show the extent of land utilisation in the different states in India. The first correlation may be between the total geographical area of the State according to the Surveyor General or the Director of Land Records and the net area sown. But this will not give a correct picture, inasmuch as that will include lands which can never be brought under cultivation, such as rocky or steep hills, forests, water-area, etc. Therefore, a more correct picture can be had if a correlation is made between the net area available on the one hand and the actual area cultivated on the other. The net area available may be calculated by deducting from the total area, forests and other lands not available for cultivation. On the other hand, the actual area cultivated may be calculated by adding up with the net area actually sown the current fallows which are cultivated lands for all practical purposes. The second set of correlations can be made on this basis. The following table gives two sets of correlations on the basis of figures given in the *Agricultural Statistics, Government of India, 1949-50* :

TABLE I—Land utilisation

	1st Set	2nd Set
All India	32.8%	48.4%
Total Part 'A' States	40.7%	65.1%
Assam	10.2%	15.4%
Bihar	50.7%	82.6%
Bombay	57.7%	91.1%
Madras	38.3%	76.9%
Orissa	16.5%	23.9%
Punjab	49.9%	80.7%
Madhya Pradesh	34.9%	56.8%
West Bengal	59.5%	85.1%

The following table gives figures for density of population:

TABLE II—Density of Population per sq. mile, 1951

Assam	106
Bihar	572
Bombay	323
Madras	446
Uttar Pradesh	557
Orissa	244
Punjab	338
Madhya Pradesh	163
West Bengal	806

It will be seen that no direct correlation can be established between population pressure and land utilisation. For instance, Bombay and the Punjab have a comparatively low density, but their land utilisation is very high.

The following table gives the picture of distribution of population in different occupation groups and between towns and villages :

TABLE III—Occupation Pattern, 1951 Census*

	Percentage of population dependent on non-agricultural occupations to total population	Percentage of urban population to total population	Percentage of population dependent on agricultural occupations to total population	Percentage of rural population to total population	Percentage distribution of non-agricultural livelihoods in urban population
Assam	26.7	4.6	73.3	95.4	93.5
Madhya Pradesh	24.0	13.5	76.0	86.5	84.3
Orissa	20.7	4.1	79.3	95.9	86.0
Bombay	38.5	31.1	61.5	68.9	84.5
Punjab	35.5	19.0	64.5	81.0	90.0
Madras	35.1	19.6	64.9	80.4	83.0
Uttar Pradesh	25.8	13.6	74.2	86.4	87.6
Bihar	14.0	6.7	86.0	93.3	77.0
West Bengal	42.8	24.8	57.2	75.2	95.8

This table again shows the futility of attempting any explanation of the nature and

extent of land utilisation in terms of any one cause.

* From Statement I of Part IA of this Report.

**BRIEF ACCOUNTS OF SOME OF THE
NATURAL RESOURCES AND
INDUSTRIES OF THE STATE**

(With two Bibliographies)

CONTENTS

NOTE

	PAGE
PLANTS	
I The commonly known economic plants of the State compiled by Chanchal Kumar Chatterjee	313
II The more important varieties of rice grown in the State compiled by Chanchal Kumar Chatterjee	321
III (a) The commonly known dyestuff plants of the State compiled by Chanchal Kumar Chatterjee	323
(b) Extract from Francis Buchanan-Hamilton on dyeing in Malda in the beginning of the nineteenth century	332
IV The commonly known plants and woods yielding oily substances compiled by Chanchal Kumar Chatterjee	337
V Common plants employed in basketware, wicker works, etc., compiled by Chanchal Kumar Chatterjee	338
VI The common medicinal plants of the State compiled by Chanchal Kumar Chatterjee	339
VII (a) The common economic timbers of the State	341
(b) Woods found suitable for the match industry in West Bengal compiled by Chanchal Kumar Chatterjee	348
VIII Pith and the pith industry compiled by Kamal Majumdar and Chanchal Kumar Chatterjee	349
LX Three modern industries using wood—	
(a) Plywood	352
(b) The bobbin industry	354
(c) Small boxes of various kinds compiled by Kamal Majumdar	357
X Two forest products—	
(a) Wax reprinted from Francis Buchanan-Hamilton	360
(b) Lac compiled by A. Mitra	360
FIBRES	
XI The commonly known fibrous plants of the State compiled by Chanchal Kumar Chatterjee	363
XII (a) Cotton in West Bengal compiled by Chanchal Kumar Chatterjee	365
(b) Weavers and weaving in West Bengal compiled by Mukul Gupta	368
XIII Silk in West Bengal compiled by Chanchal Kumar Chatterjee	375
XIV Two small industries using cloth compiled by Kamal Majumdar	
(a) The umbrella	384
(b) Oil cloth	389
NARCOTICS	
XV The narcotic derivatives of hemp compiled by Chanchal Kumar Chatterjee	391
XVI The bidi industry compiled by Kamal Majumdar	394
FISHES AND FISHING	
XVII List of Common Edible Fishes in West Bengal compiled by the Director of Fisheries, West Bengal	397
XVIII Fishing in Bengal compiled by Kamal Majumdar	401
XIX The fishing nets of Bengal compiled by Chanchal Kumar Chatterjee	403
XX Two extracts from Francis Buchanan-Hamilton—	
(a) Fishing nets in District Dinajpur	410
(b) Fishing contraptions in Rangpur	413
CONCHSHELLS	
XXI The conch-shells industry compiled by Chanchal Kumar Chatterjee	417
BOATS AND SHIPS	
XXII Boats and Ships compiled by Chanchal Kumar Chatterjee—	
(a) Boats and Ships	424
(b) The Common Boats of the Present day	434
(c) Types of Cargo Boats in Murshidabad District	434

CONTENTS		PAGE
EARTH AND CLAY		
XXIII	Native pottery compiled by Kamal Majumdar	436
LEATHER AND HAIR		
XXIV	Hides and leather trade in the State compiled by Chanchal Kumar Chatterjee	440
XXV	The brush industry compiled by Kamal Majumdar	445
METALS		
XXVI	(a) The indigenous manufacture of iron compiled by Kamal Majumdar	446
	(b) A list of iron implements in common use compiled by Kamal Majumdar and Chanchal Kumar Chatterjee	456
XXVII	Brass and bell metal industry compiled by Kamal Majumdar	472
XXVIII	Gold work compiled by Kamal Majumdar and Chanchal Kumar Chatterjee	478
BIBLIOGRAPHY		
XXIX	Books compiled by Chanchal Kumar Chatterjee	488
XXX	Journals and memoirs compiled by Chanchal Kumar Chatterjee	500

NOTE

ABOUT THE MIDDLE of 1952 I asked Sri Kamal Majumdar and Chanchal Kumar Chatterjee if they would consider the preparation of a good bibliography of articles, memoirs and books published from ancient times to the present day on the natural resources, trade, commerce and industry of Bengal. The scope of the bibliographical survey was discussed for several days and it was agreed that the best course would be to prepare a bibliography under several main heads and knit together a connected account of the contents of the more important contributions on each subject.

As the work proceeded, an unsuspectedly large horizon revealed itself to take stock of which it was fairly impossible within the time allotted. It was felt that a fairly comprehensive and manageable bibliography on the natural resources, trade, commerce and industry of Bengal *alone* would run to a few thousand books and journals not counting separately the serial issues of journals and memoirs or the separate volumes and parts of books. Such a bibliography would be the scholar's paradise but would demand several years of unremitting work, constant correspondence with the important libraries and societies of Europe and America, and knowledge of several languages. For, the number and nationalities of persons who have written on the natural resources, trade, commerce and industry of Bengal and often on Bengal alone and not other parts of India, are amazingly large and various.

It was therefore decided to continue the work in progress and if Sri Chanchal Kumar Chatterjee should be able to continue on his own it should be possible to publish a worth while bibliography when the time comes. It was considered desirable, however, to publish in the meantime some account of the work already performed. The pages that follow give so much of the work as could be put together and hurriedly edited.

The subjects which the bibliography was intended to cover as a practicable survey are set out in the annexure to this note. It will be seen that the compilations cover only a fraction of the field originally contemplated, but are related to the subjects of the Introductory Chapter of Part IA of this Report. The bibliography is an interim report. Some of the books mentioned in the compilations have been repeated in the bibliography. What is now presented is very different from what was originally intended but will, it is hoped, be found interesting enough.

I regret that I have not been able properly to discharge the role of editor. I wish I had checked the translations and references more closely. For a brief while Sri Radhaprasad Gupta helped with draft translations of Sri Kamal Majumdar's articles. At the time the draft of this part of the Report was taken up, the writing, editing, putting together, laying out type, printing and publishing of as many as eight books were on my hands, and naturally I failed to give as much time and attention to the drafts and work of translation as I should have.

The index shows which particular article has been compiled by whom. The bibliographies are largely Sri Chanchal Kumar Chatterjee's effort.

A. MITRA

ANNEXURE

PRACTICABLE SURVEY

- A. Bowels of the earth
1. Iron and Steel—
 - Iron extraction and smelting
 - Preparation of steel casting, beating and tempering
 - Weapons:—
 - Cannon
 - Firearms
 - Spearheads
 - Arrowheads
 - Swords
 - Cullasses
 - Shields
 - Armour
 - Agricultural implements—Ploughshare, harrows, etc.
 - Fishing implements—Hook, reel
 - Household utensils—Pots and pans
 - Transport equipment—Hammer shoe-horse, cart wheel frame, boats, palanquine handles
 - Cutlery—Knives, janti, scissors, etc.
 - Ornaments and toys—for the person, for the house
 - Chased work in iron and steel
 - Engraved work
 - Steel alloy work medicinal use of iron
 2. Copper and brass—
 - Extraction and smelting
 - Copper
 - Brass
 - Preparation of bell metal
 - Centres of bell metal making
 - Centres of copper industry
 - Centres of brass industry
 - Casting, beating, moulding moulds
 - Categories same as iron
 - Making of other alloys
 - Chasing
 - Engraving
 - Inlay work
 - Alloying
 - Wire and copper and from tinsel
 3. Gold and silver—
 - Extraction and employment
 - Ornaments—
 - Chasing
 - Engraving
 - Dice work, casting, beating and moulding
 - Gold and silver thread
 - Working in gold and silver thread
 - Inlaying gold and silver
 - Gold and silver alloy
 - Medicinal gold and silver
 - Gold and silver and precious stone
 - Gold leaf work
 - Silver leaf work
 - Gold and silver wire
 - Gold and silver
 4. Zinc and other base metals (lead, mercury etc.)—
 - Alloying with base metals
 - Categories of production as in iron
 - Chasing work
 - Engraving
 - Casting, beating, mould work
 - Dice work
 - Inlay work
 - Inlay work (in wood)
 - Medicinal use of mercury
 - Wire and tinsel
 - Printing on paper
 - Printing on calico, silk, etc., leather foil
- B. Surface of the earth
1. Stone—
 - Housebuilding and other public works (architecture and sculpture)
 - Household utensils
 - Stone crockery
 - Toys
 - Other forms of carving
 - Turning in lathe
 - Images
 2. Earth—
 - Housebuilding
 - Earthen pastes, vermilion
 - Bricks
 - Tiles
 - Surki
 - Terracotta decorations
 - Pottery, Household utensils, pots, jugs, etc., etc.
 - Household crockery
 - Ornaments and toys, images
 - Baked and unbaked earth
- C. Vegetable Kingdom
1. Wood—
 - Housebuilding
 - Means of transport:—
 - Carriages
 - Boats
 - Furniture
 - Household goods
 - Sculpture
 - Woodcarrying
 - Woodcuts and engraving
 - Inlaying in wood
 - Ornaments and toys
 - Block making, etc., etc.
 - Musical instruments
 2. Reeds and bamboos—
 - Housebuilding and roofmaking
 - Wall making
 - Mat make
 - Furniture
 - Mats and other household goods like
 - Fine arts

I. The Commonly Known Economic Plants of the State—contd.

Serial No.	Botanical Name	English Name	Vernacular Name		Reference to the Dictionary of Economic Products (George Watt)	Notes
			Bengal proper			
1	2	3	4	5	6	
II.—Pulses—concl'd.						
22	<i>Phaseolus Mungo</i> and <i>P. Roxburghii</i>	Mungo var.		Mas Kalai	P. 513	
23	<i>Phaseolus aconitifolius</i>			Bhringi	P. 468	Grown both for food and fodder.
24	<i>Dolichos biflorus</i>	Horsegram		Kulthi, kalai	D. 758	Grown chiefly in Bihar and Chota Nagpur.
25	<i>Lathyrus sativus</i>			Khesari	L. 100	
26	<i>Cajanus indicus</i>	Pigeon pea		Arhar	C. 49	
27	<i>Vigna Cajiang</i>	Cow pea		Barbati	V. 116	Principally used as a table vegetable like beans.
III.—Table Vegetables—(a) Pot herbs						
28	<i>Portulaca oleracea</i>	Indian purslane		Nuniya shag	P. 1179	
29	<i>Ipomaea reptans</i>			Kalmi shag	I. 412	An aquatic plant.
30	<i>Amarantus polygamus</i>			Note shag	A. 941	
31	<i>Beta bengalensis</i>	Country spinach, Indian beet		Palam shag	B. 480	A variety of <i>B. vulgaris</i> .
32	<i>Rumex vesicarius</i>			Chuka palam	R. 650	
33	<i>Basella alba</i>	Indian spinach		Sada puishag	B. 203	Varieties of one plant.
34	<i>Basella rubra</i>	Do		Lal puishag	B. 209	
35	<i>Chenopodium album viride</i>	White goose foot		Beto shag	C. 1003	One of the common shags.
36	<i>Mentha viridis</i>	Mint		Pudina	M. 451	
37	<i>Enhydra fluctuans</i>			Hingcha shag, helanchha shag.	E. 213	
38	<i>Marsilea quadrifolia</i>				M. 306	An aquatic herb found at the edges of ponds.
III.—Table Vegetables—(b) Roots and Tubers						
39	<i>Solanum tuberosum</i>	Potato		Gol alu	S. 2320	A native of Chili in South America.
40	<i>Raphanus sativus</i>	Radish		Mula	R. 31	
41	<i>Batatas edulis (= Ipomoea Batatas)</i>	Sweet potato		Ranga alu, sada alu	I. 348	A native of tropical South America. The red variety is more frequently found in cultivation in our province than the white.

42	<i>Dioscorea alata</i>	Yam	Chukari alu	D. 484
43	<i>Dioscorea fasciculata</i>		Sutni alu	D. 507
44	<i>Colocasia antiquorum</i> (= Arum Colocasia)	Arum	Kachu	C. 1732
45	<i>Alocasia indica</i> (= Arum indicum)	Arum	Man Kachu	A. 809
46	<i>Amorphophallus campanulatus</i> (= Arum Arum campanulatum).	(= Arum Arum)	Ol	A. 996
47	<i>Brassica oleracea</i>	Kohl-rabi	Ol kapi	B. 852
48	<i>Brassica Rapa</i>	Turnips	Shalgam	B. 811
49	<i>Daucus Carota</i>	Carrots	Gajar	D. 173
50	<i>Beta vulgaris</i>	Beet-root	Bit palam	B. 480
51	<i>Helianthus tuberosus</i>	Jerusalem artichoke	Hati chok	H. 89

Introduced by Europeans.
A native of North-East America.
Introduced by Europeans.

III.—Table Vegetables—(c) Cucurbits used as Vegetables

52	<i>Cucurbita maxima</i>	Gourd, Squash, orred gourd	Bilati kumra	C. 2316
53	<i>Cucurbita Pepo</i>	Pumpkin, vegetable marrow	Deshi or suriya kumra	C. 2331
54	<i>Lagenaria vulgaris</i>	Rottle gourd	Lau, kadu	L. 30
55	<i>Momordica cochinchinensis</i>		Kankrol	M. 634
56	<i>Momordica Charantia</i>		Karola	M. 626
57	<i>Momordica muricata</i>		Uohchhe	M. 626
58	<i>Luffa acutangula</i>		Tarai	L. 556
59	<i>Luffa aegyptiaca</i>		Bundul	L. 569
60	<i>Trichosanthes anguina</i>	Sanake-gourd	Chichinga	T. 569
61	<i>Trichosanthes doica</i>		Patal, kundruki	T. 586

Probably a native of America.

III.—Table Vegetables - (d) Other Fruits and Pods used as vegetables

62	<i>Solanum Melongana</i>	Brinjal	Begun	S. 2284
63	<i>Solanum Melongana varlonge</i>	Long Brinjal	Kuli begun	
64	<i>Hibiscus esculentus</i>	Ladies' finger	Dhanrosh, bhindi	H. 196
65	<i>Hibiscus sabdariffa</i>	Roselle	Menda, tekmanda	H. 233
66	<i>Ficus hispida</i>	Country fig	Dumbur	F. 202
67	<i>Vicia Faba</i>	Field beans	Bakla	V. 109
68	<i>Dolichos Lablab</i>	Country beans	Sim.	D. 789
69	<i>Moringa pterygosperma</i>	Indian horse-radish tree	Sajna	M. 721
70	<i>Cucumis sativus</i>	Cucumber	Shasha, kshira	C. 2287
71	<i>Brassica oleracea</i>	Cabbage	Bandha kapi	B. 852
72	<i>Brassica oleracea</i>	Cauiiflower	Phul kapi	B. 852
73	<i>Lactuca sativa</i>	Lettuce	Salad	L. 21
74	<i>Lycopersicum esculentum</i>	Tomato	Gur begun, bilati begun	L. 596

Also known as *S. esculenta*.
Also used to make a conserve like red current jelly.
The fruits in the green state are used as vegetables.

Introduced by Europeans.

IV.—Fruits

75	<i>Mangifera indica</i>	Mango	Am.	M. 147
76	<i>Artocarpus integrifolia</i>	Jack	Kanthal	A. 1489

The sawdust yields, on boiling, a yellow dye used to colour the Burmese priests' robes.

ECONOMIC PLANTS

I. The Commonly Known Economic Plants of the State—contd.

Serial No.	Botanical Name	English Name.	Vernacular Name		Reference to the Dictionary of Economic Products (George Watt)	Notes
			Bengal proper			
1	2	3	4	5	6	
IV.—Fruits—contd.						
77	<i>Psidium Guyava</i>	Guava	Peara.	P. 1343	Originally a native of America. Naturalized.	
78	<i>Cocos nucifera</i>	Cocoanut	Narikel	C. 1020	The outer wall of the fruit yields the sole fibre of commerce.	
70	<i>Borassus flabellifer</i>	Palmyra palm, fan palm	Tal	B. 603	Cultivated all over the province, (Bengal, Behar and Orissa) excepting Chota Nagpur.	
80	<i>Aegle Marmelos</i>	Bael	Bel	A. 534	The fruit possesses very valuable medicinal properties.	
81	<i>Zizyphus Jujuba</i>	Round plum jujube	Kul	Z. 231	Sparingly cultivated. A native of Brazil.	
82	<i>Ananas sativa</i>	Pineapple	Anaras	A. 1045		
83	<i>Anona squamosa</i>	Custard apple	Ata	A. 1100	Supposed to be an introduced plant.	
84	<i>Anona reticulata</i>	Bullock's heart	Nona ata	A. 1158	Supposed to be an introduced plant.	
85	<i>Carica Papaya</i>	Papaya	Pepe	C. 581	Introduced from America. The juice of the green fruit is valued as a pepsin.	
86	<i>Eugenia Jambolana</i>	Indian blackberry	Jam	E. 410	See No. 118 for <i>Musa sapientum</i> var. <i>paradisifera</i> , which is used as a vegetable.	
87	<i>Musa sapientum</i>	Banana	Kanthali kala, champa kala	M. 811		
88	<i>Citrus Aurantium</i>	Orange	Kamla nebu	C. 1232	A native of the Malay islands. Extensively cultivated in numerous forms, the two chief being (1) the patl nimbu or common round lime, and (2) the Kaghazi nimbu or long small lime. The latter is most valued.	
89	<i>Citrus decumana</i>	Pomelo, shaddock	Batabi nebu	C. 1203		
90	<i>Citrus medica var. acida</i>	Lemon, lime	Pati nebu	C. 1206		
91	<i>Tamarindus indica</i>	Tamarind	Tentul	T. 28	} Used for giving an acid taste to curries.	
92	<i>Dillenia indica</i>		Chalta	D. 428		
93	<i>Phyllanthus distichus</i>	Otakeite gooseberry	Nor	P. 627		
94	<i>Spondias mangifera</i>	Hog plum	Amra	S. 2040		
95	<i>Spondias dulcis</i>	Otakeite apple	Bilati amra	S. 2044		

96	<i>Elaeocarpus serratus</i>	Indian olive	Jalpai	E. 67	} Used for giving an acid taste to curries.
97	<i>Averrhoa Carambola</i>		Kamranga	A. 1646	
98	<i>Carissa Carandas</i>		Karamcha	C. 696	} A tree of the Malay Peninsula,
99	<i>Nephelium Litchi</i>	Litchi	Lichu	N. 68	
100	<i>Prunus persica</i>	Peach	Pich	P. 1322	} Generally cultivated. Wild in Chota Nagpur.
101	<i>Grewia Asiatica</i>		Phalsa	G. 663	
102	<i>Punica Granatum</i>	Pomegranate	Darim, dalim	P. 1426	} The bark is valued as a tan and dye for leather.
103	<i>Eugenia Jambos</i>	Rose apple	Golap jam	E. 432	} Common in gardens.
104	<i>Eugenia javanica</i>		Jamrul	E. 439	
105	<i>Eriobotrya japonica</i>	Loquat	Laket phal	E. 285	} Oil is also extracted from the fruits.
106	<i>Feronia Elephantum</i>	Wood apple	Keyet bel	F. 53	
107	<i>Terminalia Catappa</i>	Indian almond	Deshi badam	T. 312	} Kol-Tarum.
108	<i>Anacardium occidentale</i>	Cashew nut	Hijli badam	A. 1014	
109	<i>Buchanania latifolia</i>		Piyal, chiraunchhi	B. 913	} A native of America.
110	<i>Nephelium Longana</i>		Ansh phal	N. 72	
111	<i>Achras Sapota</i>	Sapodilla	Sapeta	A. 376	} The fruits in the green state are used as vegetables.
112	<i>Diospyros melanoxylon</i>	Bengal ebony	Kend	D. 615	
113	<i>Musa sapientum, var. paradisiaca</i>	Plantain	Kach Kala	M. 811	} The plant is of American origin.
114	<i>Cucumis Melo</i>	Sweet-melon	Kharmuj	C. 2263	
115	<i>Cucumis Melo var. utilissima</i>	Mash-melon	Phuti, kankur	C. 2273	} A floating aquatic.
116	<i>Citrullus vulgaris</i>	Water-melon	Tarmuj	C. 1221	
117	<i>Physalis peruviana</i>	Cape gooseberry, tipari	Tepari	P. 683	} The plant is of American origin.
118	<i>Trapa bispinosa</i>	Water chestnut	Paniphal, singhara	T. 516	
119	<i>Pyrus communis</i>	Pear	Nashpati	P. 1452	} A floating aquatic.
120	<i>Pyrus Malus</i>	Apple	Apel	P. 1463	
121	<i>Vitis vinifera</i>	Grape	Angur	V. 233	

V.—Spices and other Food Adjuncts

122	<i>Curcuma longa</i>	Turmeric	Haridra, halud	C. 2433	} Introduced from South America.
123	<i>Zingiber officinale</i>	Ginger	Ada, Adrak	Z. 201	
124	<i>Curcuma Amada</i>	Mango-ginger	Amada	C. 2381	} The seed has valuable medicinal properties.
125	<i>Capsicum acuminatum (=C. frutescens of Roxburgh).</i>	Chillies	Lanka marich	C. 455	
126	<i>Allium tuberosum</i>	Indian leek	Banga gandina	A. 786	} The seed has valuable medicinal properties.
127	<i>Allium cepa</i>	Onion	Peyaj	A. 769	
128	<i>Allium sativum</i>	Garlic	Rasum	A. 779	} The seed has valuable medicinal properties.
129	<i>Coriandrum sativum</i>	Coriander seed	Dhone	C. 1954	
130	<i>Nigella sativa</i>	Black cummin	Kole jire	N. 158	} The seed has valuable medicinal properties.
131	<i>Trigonella Foenum-graecum</i>	Fenugreek	Methi	T. 612	
132	<i>Carum copticum</i>		Jowan	C. 691	} The seed has valuable medicinal properties.
133	<i>Carum Roxburghianum</i>		Chanu, rajani	C. 701	
134	<i>Piper longum</i>	Long pepper	Pipul	P. 805	} The seed has valuable medicinal properties.
135	<i>Piper Betle</i>		Pan	P. 776	
136	<i>Piper Chaba</i>		Chai	P. 797	

I. The Commonly Known Economic Plants of the State—contd.

Serial No.	Botanical Name	English Name	Vernacular Name		Reference to the Dictionary of Economic Products (George Watt)	Notes
				Bengal proper		
1	2	3	4	5	6	
V.—Spices and other Food Adjuncts—concl'd.						
137	<i>Pandanus fascicularis</i>	.....	Kiya phul	P. 26	Grows in the Darjeeling district.
138	<i>Amomum subulatum</i>	The greater cardamum	Bara elach	A. 976		
VI.—Oilseeds						
139	<i>Brassica juncea</i>	Indian mustard	Rai	} B. 807		
140	<i>Brassica campestris</i> var. <i>Sarson</i>	Indian colza	Svet rai			
141	<i>Brassica Napus</i> var. <i>dichotoma</i>	Indian rae	Sarshe	..		
142	<i>Linum usitatissimum</i>	Linseed	Tisi, masina	L. 385		
143	<i>Sesamum indicum</i>	Gingelly, sesamum	Til	S. 1078		
144	<i>Guizotia abyssinica</i>	Niger oilseed	Sargonja	G. 735		
145	<i>Ricinus communis</i>	Castor	Reri	R. 369		
146	<i>Arachis hypogaea</i>	Groundnut or earthnut	China badam, mat badam.	A. 1261	A South American plant.	
147	<i>Melia Azadirachta</i>	Neem, Margosa	Nim	M. 363		
148	<i>Galedupa indica</i> (= <i>Pongamia glabra</i>)	.....	Karanoha	P. 1122	
149	<i>Eruca sativa</i>	.....	Taramani	..	In Central Bengal occasionally. Common in Bihar.
VII.—Drugs						
150	<i>Cinchona Ledgeriana</i>	Cinchona	Kuinain	C. 1129	A native of Ecuador and Peru.	
151	<i>Thea Chinensis</i>	Tea	Cha	C. 244		
152	<i>Coffea arabica</i>	Coffee	Kafi	C. 1641	Cultivated sparingly in Chota Nagpur.	
153	<i>Nicotiana rustica</i>	} Tobacco	Tamak	N. 100 & 101		
	<i>N. Tabacum</i>					
154	<i>Papaver somni ferum</i>	Opium, poppy	Apbing, posta	P. 87	Cultivated only in Bihar. Elsewhere a prohibited plant. Only white flowered forms are cultivated in our area.	
155	<i>Cannabis sativa</i>	Hemp	Ganja	C. 331	A prohibited plant in our area, though occurring as a roadside weed everywhere. Ganja is the female flowering tops with the resinous exudation thereon.	

156	<i>Datura fastuosa</i> and <i>D. fastuosa</i> var. <i>alba</i>	Thorn apple	Dhuturo	D. 151	The white variety is more common.
157	<i>Croton Tiglium</i>		Jaypal	C. 2192	Cultivated in the Western Provinces.
VIII.—Dyes					
158	<i>Indigofera sumatrana</i>	Indigo	Nil	I. 145	Oil is expressed from the seed.
159	<i>Carthamus tinctorius</i>	Safflower	Kusum	C. 145	
160	<i>Nyctanthes Arbor-tristis</i>		Siuli	N. 179	The corolla tubes yield an orange dye.
161	<i>Bixa Orellana</i>	Arnatto	Natkan	B. 523	Of American origin. Wild in village jangal.
162	<i>Lawsonia alba</i>	Henna	Medi	L. 126	Grown generally in hedges.
163	<i>Diospyros Embryopteris</i>		Gab	D. 582	
164	<i>Butea frondosa</i>		Palas	B. 944	Petals used for dyeing tasar. One of the favourite trees of the lao insect.
165	<i>Acacia arabica</i>	Babul	Babul	A. 101	Sontal-Murup; Kol-Murut. The leaves and legumes are used as fodder.
166	<i>Terminalia Chebula</i>	Black myrobalan	Haritaki	T. 325	Sontal and Kol-Rol, rola.
167	<i>Terminalia belerica</i>	Beleric myrobalan	Bahera	T. 293	Sontal and Kol-Lopong.
168	<i>Phyllanthus Embica</i>		Amlaki	P. 632	Sontal-Meral; Kol-Aura.
169	<i>Morinda citrifolia</i>		Aich, al	M. 656	
IX.—Fibres					
170	<i>Corchorus capsularis</i> , <i>Corchorus olitorius</i>	Jute	Pat, nalita, koshta	C. 1846 & 1861	Leaves used as potherb and also medicine.
171	<i>Crotalaria juncea</i>	San hemp	Shan	C. 2105	
172	<i>Gossypium</i> sp.	Cotton	Kapas, tula	G. 404	Stalks, after extraction of fibre, used like jute stalks.
173	<i>Sesbania cannabina</i>		Baincha	S. 1166	
174	<i>Hibiscus cannabinus</i>	Deccan hemp	Mestapat	H. 177	
175	<i>Saccharum arundinaceum</i> var. <i>ciliare</i>	Munj grass	Munchha ghas	S. 6	
176	<i>Ischoemum angustifolium</i>	Sabe	Babuj ghas	I. 494	Sontal-Bachkom. Used in paper-making.
177	<i>Agave americana</i>	Aloe	Ban anaras	A. 603	
178	<i>Furcraea gigantea</i>	Mauritius hemp	Murga, morabba	F. 749	
179	<i>Boehmeria nivea</i>	Rhea or ramie	Riha, kankura	B. 576	
180	<i>Calotropis gigantea</i>		Akanda	C. 170	Both the floss and the bastifibre are said to be valuable, but there is no trade.
181	<i>Salvia malabaricum</i>	Silk cotton	Simul	B. 632	The Kapok of commerce.
X.—Miscellaneous					
182	<i>Maranta arundinacea</i>	Arrowfoot	Ararut	M. 267	An American plant.
183	<i>Curcuma Zedoaria</i> , <i>Curcuma Zerumbet</i>	Zedoary, zerumbet	Shati	C. 2499 & 2507	Powdered and steeped in a decoction of Sappan wood, the rhizomes yield the abir powder used by the Hindus at the Holi festival.
184	<i>Calamus Rotang</i>	Rattan cane	Bet	C. 104	
185	<i>Imperata arundinacea</i>	Thatching-straw	Ulu ghas	I. 51	
186	<i>Cyperus tegetum</i>	Sedge	Madur kati	C. 2624	

I. The Commonly Known Economic Plants of the State—concl'd.

Serial No.	Botanical Name	English Name	Vernacular Name -		Reference to the Dictionary of Economic Products (George Watt)	Notes
			Bengal proper			
1	2	3	4	5	6	
X.—Miscellaneous—concl'd.						
187	<i>Bambusa Balcooa</i> and <i>B. Tulda</i>	Bamboo	Bansh	B. 118	<i>B. arundinacea</i> is a spiny form common in Central and South India and Burma, but not common in the Province.	
188	<i>Saccharum spontaneum</i>	Reed	Khag	S. 49		
189	<i>Arundo Karka</i>	Reed	Nal	A. 1538 & P. 618		
190	<i>Aeschynomene aspera</i>	Sola	Shola	A. 560		
191	<i>Typha angustata</i> , <i>Typha elephantina</i>	....	Hogla	T. 864	
192	<i>Areca Catechu</i>	Betel-nut	Supari	A. 1294		
193	<i>Morus indica</i>	Mulberry	Deshitunt	M. 756	Grown for rearing silk-worms.	
194	<i>Morus laevigata</i>	Mulberry	Pahare tunt	M. 776	Used as fodder in Darjeeling district.	
195	<i>Terminalia tomentosa</i>	....	Asan	T. 362	Wild in Bihar and Chota Nagpur. The most rearing tasar cocoons.
196	<i>Schleichers trijuga</i>	....	Kusumb	S. 950	Wild in Bihar and Chota Nagpur. The most important of the trees producing lac.
197	<i>Soirpus Kysoor</i>	Chufa	Keshur	S. 977		
198	<i>Pachyrhizus angulatus</i>	....	Shank alu	P. 1	An edible root. Found wild.
199	<i>Nelumbium speciosum</i>	Lotus	Padma	N. 39	The seed and roots are eaten.	
200	<i>Flacourtia sepiaria</i>	....	Bainchi	F. 615	
201	<i>Madhuca latifolia</i>	....	Mahua	B. 220	
202	<i>Semecarpus Anacardium</i>	Marking-nut tree	Bhela	S. 30	Sontal-Matkom ; Kol-Mankadam.	
203	<i>Saccharum officinarum</i>	Sugarcane	Ak, ikshu	S. 1041	Grows chiefly in Bihar.	
204	<i>Phoenix sylvestris</i>	Date palm	Khejur, khajur	P. 588	The juice of the tree is used chiefly for making toddy, and also for making gur.	

II

The More Important Varieties of Rice Grown in the State

The following is a list of the more important varieties of rice grown in Bengal. It is interesting to recall that Abul Fazl-i-Allami in his *Ain-i-Akbari* remarked that "the principal cultivation is rice of which there are numerous kinds. If a single grain of each kind were collected, they would fill a large vase" (*Ain-i-Akbari*, H. S. Jarrett and J. N. Sarkar, Vol. II, p. 134). For a current list of varieties of rice, see *An account of Land Management in West Bengal*, by A. Mitra, West Bengal Government Press, 1953.

[H—W. W. Hunter: *Statistical Account of the District.*]

Burdwan

See Hunter: Burdwan, P. 68.

Aus: Aus rice is divided into three varieties, viz., Aus proper, Kalesh, and Niali, which are subdivided into different species—

Aus.—Kala-Kandi, Bhasa, Madhu-malati, Saljati, Naya Ramsal, Kaya.

Aman.—Kanakchur, Ramsal, Bans-gajal, Badshah-bhog, Chinisankar, Gopal-bhog, Parmanna-bhog, Draupadi-sal, Manik-kalma, Lal-kalma, Gauranga-sal, Jhinga-sal, Krishna-sal, Bankchur, Bansmati, Bena-phuli, Khas-khamani, Kasi-phul, Chatni-nakhi, Randhuni-pagal, Donar-guri, Halud-guri, Khejurtherubi, Jira-sal, Lau-sal, Raban-sal, Darma-sal, Jhata-kalma, Kali-kalma, Nona, Harkali, Chhachi maul, Grihinipagal.

Birbhum

See Hunter: Birbhum, P. 345.

Aus gota, Aus Bhasa, Aus katki, Aus sakin, Aus Ramsal, Gadai sal, Maka neasi, Sali danga, Son peali, Dubraj, Mahipal, Kaya, Sal kaya, Bara katki, Chhota katki, Dudh sal, Sindur mukhi, Manik kalma, Baus gaja, Lau sal, Hathi-sal, Bara kalma, Jata kalma, Panch kalma, Biruti, Kanak-chur, Kalajira, Dudh Kalma, Bhut Kalma, Ajil kalma, Nona dhan, Aus gurguri, Jhinga sal, Parmanna sal, Pannai, Hencha sal, Khai magur, Kali dubraj, Bansmati, Bansphul, Aus kalma, Kali kalma, Kusum kalma, Dogra sal, Raghu sal, Dumur phul, Das-guti, Ganu tulis, Jhakru, Badshahi bhog, Bon goti, Darka sal, Lau kalma, Dubra, Khudi khasa, Jire sal, Naga, Gobinda bhog, Jagannath bhog, Gangajali, Samudra bali, Grihasta pagal, Charui mukhi, Gua thupi, Gat mani, Ram sal.

Midnapur

Six different descriptions of rice are grown in Midnapur District:

See Hunter: Midnapur pp. 79-80.

Aus.—Anatrakha, Pat kuri, Surgunchapa, Durga bhog, Asram sal, Berehati, Askadalai, Tetkua, Ketachali, Asamala, Jhinga-sal, Chali, Sultan-chapa, Asmuti, Asgangajal, Patsal.

Aman.—Kata-dhan, Kelakata-dhan, Bho-man kanu, Patna, Lausal kata, Hemta, Donarguri, Dhulia, Bangi, Draupadi sal, Ramsal, Bena phul, Nauari Ghas kandi, Rup sal, Nana, Jhinga sal, Kaia, Kalindi, Bakuti, Kasi phul, Kala kartik, Gaurikajal, Raban sal, Bidhishan sal, Chanddakhopa, Raj-kisor, Natkan, Rangi, Haina-khuri, Bhuri.

Another variety of Haimanti or *Aman* Rice Krishna bhog, Haldiguri, Sankar bhog, Ram chandra bhog, Dainaguri, Sankar chini, Kala jira, Magurbicha, Bangi, Dhulia, Kumradal, Geri komal, Katak tara, Kanak chur, Ganga tulsi, Ramsal, Jhinga sal, Sundar sal, Chamardal, Gaya bali, Parijat, Nuna, Khepa-jhinga, Bakni, Sona tar, Gandha malati, Randhuni pagal.

Nuan.—Kali kasi phul, Muktahar, Saljhati, Kasi phul, Kaluganti.

The other three varieties are :

BORA. KAKRI. JHANJI.

24-Parganas

See Hunter: P. 135.

Aman Rice:

- 1 Goromoni
- 2 Kala dyam
- 3 Mati-choul
- 4 Kumra jol
- 5 Bayar bant
- 6 Dudhi bonta
- 7 Hogla
- 8 Khajuri churi
- 9 Dhalsar
- 10 Patnai
- 11 Daria khuchi
- 12 Bayar neja
- 13 Akulya
- 14 Karim sal
- 15 Chait mallik
- 16 Sundar sal
- 17 Balidar
- 18 Kanak chur
- 19 Sarunati
- 20 Sital-pira
- 21 Peshwari

IMPORTANT VARIETIES OF RICE

- | | |
|-------------------|------------------|
| 22 Latamau | 84 Silhet |
| 23 Dad khani | 85 Saru dhali |
| 24 China khani | 86 Kamini |
| 25 Kanta rangl | 87 Marich sal |
| 26 Bans mati | 88 Gandha malati |
| 27 Randhuni-pagal | 89 Gandha bena |
| 28 Bena phul | 90 Rani sal |
| 29 Paramanna sali | 91 Tipu ram sal |
| 30 Raj bhog | 92 Meghi |
| 31 Sitahar | 93 Naulata |
| 32 Chandra har | 94 Talmaur |
| 33 Hera | 95 Gopal bhog |
| 34 Kalapani | 96 Bansur |
| 35 Kalangi | 97 Maipal |
| 36 Juria | 98 Pipra sal |
| 37 Banghota | 99 Kartik rangi |
| 38 Bhasa panti | |
| 39 Boldar | |
| 40 Sada boldar | |
| 41 Panta rasi | |
| 42 Aman lata | |
| 43 Pudl | |
| 44 Moro | |
| 45 Ghikala | |
| 46 Kala kul | |
| 47 Dhola | |
| 48 Lal kalsi | |
| 49 Mukta har | |
| 50 Birpada | |
| 51 Dar meggi | |
| 52 Uttar meggi | |
| 53 Louri | |
| 54 Peneti | |
| 55 Lokmaya | |
| 56 Beki bajal | |
| 57 Kamini saru | |
| 58 Ram sal | |
| 59 Kamini baja | |
| 60 Gandha tulsi | |
| 61 China kanai | |
| 62 Helencha | |
| 63 Poldar | |
| 64 Lata mug | |
| 65 Durga bhog | |
| 66 Kshirkon | |
| 67 Tal mugur | |
| 68 Hele garh | |
| 69 Menki | |
| 70 Champa | |
| 71 Garimari | |
| 72 Dhalsar | |
| 73 Hati kanl | |
| 74 Hanuman juta | |
| 75 Katak saru | |
| 76 Jhat lajar | |
| 77 Dudhe bonta | |
| 78 Kom | |
| 79 Nona | |
| 80 Papitaras | |
| 81 Nal Kalma | |
| 82 Saru nagra | |
| 83 Lakshmi-bilas | |

NADIA H: P. 33

In the District of Nadia the marshy lands are nearly all used for the cultivation of long-stemmed varieties of rice, and only a few as reed and cane producing grounds. The long-stemmed rice is of two sorts; one variety being planted, the other sown. The principal sorts of swamp paddy are Keli, which is planted; and Kanailal, Kalbayara, and Mukta har, which are sown broad cast on the land before the rain covers it.

MURSHIDABAD H: P. 102

Murshidabad

Aman Rice:

- 1 Ghi Kala
- 2 Gandheswari
- 3 Chitra sali
- 4 Gandha malati
- 5 Ganga-jal
- 6 Dudh rai
- 7 Laghu
- 8 Bena phuli
- 9 Balram bhaj
- 10 Radhuni-pagal
- 11 Sundar kalma
- 12 Parbat jira
- 13 Krishna kalma
- 14 Ora
- 15 Kanakchur
- 16 Kusum sali
- 17 Sona sali
- 18 Parmanna sali
- 19 Dahar nagra
- 20 Jhinga sali
- 21 Nona
- 22 Bans phul
- 23 Meghi
- 24 Bangota
- 25 Rangi
- 26 Kunchil
- 27 Ramsal
- 28 Jata gota
- 29 Rai mam
- 30 Dad khani
- 31 Necha kalma

See Trans. Agri. Horti. Soc. of India, Vol. III, Pp. 139-43.
Viswakosh, Vol. XVII, P. 351.

DYE-STUFF PLANTS

Darjeeling

See Hunter: DARJEELING P. 92

Rice forms the staple agricultural product of the plains or tarai portion of the District.

Two classes: *Aman* and *Aus*.

Aman: Bachi, Rashna, Pani sali, Kallar, Mal sura, Nunia (Table rice), Katar, Birna phul, Khewaur, Sona Kari, Sona jhal, Dal kacha, Pakhuri, Bhusur, Kartik sali an early variety of Aman rice, so called from its ripening in the month of Kartik (October-November).

Sakai Kallar, Harintor, Sulpoan, Borni, Sokan sinni, Bindisar, Bantia, Dant hilki, Hathi dant.

Nunia is subdivided into the following six minor varieties:

Daus nunia, Kala nunia, Tulapunji, Hepsi, Bans mati, Lakshmi bilas.

Malsura is subdivided into the three following varieties:

Phutki malsura, Tilwa malsura, Sakai malsura.

Bachi is subdivided as follows:

Sor Bachi, Dokar bachi, Sindur katna, Lelpa bachi, Manohar bachi, Gunjar bachi.

Borni: Dang borni, Jhalka borni, Burhi borni.

Aus: Sounai Champa, Sasar phul, Kanai basi, Jamira, Chopar, Bhadai, Malsara, Baldar, Chengai tukri, Nilaji, Petpaka.

The poorer classes of people mostly use bhadai rice as food, reserving the haimantik for sale.

In the hilly portion of the District, rice is not grown by any means to such an extent as in the tarai. The two broad divisions known are chhota dhan and bara dhan, the former corresponds with the Bhadai and the latter with the Haimantik.

The solid preparations made from rice are:

- 1 Khai
- 2 Murki
- 3 Muri
- 4 Chira
- 5 Chaul bhaja
- 6 Pistak: Pitha
 - A Puli
 - B Saru chakli
 - C Malpua

The liquid preparations made from rice are pachwai or rice beer, and rasi, a kind of spirit.

III(a)

The Commonly Known Dye-stuff Plants of the State*

I DYE-STUFFS GIVING RED DYES

- 1 *Cæsalpinia Sappan*: Lati (Maldah)
- 2 *Carthamus Tinctorius*: Kusum
- 3 *Mallotus Philippinicus*: Kamala: Kamalaguri (Burdwan)
- 4 *Morinda Tinctoria*: Auch, Aoosh, Dravaharidra, Suranji (The general trade name)
- 5 *Morinda Citrifolia*: Aich, Ach. (Hooghly, Midnapur)
- 6 *Morinda Angustifolia*: Ban Haldi, Haldi (Darjeeling)
- 7 *Morinda Persicaefolia*: Dala Huldi, Huldi Kung
- 8 *Morinda Sp.*: Rung-Gach (Chittagong)
- 9 *Nyctanthes Arbor-tristis*: Sephalika
- 10 *Oldenlandia Umbellata*: Surbali
- 11 *Rubia Cordifolia*: Manjistha
- 12 Lac-Dye (Lassen)
- 13 *Cassia Fistula*: Amultas (Calcutta International Exhibition 1883/4 Vol. II: P. 33; CIX)
- 14 *Erythrina Indica*: Palte Madar
- 15 *Hibiscus Rosa-sinensis*: Jaba
- 16 *Peristrophe Tinctoria*: Rang
- 17 *Pterocarpus Santalinus*: Rakta Chandan
- 18 *Gerimati*: Red Ochre or Red earth

II DYE-STUFFS GIVING YELLOW DYES

- 1 *Artocarpus Integrifolia*: Kanthal
- 2 *Bixa Orellana*: Bilatti Haldi
- 3 *Butea Frondosa*: Palas
- 4 *Cedrela Toona*: Toon
- 5 *Curcuma Longa*: Halud
- 6 *Curcuma Zedoaria*: Bun huldi
- 7 *Curcuma Zerumbet*: Shati
- 8 *Symplocos Racemosa*: Lodh or Lodhra (Kalidasa)
- 9 *Symplocos Theaefolia*: Bhauri (Also see: Singen or Soongen—Darjeeling)
- 10 *Symplocos Phyllocalyx*: Chandan
- 11 *Symplocos Spicata*: Gyong
- 12 *Berberis Nepalensis*: Chatri
- 13 *Crocus Sativus*: Saffron
- 14 *Lowsonia Alba*: Mehudi
- 15 *Michelia Champaca*: Champa
- 16 *Plecosperrum Spinusum*: Gumbeng-fong
- 17 *Binee Huldi*
- 18 *Gach Huldi*
- 19 Samlick
- 20 Yellow Ochre
- 21 *Peori* or *Peri-rung*: Harital

See also Dyes and Tans of Bengal by H. W. M'Cann, Calcutta, 1883, Appendix A, B and C, Pp. 171-205.

* The information and statistics, etc., in this section all relate to the end of the nineteenth century and not to the present day—A. M.

DYE-STUFF PLANTS

III DYE-STUFF GIVING BLUE DYES

- 1 Indigofera tinctoria: Nil
- 2 Reyonng:

BROWN OR BLACK, AND GREEN DYES

BROWN OR BLACK

- 1 Acacia arabica: Babul (Lassen's Indian commerce: P. 15 and F.N.I. (*ibid*))
- 2 Acacia Farnesiana: Goochia babur
- 3 Acacia catechu: Khair
- 4 Adhatoda Vasica: Asuro
- 5 Areca catechu: Supari
- 6 Madhuca Latifolia: Mahooa
- 7 Bauhinia Variiegata: Kuchnar
- 8 Ceriops Roxburghiana: Garan
- 9 Diospyros Embryopteris: Gab
- 10 Diospyros Melanoxylon: Keund
- 11 Erythrina Sp.: Madar
- 12 Eugenia Jambolana: Jamoon, Jam
- 13 Ficus Religiosa: Ashatha
- 14 Ficus Glomerata: Gooler
- 15 Mimusops Elengi: Bakul
- 16 Piper Chaba: Chaikath
- 17 Semecarpus Anacardium: Bhalia
- 18 Shorea robusta: Sal
- 19 Strychnos Nux-Vomica: Kuchla
- 20 Hirakosh: Protosulphate iron or Green vitriol. (Mineral)

GREEN DYES

- 1 Baccaurea Sapida: Lutco
- 2 Hedyotis capitellata: Bakrelara
- 3 Mangifera indica: Am
- 4 Tagetes patula: Genda

IV DYEING MATERIALS

The following is a list of the dyeing materials used by native dyers:

See: Report on the Dyes and Tans of Bengal
—Compiled by HUGH W. M'CANN.

- 1 BABLA: Acacia arabica
The pods yield a black dye. (*Ibid*: P. 127).

- 2 KHAYER: Acacia Catechu
- 3 BAN-RITHA: Acacia Concinna
- 4 SUPARI: Gua: Areca Catechu

The nut of this plant, the well-known betel-nut palm, yields an inferior kind of catechu. It is reported from Rajshahi to be used for a coffee-brown dye, but no particulars are given.

The betel-nut is a principal ingredient in pan, which is used in dyeing red with toon (*Cedrela Toona*) in Lohardaga (p. 75): the spittle resulting from chewing pan is used as a subsidiary in dyeing with *daruharidra* (*Morinda tinctoria*) in Dinajpur (p. 35).

- 5 LATKAN: Bixa Orellana
It imparts an orange colour to silk and cotton.
See op. cit. P. 70.

- 6 PALASH: Butea frondosa

The dried flowers, called teen are used as a yellow dye. The bark is used for colouring blue.

See: Op. cit. p. 73.

- 7 BAKAM: Caesalpinia sappan

Used in dyeing a red colour.

- 8 KUSUM: Carthamus tinctorius: Safflower

The flowers yield a beautiful dye of various shades of colour, between red and yellow. The dye is obtained from the petals which contain two pigment principles, viz., Safflower-yellow, obtained by pounding and macerating the flowers with soda, and safflower-red, which is the dye of commerce.

- 9 TUN: Cedrela Toona

The flowers yield a beautiful red or yellowish dye. A red dye is occasionally extracted from the seed.

Growth and cultivation—Information regarding this tree, and that very meagre, has only been received from the Patna, Bhagalpur, and Chutia Nagpur Divisions, although it seems to be found sparingly in most parts of Bengal. It is cultivated to a certain extent, and is also found as a jungle product. Its value arises mainly from its wood, "which is made into furniture of all kinds, and is much admired for its close grain and beautiful colour, resembling mahogany, to which it is deemed equivalent." The fruit and bark are also of use for medicinal purposes, the bark being powerfully astringent. A yellow dye is extracted from the white fragrant flowers, which appear in March and April (Lohardaga), but is apparently very little used, and the tree does not seem to be anywhere cultivated for the sake of the dye. A red(?) dye is also extracted from the seed (Palamau).

The flowers and seeds are scarcely a marketable commodity, but the following prices are given:—

	per maund.
Saran and Darbhanga	
(flowers)	3 6 0
Monghyr (flowers)	10 0 0
Palamau (Lohardaga)	
(Seed ?)	8 10 0

Prices and trade—It is stated that in Palamau 120 maunds were produced during the five years preceding 1875. This must mean 120 maunds of flowers, as it is subsequently stated that 50 or 60 maunds of seed are exported annually, "chiefly to Behar markets—Gaya, Daudnagar, Patna, and Sasseram." But there is great confusion in this statement, and it is impossible to tell in each instance whether seeds or flowers, or both, are meant.

Extraction of dye—The dye is extracted generally from the flowers or from the calyx

DYE-STUFF PLANTS

alone (Chutiá Nagpur subdivision of Lohardaga), or from the seed (Palamau); but it seems to be very sparingly used, generally by the poorer classes of people, and not by professional dyers. The flowers, or the calyces alone, are simply boiled in water to extract the dye. The proportions are given from Chutia Nagpur (Lohardaga) and from Patna, but differ widely. From the former we are told that 1 seer of flowers is put in 15 seers of water and the whole boiled till 5 seers only remain; from the latter, that "to the flowers twice as much water (in weight or volume?) is added and the whole boiled till half the liquid remains: the solution is then strained." When the seeds are employed they are simply pounded and boiled in water (Palamau).

The cloth to be dyed is merely steeped in the solution so obtained, and no auxiliary of any kind is employed. The resulting colour is a very fleeting yellow.

Mr. Buck states in his report that the dye extracted from the seed is red; but no reference to this is contained in any of the returns received.

Toon with other dyes—In Saran and Darbhanga the toon dye is rarely employed separately, but is mixed with turmeric to produce a deep yellow dye called *basanti*. The *basanti* of Cawnpur is made in the same way with the addition of lime and acidulated water (vide Mr. Buck's Report, P. 20). It is probable that these two latter ingredients are also used in Saran and Darbhanga, but have been omitted from the statement by inadvertence.

In Chutia Nagpur (Lohardaga), cloth previously dyed yellow with toon flowers as above is dyed red by steeping it in a solution obtained by adding water to a paste made by grinding together *pan leaves*, *Kuth*, *supari*, and *chuna*, as if for eating (M'Cann, P. 132).

10 GARAN: *Ceriops Roxburghiana*

This plant grows abundantly in the Sundarbans, whence its bark, in extensive use as a tan (P. 158), finds its way in considerable quantity into other parts of Bengal. It is also mentioned as growing in the jungles in Midnapur, and as "growing in the jungles of the sea-shore" in Balasor. The prices given for the bark are—

Midnapur . . . Rs. 5 per seer.
Balasor . . . Anna 1 per seer.

Dr. Schlich writes—"An almost unlimited amount of garan bark is available in the Sundarbans. The bark of mature garan trees, which yields a greater proportionate amount of colouring matter than that of younger trees, sells in the Jessore district for Re. 1 per maund, that of the smaller trees running at various places from As. 12 down

to As. 4 per maund. The cost of the labour of cutting off the bark chiefly accounts for the price charged." It is needless to draw attention to the tremendous discrepancies in these prices.

The Collector of Balasor writes:—

"Grahani has a large local consumption, and is very cheap. Boatmen go to jungles and gather as much as they require: they sell it at about one seer for one anna."

The bark of garan is but little used in dyeing. It is used in Midnapur along with the barks of arjun (*Terminalia Arjuna*) and babla (*Acacia arabica*) in obtaining a black dye (p. 128). From Balasor it is reported that "the solution obtained by boiling down the bark of *garhani* with a small quantity of teel-seed oil, besides being used as a tan, is employed to stain ropes a rusty dark-brown colour, and to stain cloths worn by boatmen. It is only used with native cloths, and preserves them from the effects of water. It is said to greatly strengthen ropes which have been soaked in it." (M'Cann.)

11 KIRMDANA: *Coccus cacti*: Cochineal

Cochineal is the dried body of the female of the insect *coccus cacti*. It is a valuable red dye.

12 LAC: *Coccus Lacca*

Years	Export of Lac	
	Quantity	Value
		£
1876-77	188,712	536,976
1877-78	104,645	362,048
1878-79	91,433	298,715
1880-81	88,392	578,320

13 HALUD: *Curcuma longa*: Turmeric

This valuable plant is cultivated everywhere in Bengal, but mostly for use as a condiment, although it is extensively employed in dyeing. It is generally grown in gardens or homesteads for home consumption. As it is usually grown with other crops, it is difficult to estimate the precise area under cultivation of turmeric. The following estimates have, however, been received:

Midnapur	16,000 acres
Hooghly	1,000 bighas
24-Parganas	500 bighas
Rajshahi	8,000 to 10,000 bighas
Monghyr	10,000 acres

Growth and cultivation—In Burdwan the cultivation of turmeric is said to be "extremely limited;" in the Rajshahi Division it is said to be grown in all the districts; in the Chittagong Division it is "cultivated everywhere;" in the Patna Division it is cultivated "to a very limited extent;" in Bhagalpur it is grown "everywhere in small quantities in the neighbourhood of the villages;" in Monghyr it is grown "in large quantities in the western parts of the Begu Sarai subdivision;" in

DYE-STUFF PLANTS

Orissa it is grown "everywhere in abundance;" and in Chutia Nagpur (Lohardaga) "the area cultivated is small, as the cultivation is confined to Koeries and others who follow a similar method of cultivation."

The account given in Roxburgh's "Flora Indica" of the cultivation of turmeric may here be reproduced:—"The ground must be rich, friable, and so high as not to be overflowed during the rainy season, such as the Bengalees about Calcutta call *danga*. It is often planted on land where sugarcane grew the preceding year, and is deemed a meliorating crop. The soil must be well ploughed and cleared of weeds, &c. It is then raised in April and May, according as the rains begin to fall, into ridges nine or ten inches high and eighteen or twenty broad, with intervening trenches nine or ten inches broad. The cuttings or sets, viz., small portions of the fresh root, are planted on the tops of the ridges at about eighteen inches or two feet

as under. Nine hundred such sets is about maximum for one acre and yields in December and January about two thousand pounds weight of the fresh root."

Season of planting and digging up—Judging from Mr. Buck's Report and Mr. Liotard's Memorandum, Roxburgh's description would seem to apply pretty accurately to the cultivation of turmeric in all parts of India. It is referred to by the Collector of Monghyr as giving an accurate account of the method of cultivation adopted in his district but districts differ considerably as to the seasons of sowing and of digging up the rhizomes. According to this account the cuttings or sets, small portions of the fresh root-stock from which the plant is reared, are planted in April or May, when the rains begin to fall, and the yield is dug up in December or January following. But the following are the seasons of planting and of digging up the rhizomes in the districts named:—

District	Planting season	Digging-up season
Midnapur	April-May	February-March
Hooghly	February-March	October-November
24-Parganas	May	February
Rajshahi	March-April	March-April
Chittagong	April-May	
Saran and Darbhanga	June	March
Bhagalpur	August	December or earlier
Monghyr	April-May	December-January
Lohardaga (Chutia Nagpur)	June-July	

So that, if these accounts be correct, the season of planting varies from February to July, and of digging-up from October to April.

To supplement Roxburgh's account of the cultivation, the following extracts from the district reports may be given. In 24-Parganas turmeric is planted "in shady places on high lands well ploughed and manured." In Midnapur "the ground is several times dug up with a *kodali* (native spade) and properly watered before inserting the cuttings, and this process of turning up the soil and watering is afterwards repeated whenever the ground becomes hard and dry." In Chutia Nagpur (Lohardaga) "the soil is well dug to a depth of one foot, and well manured with old manure and ashes before the cuttings are inserted." In Saran and Darbhanga "the soil is weeded twice after the planting, but no irrigation is necessary." After being dug up the rhizomes are boiled in water and dried in the sun to form the turmeric ordinarily sold in the Indian bazar. From Hooghly we are informed that the "raw rhizomes are boiled with cowdung, peeled, washed, and dried before they are fit for use. This reduces them to half their weight."

14 GAB: *Diospyras embryopteris*

Growth—The only information regarding the growth of this plant is from Hooghly and Manbhum. In Hooghly "the tree grows wild,

and is also planted by fishermen on the borders of their homesteads": in Manbhum

"Gab is a jungle plant, not very plentiful, but can be found if required.

It ripens in October and November."

The selling price of the gab fruit is given as from Re. 1 to Rs. 2 per maund in Manbhum.

'Gabing' boats and nets—The Collector of Hooghly remarks:—"The gab fruit, when fresh, yields a gum with which boats and nets are coloured. This gum imparts a brown colour, dark inclining to red, to the object to which it is applied, and also protects the timber or fibre from the action of water. It is more prized for this latter quality than as a colouring matter." From Rajshahi it is also reported that "an infusion of the unripe gab fruits is used for steeping fishing nets, and the astringent viscous mucus of the fruit is used everywhere for painting the bottoms of boats."

Use in dyeing—Gab fruit is but sparingly used for the brown dye which it yields. The fruit is simply pounded and boiled, and the cloth steeped in the liquid, no auxiliary being employed. The following more detailed account has been received from Hooghly:

In order to produce the best dye, the gab fruit must neither be very raw nor very ripe. It is broken into small pieces and steeped for about two

DYE-STUFF PLANTS

hours in about twice as much water by weight. The gab is then removed; and again steeped for two days in the same quantity of water. The fruit is then removed and thrown away, and the two extracts thus obtained are mixed together. About $\frac{1}{4}$ of this mixture is then taken and heated to nearly boiling point, and then poured into the remainder of the extract, so as to heat the whole moderately. The cloth to be dyed is steeped in this for a few minutes, then removed and dried in the air. This process of steeping and drying is repeated three times, and the cloth has then acquired a permanent brown colour. About 400 gab fruits are required to dye 60 yards of cloth a yard wide.

In Dacca gab is used in dyeing black in conjunction with haritaki (*Terminalia Chebula*) and Hirakosh (Protosulphate of Iron). The ingredients may either be mixed together and boiled in water and the cloth steeped in this compound solution, or the cloth may be first impregnated with a decoction of haritaki and afterwards steeped in a solution prepared from gab and hirakosh. Instead of the gab fruit, the juice alone, extracted by pounding the fruit, may be employed. These two processes are described as follows:

The gabs are dried for some days before they are used. They are then cut into pieces and pounded. The juice so obtained is mixed with haritaki and hirakosh and boiled in water. In this liquid the cloth to be dyed is steeped and acquires a dense black colour. To dye a piece of cloth one yard square $2\frac{1}{2}$ chittacks of gab juice, $1\frac{1}{2}$ chittacks haritaki, 5 annas weight hirakosh, and $2\frac{1}{2}$ powas of water, are required.

One half powa of pounded dry haritaki is mixed with $\frac{1}{4}$ seer by measure of water and boiled down till $1\frac{1}{2}$ powas remain: it is then filtered, and the fabric to be dyed is steeped in the liquid and then dried. A decoction of gab is prepared by mixing $\frac{1}{4}$ powa of dry well pounded gab with $\frac{1}{4}$ seer by measure of water and boiling down till $1\frac{1}{2}$ powas remain. A little green vitriol (protosulphate of iron) is dissolved in the filtered liquid, and the fabric prepared as above is well soaked in this. On drying, it has acquired a dense black colour. To dye a piece of cloth 60 yards by

one yard, 5 or 6 seers of haritaki, 9 or 10 seers of dry gab, and $\frac{1}{4}$ seer of green vitriol, are required. (Dacca.)

- 15 *Amlaki*—*Emblica Officinalis*
16 *Nil*—*Indigofera tinctoria*

List of Indigo Factories in Lower Bengal
DYES AND TANS OF BENGAL—Compiled by HUGH W. M'CANN, P. 111 (1883).

	Mds. produced in a year
JESSORE, 13—	
Hazrapore	609
Joradah	545
Muddenderry	85
Nohatta	394
Chowlia	209
Sindooree	492
Bizoollee	154
Goldar	166
Caragoda	100
Shapore	22
Babocolly	81
Beneepore (N)	27
Nyssindpore (N)	41
KRISHNAGHUR, 3—	
Katcheekatta	105
Junglimahal	352
Sildah	248
BURDWAN, 3—	
Bancoora	167
Cossipore (N)	100
Kissenpore (N)	57
MALDAH, 1—	
Muttrapore	352
MURSHIDABAD, 12—	
Akrigunge	494
Boromasia	57
Cantacobra	278
Furridpore	164
Cuddamsaur	25
Doudpore (N)	58
Bogwanpore (N)	57
Aurungabad (N)	110
Sabdulpore (N)	191
Patkabarry	877
Rampoora	17
Turtipore	248
RAJSHHYE AND PUBNA, 6—	
Rajahpore	434
Nanjeepara	32
Syllidah (N)	141
Luckee Coondee (N)	23
Damooodeea (N)	40
Mozumpore	99
Bur Furridpore	6
BHAGULPORE, 17—	
Burragre (N)	304
Colgong	418
Kunjunpore	130
Lutteeppore	293

DYE-STUFF PLANTS

	Mds. produced in a year
Katlee	182
Moisgunge	352
Neechindipore	287
Ramnagaur	143
Shikarpore	473
Sonadah. (N)	55
Narainpore (N)	46
Notipatta (N)	96
Dogatchee (N)	32
Doleemallow (N)	102
Simultolla (N)	51
Sreeharrygunge (N)	177
Buggolah (N)	67
MIDNAPUR, 14—	
Bogree	371
Bahadurpore	137
Sugrampore	251
Fyzallygunge (N)	210
Kurbeenah	13
Putterghat	47
Gogah	66
Selimpore	65
Bowsee	94
Rajpore	40
Singhessur	71
Sultangung (N)	50
Agurpore	34
Gobarurrah	6
PURNEAH, 20—	
Bowgong	80
Gondwarrah	1,220
Kolassee	364
Munshye	418
Mynanugger	312
Inampore	42
Juggernathpore	147
Delowree (N)	40
Sahrah, &c.	242
Gocoolnugger	57
Kajah	147
Kagaha	103
Sursee	74
Patilwa	16
Neelgunge	85
Peergunge	48
Forbesabad	68
Symree	19
Latowna	19
Mathore	54

Export of Indigo

Years	Quantity cwt	Value £
1876-77	100,384	2,962,785
1877-78	120,605	3,494,334
1878-79	105,051	2,960,462
1879-80	100,923	2,947,226
1880-81	116,870	3,571,581

- 17 Sida—Lagerstroemia pariflora
18 Mehdi—Lowsonia alba

19 Kamala-guri—Mallotus Philippinensis

Growth—This tree is nowhere cultivated for the sake of the powder which its capsules yield, but is found wild in the Burdwan, Orissa, Chutia Nagpur, and Rajshahi Divisions, and probably in most parts of Bengal. In Orissa it is found, though apparently not in any great quantity, in the jungles on the hills from Morbhanj to Khurdah. In the Rajshahi Division it is said to be common on the Lower Himalayas and adjoining plains. Mr. Gamble in his "Trees, &c., of Darjeeling" states that it is found on the hills to a height of 4,000 feet.

The wood of the tree seems to be used as fuel. The red powder, which constitutes the dye-stuff, is found immediately inside the capsules of the ripe fruit. The plant blossoms at the end of autumn, and the fruit grows in bunches, each fruit being about the size of a large pea, but three-cornered. The fruit is ripe in January and February, and must be gathered before the heat of the sun cracks the outer covering so as to let the powder fall out or be washed off by rain. The fruit is dried in the sun, and the powder is then beaten out and collected. The roots are said to be also sometimes used to give a red dye (Dr. Schlich). The following extract from a report received from Birbhum would seem to show that at one time this plant was to some extent cultivated for its powder:—
"Formerly kamalaguri trees grew in abundance in Bhandirbon and the adjacent villages, where the weavers were in the habit of paying a certain rent for them, but now they are not taken care of, as the weavers have given up dyeing tussar and silk."

As the plant is nowhere cultivated, the only expense in connection with obtaining the dye-stuff is the labour of collecting it. From Puri we are told that the cost of this is Rs. 3 per maund.

Prices and trade—The selling price of the powder varies apparently very much in different districts. The figures received are:

Bankura	Rs. 7 to a 10 per maund
Midnapur	" 40 " "
Lohardaga	" 20 " "
Manbhum	" 8 " "
Cuttack	Re. 1 for 1 Cuttack ser of 105 tolas (=1-5/16 seers)
Puri	Rs. 10 per maund

The differences of price in neighbouring districts, such as Bankura and Midnapur, Lohardaga and Manbhum, Cuttack and Puri, are so striking as to throw discredit upon the figures.

There seems to be a slight export of kamalagundi powder from Orissa into the Madras Presidency. About 200 maunds annually are said to be exported from Banpur, in the Puri district, to Ganjam.

DYE-STUFF PLANTS

There is no information regarding the quantity of kamalaguri actually collected for dyeing purposes in any district except Bankura, where 25 maunds is given as the average annual produce of the district.

Process of dyeing with kamalaguri—The kamalaguri powder is used for dyeing silks, and occasionally cottons, a brilliant yellow, although its own colour is red. The powder is only very sparingly soluble in either hot or cold water, but is completely dissolved in alkaline liquids, forming a dark red solution. The resinous yellow colouring matter may be separated from this red solution either by neutralising with an acid or else by mere exposure to the air.

In Bengal the red powder is dissolved by the addition of a solution of various alkaline ashes, obtained by burning plants, and the development of the yellow colouring principle is in no case brought about by the addition of acids, but merely by allowing the cloth steeped in the red liquid to dry by exposure to the air. It is said not to require a mordant, but frequently alum is added for that purpose. The colour is sometimes heightened by the addition of *turmeric*.

Details of the processes adopted in various districts are as follows:

Dissolve the ashes of kantanate (*Amaranthus spinosus*) in water: filter and boil the liquid. Add to the liquid, as the boiling goes on, kamalagundi powder, and afterwards alum. When the boiling has continued for some time, dip the cloth in the hot liquid and allow it to remain till it has absorbed the colour: then wash and dry. The proportions of the ingredients are, for 1 seer in weight of the silk or cotton cloth:

5 seers Kantanate ash,
 $\frac{1}{2}$ seer kamalagundi,
 2 chittacks alum,

and just enough water to cover the cloth. (Cutlack, Nos. 11552 and 11954, both cotton.)

The silk or cotton to be dyed is first boiled for about 10 minutes in an alkaline solution: this part of the process is called "kharai," from "khar," which means "alkali." Fresh water is then boiled, and a little alum is thrown in during the boiling. When the alum is completely dissolved, kamalaguri powder is mixed with the water. Into this dye-mixture the silk or cotton, prepared as above, is dipped three or four times (Midnapur).

The kamalagundi powder is boiled in water, and to this are added taj (bark of *Cinnamomum Tamala*),

jatamansi (root of *Nardostachys Jatamansi*), and Kuchoor (root of *Curcuma Zerumbet*) (Lohardaga).

In the following, turmeric is added in addition to the alkali, with or without alum:

Mix 1 seer of the ash of plantain leaves or the leaves of nishinda (*Vitex Negundo*) with 12 seers of water: filter through a cloth. To the solution add 1 seer kamalaguri and boil. When the solution has boiled over twice or thrice, add $\frac{1}{2}$ chittack powdered *turmeric* and 1 chittack *alum*, and boil again thoroughly. To test whether the boiling has advanced far enough, put a drop of the solution on the finger nail: if the nail is stained, the dye is ready. The silk cloth is then dipped in this, and the whole set aside for a day. The cloth is then washed with pure water and dried. (Birbhun.)

Potash or sajimati is dissolved in water: solution filtered, and the kamalaguri added along with a little *turmeric*. (Bankura.)

The kamalagundi is mixed with *turmeric* and treated with *potash* and *alum*. (Puri.)

There are two specimens of yarn in the Economic Museum dyed a very beautiful orange with latkan (*Bixa Orellana*) and kamalaguri, but the method is not stated.

The various species of *Morinda*, the roots of which yield a red dye, are not very readily distinguishable from one another, and indeed they are sometimes all grouped together under the one specific name *Morinda citrifolia*, Linn. In the enquiry of which this report is the result, growing plants were in many cases forwarded from the various districts, and these were carefully identified and named by Dr. King, of the Royal Botanical Gardens, Seebpore. In other cases, however, the name given by the local authority forwarding the specimens of the dye has apparently been accepted without further enquiry. It is impossible at this date to ascertain in what cases the labels on the Museum specimens may be relied on as giving the correct scientific name of the corresponding plant, and in what cases the scientific name has no other authority than that of the local officer who despatched the specimen. Under these circumstances it is probable that the information below may frequently be entered under the wrong specific name, but it is impossible now to ensure any greater accuracy.

20 АСН: *Morinda Citrifolia* (Red dye)

In the three districts Puri, Hooghly, and Midnapur, the plant called achhu, aich, or ach would seem to be not the *Morinda tinctoria*, as elsewhere, but apparently the

DYE-STUFF PLANTS

Morinda tinctoria. Apart from this difference all that is said above relating to the cultivation of aich and the methods of extracting the dye from the roots or root-bark applies equally to this species of *Morinda*. It is found growing wild in the jungles of the Puri district, and is also cultivated to a slight extent in various subdivisions of that district, but no estimate is attempted of the area under cultivation. In Hooghly the plant is grown to some extent in the neighbourhood of Baidyabati, the estimated area under cultivation being 100 bighas; but the collector states that the cultivation of the plant is gradually decreasing, owing, it is said, to the cost of cultivation. In Midnapur the area under cultivation is estimated at 10,000 acres.

From Puri we are told that this species of *Morinda* grows best in ordinary soil, with perhaps a slight admixture of sand. The soil commonly called *baliza mati* by the natives is said to be the most favourable. It is, like the *Morinda tinctoria*, cultivated by slips or cuttings, which are planted out in ridges at the beginning of the rainy season, about June or July (Puri), or at the beginning of the cold season, October or November (Midnapur). The ground is previously prepared by ploughing and digging, and the plants are inserted on the ridges about two or three cubits apart. In Puri from 300 to 400 plants occur in a man of land, and the plant is grown frequently in very large fields of two or three mans in extent. The plants are watered regularly until the new leaves shoot, but afterwards they require very little care or attention: they grow to the height of three or four cubits in two year's time. From Puri we are told that the roots are partly dug up in the second year, but only come to perfection in the third or fourth year; from Midnapur, that they mature generally in two years, when their roots are dug out; and from Hooghly, that they take three or four years in maturing.

No information of the cost and profits of cultivation is given from Puri or Midnapur, but the Collector of Hooghly gives the following figures:

Cost of making the ridges, weeding, tending the plants for three or four years	Rs. 50 per bigha
Yield of root	20 to 25 maunds per bigha
Selling price	Rs. 8 to Rs. 9 per maund
Profit at end of four years	Rs. 150 per bigha, or Rs. 38 to Rs. 50 per annum

He also states that there is a very small quantity of fine root produced, which sells at from Rs. 25 to Rs. 30 per maund. The Collector of Midnapur states that the average price of the root in his district is Rs. 20 per maund. The price of aich in two neighbour-

ing districts like Midnapur and Hooghly can scarcely differ so widely as this. If these figures can be relied on, comparing them with those for *Morinda tinctoria*, it would seem that whilst the cost of cultivating this species of *Morinda* is to some extent less than in the case of *Morinda tinctoria*, the profit is considerably higher; Also that whilst the root in general sells at pretty much the same rate, the finer varieties fetch a much higher price than in the case of *Morinda tinctoria*. The yield per bigha is pretty much the same in the two cases.

The aich produced in Puri is all consumed locally, but a larger quantity of that produced in the Hooghly and Midnapur districts finds its way to Calcutta. In the former district all that is locally consumed is by the dyers of Chandernagore.

As in the case of *Morinda tinctoria*, the dull red colouring matter of this species resides chiefly in the root-bark, the roots themselves being yellow and giving a yellow dye.

Preparation of dye.—The roots are cut into small pieces and boiled or steeped in water; a little alkali is mixed with the liquid so obtained before its being used as a dye for cotton yarns and cloths. In Midnapur there is a special class of the people, called *jugi*, exclusively engaged in the production of aich dye.

In the Midnapur district a red dye for home use is produced by boiling the juice of small green jack fruit with aich root and lime. With this red dye cloth and the jute used in tying bomb are dyed.

In the same district aich is used in preparing a purple dye—as follows: Equal quantities of indigo, *sajimati*, lime, and pieces of aich root are steeped in water in a covered pot for four days. The mixture ferments and froth collects at the top. This froth is removed, and yarn and cloth previously dyed red are steeped in this liquid two or three times, acquiring a purple colour (p. 125).

- 21 Siuli—*Nyctanthes arbor-tristis*
- 22 Ratanjut—*Onosma echioides*
- 23 Dalim—*Punica Granatum*
- 24 Manipal—*Randia dumetorum*
- 25 Manjistha—*Rubia cordifolia*
- 26 Lodh—*Symplocos sumuntia*

The bark and the leaves yield a yellow dye which is used along with madder.

This tree is nowhere cultivated, but is found here and there wild in the jungles. It is specially mentioned as growing wild on the Garjats and other hill ranges in Orissa. The only other districts in which it is mentioned as a jungle product are the Santal Parganas and Midnapur. Balfour says "it is a native of Burdwan and Midnapur in Bengal." The bark is said to be used in Cuttack for medicinal purposes as an astringent.

DYE-STUFF PLANTS

Both bark and leaves are used in dyeing. The prices of the bark given are:

As.	
Midnapur	4 per seer.
Balasor	5 "

In Cuttack "it is sold roughly by the basket." There is a slight trade in lodh bark; it is said to be exported largely from Manbhūm to Raniganj and Asansol, and to Calcutta from the Santal Parganas. Into the Bhagalpur district it is imported from the North-West.

The lodh bark by itself yields a yellow dye, which is extracted by steeping it in hot water. But this seems to be rarely, if ever, employed. The only district in which mention is made of lodh being used as a dye by itself is Balasore, in which "the bark is boiled in water for eight hours and cotton cloth is steeped in this infusion for half an hour." From Chutia Nagpur (Lohardaga) we are told that a red dye is prepared by boiling lodh bark with *sajimati*, this dye being used in printing red on a white ground.

Lodh bark with other dyes.—Lodh bark is used chiefly as an auxiliary with other dyes, as it appears to act as a mordant. The dyes as an auxiliary to which it is chiefly employed are al or aich (*Morinda tinctoria*), lac, bakam (*Caesalpinia sappan*), and paras (*Butea frondosa*). It is employed as an auxiliary with aich or achchū in Lohardaga, Monghyr, and Balasor; with lac in Maldah; with bakam in Balasor; and with paras in Patna. From Cuttack it is stated to be used for obtaining a red dye with lac, alum, and turmeric, but no details are given. It is also employed by the Meches of the Darjeeling Terai along with turmeric and *gumbengfong* in dyeing silk yellow (p. 90). Lodh bark is also used in the preparation of abir powder, as described in detail on p. 4.

The leaves of the lodh tree are also employed along with *Morinda tinctoria* in the Chutia Nagpur subdivision of Lohardaga.

Roxburgh gives the following details of a process of dyeing red with al and munjeet adopted by the dyers of Calcutta:

For three yards of cloth take lodh bark, burra hur (*Myrabolana Chebula*, Mat. Med. *Terminalia Chebula*, Roxb.), of each 1 chittack, or 2 ounces, pound and rub them with water on a stone; mix them up with water and steep the cloth in it; then dry it. Take 1 chittack of alum, dissolve it in water and boil it; put the cloth into this solution,

and let it boil for an hour; then wash and dry it. Then take al, viz., *Morinda tinctoria*, Roxb., one chittack, dhawra flowers, *Grislea tomentosa*, Rox., one chittack, munjeet, *Rubia Munjeet*, Roxb., half a seer, nearly a pound, separately, mix them with lukewarm water, and let it boil. Then put in the cloth and let it remain boiling for forty minutes.

27 *Segun*—*Tectona grandis* (The Teak Tree)
The leaves give a red dye; they are very large, and are used as plates, for packing and for thatching.

28 *Bahera*—*Terminalia belerica*
The astringent fruit is one of the myrabolams of commerce, used in dyeing cloth and tanning leather.

29 *Haritaki*—*Terminalia chebula*
Mixed with alum they give a yellow dye, and ferruginous clay a permanent black colour.

EXPORT

Years	Quantity cwt.	Value £
1876-77	361,217	135,822
1877-78	537,055	230,526
1878-79	541,346	234,574
1879-80	354,977	158,081
1880-81	315,628	123,608

30 *Asan*—*Terminalia tomentosa*
The bark is used in tanning, and also in producing black dye.

31 *Raktapitta*—*Ventilago maderaspatana*
The root yields a red dye. The bark is made into cordage.

32 *Dhak*—*Woodfordia floribunda*
The tree is valuable for its flowers which yield a red dye, used in colouring cotton, silk, and leather.

33 *Indrajau*—*Wrightia tinctoria*
The leaves yield an inferior sort of indigo blue and are used in dyeing.

34 *Bakam*—*Caesalpinia sappan*

35 *Al or Aich*—*Morinda tinctoria*

36 *Huldi Kung*—*Morinda persicaefolia*

37 *Rung-gach* (Chittagong)—*Morinda* Sp.

38 *Sephalika*—*Nyctanthes arbor-tristis*

39 *Palte Madar*—*Erythrina indica*

40 *Jaba*—*Hibiscus rosa-sinensis*

41 *Rang*—*Persistrophe tinctoria*

42 *Rakta chandan*—*Pterocarpus santalinus*

43 *Kanthal*—*Artocarpus integrifolia*

No. 35, see M'Cann, p. 20.
No. 36, see M'Cann, p. 39.
No. 37, see M'Cann, p. 39.
No. 38, see M'Cann, p. 41.
No. 40, see *ibid.*, p. 66.
No. 41, see *ibid.*, p. 66 (also Dr. King).
No. 42, see *ibid.*, p. 67 (imported from Madras—*cf.* Cheli).
No. 43, see *ibid.*, p. 69.

DYEING IN MALDA

- | | |
|--|--|
| 44 <i>Shati</i> —Curcuma Zerumbet | 62 <i>Kuchuar</i> —Bauhinia Variegatâ |
| 45 <i>Bhanri</i> —Symplocos theifolia | 63 <i>Kend</i> —Diospyros melanoxylon |
| 46 <i>Singen or Soongen</i> (Darjeeling—
Symplocos racemosa | 64 <i>Madar</i> — |
| 47 <i>Chandan</i> —Symplocos phyllocalyx | 65 <i>Jamoon, Jam</i> —Eugenia Jambolana |
| 48 <i>Gyong</i> —Symplocos Spicata | 66 <i>Ashatha</i> —Ficus Religiosa |
| 49 <i>Chatri</i> —Berberis nepalensis | 67 <i>Goolur</i> —Ficus Glomerata |
| 50 <i>Saffron</i> —Crocus Sativas | 68 <i>Bakul</i> —Mimusops Elengi |
| 51 <i>Mehndi: Henna</i> —Lawsonia alba | 69 <i>Chaikath</i> —Piper chaba |
| 52 <i>Gumbengfong</i> —Plecosperrum spinositum | 70 <i>Bhalia or Bhelwa</i> —Semecarpus Anis-
cardium |
| 53 <i>Gach Huldi</i> (Chittagong)— | 71 <i>Sal</i> —Shorea Robusta |
| 55 <i>Camlick</i> — | 72 <i>Kuchla</i> —Strychnos Nux-Vomica |
| 56 <i>Ramraj</i> —Yellow ochre | 73 <i>Hirakosh</i> —Protosulphate of Iron, or
Green vitriol |
| 57 <i>Harital</i> —Peori or peri rung | 74 <i>Baccaurea Sapida</i> — |
| 58 <i>Gochia Babul</i> —Acacia Farnesiana | 75 <i>Hedyotis capitellata</i> — |
| 59 <i>Khair</i> —Acacia Catechu | 76 <i>Mango</i> —Mangifera indica |
| 60 <i>Asuro</i> —Adhatoda Vasica | 77 <i>Genda</i> —Tagetes Patula |
| 61 <i>Mahooa</i> —Madhvea Latifolia | |

III(b)

Extract from Francis Buchanan-Hamilton on Dyeing in Malda in the Beginning of the Nineteenth Century

By far the greatest part of the cloth, that is used dyed in this district, receives the colour in the state of thread, and the operation is most commonly performed by the weavers, but there are a few houses of professed dyers, chiefly in Maldeh, who dye thread and a few others in different parts, especially Dinajpoor, who dye turbans and girdles.

The dyers of Maldeh are about 25 houses, and confine their operations to indigo and lac. The ser weight, by which all the operations are conducted, contains 92 s.w. or is nearly 2 $\frac{86}{100}$ lbs. avoirdupois (16,522 grains).

The indigo vat is made thus:—Take 5 sers of indigo, break it into small bits, put it into an earthen tub or vat with five pots (about 60 sers) of alkaline ley, and stir them about for three hours. Then put this mixture into two pots, and add to each $\frac{1}{2}$ ser of Chakunda seed (Cassia Tora W.) boiled in 2 $\frac{1}{2}$ sers of water, and boil the mixture all night, that is to say a fire is kindled under the pots, and burns under them until the fuel is consumed, the people having gone to sleep at their usual time. In the morning, the fire having gone out, stir the decoction with a stick for 1 $\frac{1}{2}$ hours. This boiling and stirring must be performed four nights and

- No. 44 see *ibid.*, p. 87.
 No. 45 see *ibid.*, p. 88 (also see Dr. King, Dr. Gamble).
 No. 46 see Dyes and Tans of Bengal by Hugh W. McCann, pp. 89 and 124.
 No. 47 see *ibid.*, p. 89 (Dr. Schlich, *vide* Hooker's Himalayan Journal, vol. II, p. 41).
 No. 48 see *ibid.*, p. 89
 No. 49 see *ibid.*, p. 90.
 No. 50 see *ibid.*, p. 90.
 No. 52 see *ibid.*, p. 90.
 No. 55 see *ibid.*, p. 91.
 No. 56 see *ibid.*, p. 91.
 No. 57 see *ibid.*, p. 92.
 No. 58 see *ibid.*, pp. 128 and 138.
 No. 59 see *ibid.*, p. 129.
 No. 60 see *ibid.*, p. 132.
 No. 61 see *ibid.*, p. 133.
 No. 63 see *ibid.*, p. 135.
 No. 64 see *ibid.*, p. 135.
 No. 65 see *ibid.*, p. 135.
 No. 66 see *ibid.*, p. 136.
 No. 67 see *ibid.*, p. 136.
 No. 68 see *ibid.*, p. 136.
 No. 69 see *ibid.*, p. 136.
 No. 70 see *ibid.*, p. 137.
 No. 71 see *ibid.*, p. 137.
 No. 73 see *ibid.*, p. 138.
 No. 74 see *ibid.*, p. 139.
 No. 75 see *ibid.*, p. 139.
 No. 76 see *ibid.*, p. 139.
 No. 77 see *ibid.*, p. 140.

DYEING IN MALDA

mornings. The vat is then ready for dyeing. The thread, either silk or cotton, is kept 40 minutes in the pot. It is then wrung, dried in the sun, and washed. If the colour is not deep enough, it must get another dip in the other pot. The remaining colour is applied to other thread, the dye of which is completed by other vats.

The alkaline ley is prepared as follows : Take 20 sers of fresh burned roots and stems of the plantain tree. Put them into a large earthen pot, that has a hole in the bottom, over which a quantity of grass is laid. Through this filter slowly 60 sers of water, which forms the ley fit for use. Five sers of indigo should give a good full colour to 6 sers of cotton thread, or to 2½ sers of silk. It costs 2 rs., being a kind very inferior to that prepared by Europeans, and is made in the form of balls by the natives of Rongpoor, and is generally much adulterated with clay. The good indigo, prepared by Europeans, is never employed by the tradesmen of Maldeh. The colour which they dye is very good. The same people often dye green with indigo ; but generally the weavers give them thread, which has previously been dyed yellow, either with turmeric, or with the bark of the Jak tree, as will hereafter be described. The latter green is fixed. That dyed with turmeric is perishable.

For dyeing 1 ser of cotton thread blue, the dyer receives 12 anas, or 4½ rs. for each vat. The materials may cost 2½ rs. The labour occupies five days, in which the workman gains 2 rs. If he dyes the cotton green, and performs the whole steps of the operation, he receives 1½ rs. for each ser. The dyeing silk costs 1½ rs. a ser ; so that the artist, when he dyes silk, has only a profit of 1¼ rs. on his vat, but probably some circumstance was concealed, which renders both equally advantageous.

It is to silk alone, that the dyers give a colour with lac. The manner, in which this is done, is as follows. Take 11 sers and 2 rs. weight (1/48 part of a ser) of stick lac. Having removed the sticks, it will weigh 10 sers. Grind this in a hand-mill, and sift it, grinding the larger pieces repeatedly, until the whole is reduced to powder. It is then put into a boiler, which is a strong vessel of earthenware, coated on the inside with melted shell lac, mixed with sand. To the powdered lac add 10 sers of water, in which 1/96 part of a ser of sajimate (carbonate of soda) has been dissolved, trade the lac and water with the feet, and then boil them for three hours. The lac must then be put into a basket, and the water allowed to drain from it into the pot, and the infusion is then to be poured into another vessel. Five other similar infusions are to be made

from the same lac, so that in all there are 60 sers of infusion. The lac exhausted of its colour is reserved for sale, and the infusion must be boiled down to 55 sers. To this add ¼ of a ser of Lodh bark (see trees, No. 80) powdered, and stir about the mixture. Next day the infusion is decanted, and there are 50 sers of clear dye fit for use. In the meantime an infusion of 4½ sers of bruised Tamarinds in 20 sers of water has been prepared, and decanted. Boil 3 sers of silk in one-half of the dye, and in one-half of the infusion of tamarinds for 1½ hours. Then wash it, and boil it for an equal length of time in the remainder, when the colour will be complete. The stick lac is brought from Assam by the way of Moorshedabad, and costs 11 or 12 rs. a man. The 11 sers of stick lac gives 7 sers of the lac separated from the colour, which sells at 9 rs. a man. The lac therefore costs in all 3 rs., and the seed lac sold brings 1 re. 9 anas ; so that the dye for 3 sers of silk costs 1 re. 7 anas, besides tamarinds, Lodh, and soda ; but these are trifles. The Lodh is brought from Rajmohal. The soda from Patna. I did not learn the price of dyeing a ser of silk ; but this branch is more profitable than the dyeing with indigo ; and is in fact the chief employment of the Maldeh dyers, who make high wages. One man and his wife can clear at least 12 rs. a month. Besides a house they require 100 rs. capital, if they dye with lac ; 10 rs. are sufficient, if they dye only with indigo. They never buy thread to dye, and then sell it ; but content themselves with dyeing what is brought at so much the ser. Whatever more remains to be said on the art of dyeing in this district, will be found in the next article.

The cloth manufacture, that seems most peculiar to this district, is that woven of a mixture of silk and cotton, and from the chief place where it is made, this cloth is called Maldehi. As the thread is dyed before it is woven, I shall continue to detail the process of dyeing as that is performed by the weavers, and their wives, and then proceed to give an account of the other parts of their art. And first I shall treat of the method used with silk. The first operation is to bleach it, and this is done in three ways. The operation is performed each time on from ½ to 2 sers (80 s.w.), or from about 1 to 4 lbs. of silk ; but I shall suppose the quantity to be one Calcutta ser or 2 $\frac{50}{1001}$ lbs., and all the other weights to be in proportion. For the the first kind of bleaching the silk is steeped the whole night in water. In the morning it is wrung, and dried in the sun. It is then boiled, with 1 ser of soap, in a sufficient quantity of water, for

DYEING IN MALDA

about 48 minutes. Then it is washed in clean cold water, and dried in the sun. The silk is of only a dingy white, but it is better than the others. The second quality of bleaching requires 10 or 12/16 of a ser of soap, the process in other respects is the same. The third quality is not allowed soap; but is boiled with 2 sers of the fresh made ashes of the root and stem of the plantain tree. In each of these operations one-quarter of the silk, by weight, is lost. All the kinds are used as whites in cloth, and all may be dyed of every colour; but the colours dyed on the first are clearer and higher priced than those dyed on the second, and those on the second are again superior to the colours dyed on the third.

In the following manner a fine bright but perishable yellow is given to silk by turmeric. For one skein of bleached silk, weighing 2 s.w. (359 grains nearly), take 5 s.w. of well cleared turmeric, and grind it upon a stone, adding a little water during the operation, until it is reduced to a pulp. Then add to this 20 s.w. of water, and filter the infusion. Soak the silk two or three days in this water. Then wash it, and put it into a solution of $\frac{1}{2}$ s.w. of alum in 20 s.w. of water. Then dry it, and the operation is finished. A good fixed yellow, although not so bright as given by turmeric, is communicated to silk by the wood of the Jak tree (*Artocarpus integrifolia*, trees No. 102). A skein of silk as before, is soaked a whole day in a solution of alum, and is then dried. It is then put into a decoction of Jak wood prepared in the following manner. Take 40 s.w. of chips of Jak wood, boil them all day, adding occasionally water so as to make a strong decoction, which is strained. In this the silk remains two days, it is then washed, and dried in the sun.

Two colours are given with safflower (*Carthamus tinctorius*), and are called Kusom and Golabi. The Golabi is a fine rose-red, but is not a fixed colour. For one skein of silk take 10 s.w. of safflower, dry it and reduce it to powder; then add 1 s.w. of impure carbonate of soda (*sajimati*), and rub them with the hands for about 12 minutes. Then put them on a cloth strainer, and allow 40 s.w. of water to drain through them. In this water steep the silk a whole day, and wash it. Then put it into an infusion of tamarinds, which is prepared thus: Take 5 s.w. of ripe tamarinds freed from the shell, and having rubbed them well with 20 s.w. of water, strain this for use. In this infusion the silk is kept between 48 and 72 minutes, and is then dried in the shade. The Kusom colour is better fixed, but is not such a fine red; still, however, it is a beautiful colour. The only differences in the process are that

30 s.w. of safflower are used, and that $\frac{1}{2}$ s.w. of alum, and 1 s.w. of lime-juice are added to the infusion of tamarinds.

Silk is dyed of a fixed red colour with Monjista (*Rubia manjista*). Soak a skein in water for four or five hours. Then keep it as long in a solution of alum. Then put it for an hour into a decoction of Monjista, which is thus prepared. Take 10 s.w. of Monjista, beat it to powder, and boil it for about five hours in 80 s.w. of water. Pour off the water, boil the Monjista in similar quantities of water three times, and keep all the four decoctions. The silk remains an hour in each. It is then washed, and dried in the sun. The red of Monjista by Jak wood is changed into what the natives call golden (*Sonala*); but in fact into a colour, which more resembles that of new copper. After the first immersion in alum the silk is soaked in the decoction of Jak wood for 120 minutes. It is then again soaked in an infusion of alum, and then is dyed with the Monjista; but 5 s.w. of this is sufficient.

There are a great many colours given, in which a preparation of iron called Moski is employed. This is a Persian word signifying black, and all these dyes have probably been introduced by the Muhammedans. I shall first give an account of the manner in which Moski is prepared, and then detail the various colours in dyeing which it is used. Take 20 s.w. of wheat flour, 5 s.w. of extract of sugar-cane (*Gur*), 1 s.w. of boiled butter (*Ghi*), 240 s.w. of old iron, 400 s.w. of water. Let them stand in a pot 10 days in hot weather, and 16 days in cool. After being strained, the liquor is fit for use. If not strained, it will keep four or five months, without spoiling. The Moski contains an exacetate of iron; but it would require very accurate experiments fully to develop its other ingredients, and how far these may have any share in the operations of the dyer.

There are three colours called Uda; one given by the Horitoki (*Myrobalanus Chebula Gaert.*, trees No. 14) another by the Chamolotti (a *Caesalpinia* not described by Willdenow nor in the *Encyclopedie*); and the third by alum. The first kind is dyed thus. Take 10 or 12 Myrobalans, beat them, and infuse them in 20 s.w. of water for four or five hours. Then put a skein of silk, that has previously been dyed with lac, into this infusion of Myrobalans for from 120 to 144 minutes. Then wring it, and put it into 20 s.w. of Moski for a similar length of time. Then wash it in cold water, and dry it in the sun. This is a fixed dark red like Russian leather.

The second kind of Uda is equally well fixed, and is darker than the former. I shall

DYEING IN MALDA

first describe the manner in which the infusion of Chamollotti is made. Take one-half s.w. of the dry pods separated from the seeds, powder them, and beat them well in a mortar with 20 s.w. of water, and strain the infusion for use. The pods of this plant, when green, contain a quantity of clear viscid liquor, that surrounds the seeds, that in the ripe fruit becomes dry, and that probably is the part in which its dyeing qualities reside. In order to dye Uda with this plant, put a skein of silk, that has previously been dyed with lac, into the above mentioned infusion for two hours. Then wring it, and put it into 20 s.w. of water mixed with 10 s.w. of Moski. Dry it in the sun, and in two hours, if the colour is not good, put it again into 20 s.w. of water and 10 s.w. of Moski. Then wash the silk in cold water and dry it in the sun.

The third kind of Uda is equally well fixed, and is a clearer colour. Take a skein of silk, that has been dyed with Lac, put it for one hour into a solution of one-fourth s.w. of alum in 20 s.w. of water. Then put it into Moski as in the last mentioned process.

Moski gives silk that has been dyed with Monjista, a fixed colour called (Tamrojyoti) or copper colour. The process is rather tedious. First the silk is put into the infusion of turmeric for 24 hours, then into a decoction of Jak wood, which is changed two or three times in the course of the third day. After this the silk is soaked for half a day in a solution of alum. In the remainder of the fourth day it is soaked in the decoction of Monjista. It is then washed, and kept for two or three hours in a mixed infusion of Myrobalanus and Chamollotti. It is then wrung and put into Moski for six hours.

The dye called Filtusi, from a Persian word signifying Elephant colour, is a dirty black, but is well fixed. A skein of bleached silk is soaked six hours in a solution of alum, and is then wrung. Two decoctions, one of Jak wood the other of Monjista, are then prepared, as before described, 10 s.w. of each is mixed, and the silk is soaked in the mixture for an hour and a half. It is then washed, and put for an hour into the infusion of Chamollotti. It is then wrung, and put for two hours into Moski. Finally, it is washed and dried in the sun.

Silk is dyed a lead-colour (Sisa) by Moski. The skein must have been bleached in the best manner, and soaked for an hour in a solution of alum. It is then wrung, put into the Moski, washed, and dried in the sun.

The Polas Kungri, or bud of the Butea frondosa, is a colour that I have not seen. The object from whence its name is derived, is black with a tinge of green. The skein

of silk is soaked for 24 hours in the infusion of turmeric, and wrung. It is then put for two hours into a solution of alum, wrung again, and soaked a day in the decoction of Jakwood. It is then washed in cold water, wrung, and put for three hours in the infusion of Chamollotti. It is then wrung, and having been put into 40 s.w. of Moski, the pot is placed in the sun a whole day. It is finally washed, and dried in the sun. The colour is said to be fixed.

The dye called Lobonggo, Kornophuli, or clove colour, is a fixed brown. The skein of silk is soaked three hours in the solution of alum, then wrung, and soaked for a whole day in the decoction of Jak wood. It is then wrung, and again soaked for three hours in the solution of alum. After being wrung it is soaked for a whole day in a decoction of Monjista, and during the course of the operation this is changed four times. It is then wrung, and put for two hours in the infusion of Chamollotti. Finally it is wrung, kept for a day in a pot of Moski, exposed to the sun, washed, and dried in the sun.

The colour called Panduki, from the name of a flower is a well fixed lilac. The skein of silk must have been bleached in the best manner. Take 2½ s.w. of the infusion of Lac brought from the dyers, add to this 10 s.w. of water, in which 1 s.w. of tamarinds have been infused for a short time. In this mixture wash the silk for three hours, wring it, wash it, and keep it for two hours in the infusion of Chamollotti. Then wring it, put it for half an hour in 2½ s.w. of Moski, diluted with 30 s.w. of water, wash, and dry it in the sun.

These are the colours given to silk thread. I shall now detail those which the weavers give to cotton, and which are three in number.

The first, called Salu by the natives, is a well fixed light pomegranate colour. Take 20 s.w. of cotton thread soak it three days in cool water, wash it merely by rubbing it with hands, without beating, and dry it in the sun. Then take of dried Chamollotti pods, freed from seeds, 5 s.w., powder them well in a mortar, and rub them for an hour with a little water. Then add two sers of cool water, mix them, put the cotton into the mixture in the mortar, and knead it with the hand for an hour. Throw away the water, and dry the cotton, as impregnated with Chamollotti, in the sun. Dissolve 3½ s.w. of alum in 40 s.w. of water, and add 1 s.w. of impure carbonate of soda, which has been dissolved in 10 s.w. of water, and then strained. In this solution put the thread, and rub it with the hands for an hour. Then wring, dry it in the sun, wash it well, and dry it again in the sun. Take

DYEING IN MALDA

40 s.w. of dry Monjista, powder it with the Dhengki, and boil it in 5 sers of water to 4 sers. Then boil the thread in the decoction for half an hour, wring, and dry it. Then keep it half a day in 1 ser of water, holding in solution 3 s.w. of alum, and wring, and dry again. Then boil 20 s.w. of powdered Monjista in 4 sers of water to 30 sers, and in this boil the cotton for a quarter of an hour. Finally wash and dry the thread.

Thread thus dyed may be changed into what is called Uda, by the following operation: Take 20 s.w. of the dyed thread, put it in 7½ s.w. of the infusion of Chamollotti, stir them with the hand for 24 minutes, then wring the thread, and put it for an hour into one seem of Moski mixed with half a ser of water. Finally wash the thread in cold water, and dry it in the sun. This makes a deep colour, and lighter shades may be obtained by suing ¾ or ½ ser of Moski.

The third colour, called Kusom, is not well fixed; but is a bright beautiful light red, like the pomegranate flower. For 20 s.w. of cotton thread take 1½ ser of dry safflower, powder it on a cloth, and wash it, until the yellow colour is entirely separated. Then add by degrees 15 s.w. of impure carbonate of soda (Sajimati) and rub them together for an hour, until they become scarlet. Then put them on the strainer, and filter water slowly through them, until all the colour is carried away, and keep this infusion of safflower. At the same time put 60 s.w. of tamarinds, freed from the pod, into 2 sers of water, rub them and strain the infusion. Mix the infusions, and divide them into two equal parts. Put the thread into one part for an hour, then wring it, and put it in the remaining half of the infusions for three hours. Then wash, and dry in the shade.

IV

The commonly known plants and woods yielding oily substances

- 1 *Akbrot*: (*Aleurites moluccana*)
A useful oil easily extracted from the kernels—known as Kekna oil in South India. (Catalogue of the contributions from India to the London Exhibition, 1862.)
- 2 *Chini-badam*: (*Arachis hypogaea*):
Ground-nut
The most valuable produce of the plant is the oil, obtained by expression from the seeds. Specific gravity—0.918 (approx.) becomes turbid at 3° concretes at 3° to 4°, and hardens at 7°. It is chiefly used for burning in lamps, and in the manufacture of soap.
- 3 *Shial-Kanta*: (*Argemone mexicana*)
Grows spontaneously on wastelands at the beginning of the cold season. The whole plant abounds in a yellow juice, which, when dry, resembles gamboge, and is proscribed in dropsy, Jaundice, and cutaneous affections.
A pale-yellow, clear, limpid oil is obtained from the seeds, which is used for burning in lamps, and given medicinally in ulcers and eruptions.
- 4 *Mahua*: (*Madhuca Latifolia*)
An oil is obtained by expression from the seeds which is used for burning in lamps, as well as for adulterating ghi.
- 5 *Sarisha taila*: Mustard (*Brassica campestris*)
The seeds of this species are perhaps the most important of all the Indian oil-seeds. They afford the oil with which the people cook their vegetables and fish, and which they burn in their lamp.
- 6 *Pryal*: (*Buchanania latifolia*)
- 7 *Deodar*: (*Cedrus Deodara*)
A dark, strong-smelling oil, of powerful antiseptic properties is obtained from the wood.
- 8 *Narkel*: (*Cocos mucifera*)
The oil is extracted from the dried albumen is used for culinary purposes and for burning in lamps.
- 9 *Morn-China*: (*Excoesaria selifera*)
A moderate-sized tree, originally native of China and Japan now introduced into India.
- 10 *Ram till*: (*Guizotia oleifera*)
Cultivated in Bengal chiefly in the hilly districts for seeds which yield a sweet oil resembling sesamum oil. Its commercial name is Niger seed.
- 11 *Bagbheranda*: (*Jatropha curcas*)
A soft-wooded evergreen plant indigenous to America, cultivated in India chiefly as hedge plant.
The seeds yield an oil used for burning.
- 12 *Tisi*: (*Linum Usitatissimum*)
Linseed is largely cultivated in Bengal. It is one of the most important of the oil-seeds of India. The Chemical composition of the seeds has been found to be, in one hundred parts, musilage 15.12, chiefly in the seed-coat; 11.26 fatty oil in the nucleus; emulsion 44.38 in the husk; besides a small proportion of wax, starch, resin, etc.
- 13 *Gandhabiroza*: (*Pinus longifolia*)
- 14 *Pista*: (*Pistacia vera*)
- 15 *Dal-Karanja*: (*Pongamia glabra*)
The seeds yield a thick brown oil used for burning.....
- 16 *Badam*: (*Prunus Amygdalus*)
- 17 *Mula*: (*Raphanus sativaus*)
- 18 *Reri*: (*Ricinus communis*): Castor seed
- 19 *Ritha*: (*Sapindus detergens* and *trifoliatu*) (The soap-nut tree)
An oil is obtained from the seeds.
- 20 *Til*: (*Sesamum indicum*): Tilseed:
Gingelly

Common plants employed in basketware, wicker works, etc.

[See *Calcutta International Exhibition* (1883-84) Vol. II, page 17.

Calcutta Exhibition of Art-Manufactures (1882) p. 254; p. 302 Nos. 714, 715 and 754, p. 305; No. 733. Do. Appendix.]

The above heading embraces several distinct crafts, but since the materials employed are often identical, collective treatment may perhaps be the most satisfactory. The opening paragraph of the article BAMBOOS (see Watt p. 104) has already set forth some of the leading ideas that prevail, such as the separation of the Bamboos (Bambuseae) from the canes (calamus) and from the reeds. But there remains the even more difficult task of designing a classification for the basket materials that are neither reeds nor canes, and for the matting materials that are often grasses, reeds, canes or even bamboos.

The following may be mentioned as the chief materials used and the centres of their utilisation:

1 *Acacia arabica*—Agricultural baskets. Strong and durable baskets are plaited of young green babul-twig (Watt. p. 8).

2 *Alnus nitida*—The alder or shrol, udish etc., twigs used in tying loads, in construction of rope-bridges and of crude baskets.

3 *Arundinaria aristata*—The neat little baskets used by the hillmen to hold the wool and distaff with which they beguile leisure hours is made of the ringal bamboo (Watt. p. 99).

4 *Bambusa*—In Bengal ingenious and often neatly constructed fish-traps and bird-cages are also constructed of bamboo. The traffic in these articles is by no means insignificant (*Ibid.* p. 115).

5 *Borassus flabellifer*—Fancy baskets.

6 *Cajanus indicus*—Agricultural baskets.

7 *Calamus*—Cane baskets of great strength are largely produced in Bihar, Bengal as for example in Patna, Pabna, etc. These are formed of entire canes wound round and round and held in position by tie-bands. In Bengal a small colony of Chinamen are engaged in the production of cane-chairs, baskets, etc. (*Ibid.*, p. 115).

8 *Caryota Urens*—The Indian Sago Palm. The plant is mentioned by almost all the pre-Linnean authors from Varro (116 B.C.) downwards. The chief commercial value of the palm lies in the fibrous cords or fibro-vascular bundles found rolled at the base of the leaf-sheath and within the petioles, flowering stalks and even the stems as well. These constitute the Kittul fibre of Ceylon and the Salopa of Orissa, a fibre which also

comes from Burma and Bombay. It is made into ropes, brushes, brooms, baskets, etc. (*Ibid.* p. 286).

9 *Corypha Umbraculifera*—Common in the moist regions of the Madras Presidency and not uncommon in Bengal, where Roxburgh regarded it as "native". It is now known that the Talipot Palm of the older writers was not BORASSUS but CORYPHA UMBRACULIFERA. The leaves are very large, often ten feet in diameter; are made into fans, mats, umbrellas, etc., very largely worked up as baskets, and strips are utilised as writing materials (ola) (*Ibid.* p. 429).

[i Cf. *Die Rohst des Pflanzeur* ii, 452-6 by Wiesner.

ii Epigraphical note on Palm-leaf, Paper and Birch-bark, in JASOB—XIX, p. 1, No. 2.]

10 *Dendrocalamus*—BAMBOOS

It is the common bamboo of Darjeeling, the Duars and Assam, and is universally employed for all kinds of basket and mat work. (*Ibid.* p. 102.)

11 *Indigofera atropurpurea*—The bankati, saknan, and 1 Gerardiana, the kati, khenti, etc., are fairly extensively employed by the hillmen to tie loads and make baskets, etc.

12 *Melocalamus compactiflorus*—This arborescent, tufted and scandent evergreen occurs in Eastern Bengal and Burma, viz., from Sylhet and Chittagong down to Martaban; but is frequent only between alt. 4,000 ft. and 6,000 ft. The culms are largely used for basket-work, and when split in the green state may be reduced to such fine and pliable strands that may be woven. (*Ibid.*, p. 103.)

13 *Phragmites* of the reeds proper there are two species, *P. Communis* (dila or dambú), met with in the marshes and on the margins of lakes in North-West India up to altitude 10,000 ft., and *P. Karka* (nala, nal, nar, sur, Kaing, Karka, etc.), found in the swamps of the more tropical India. Split open they are made into mats, and thus constitute one at least of the sources of the darma mats of Bengal. These are produced cheaply and in great abundance, being universally employed in house-construction. They are also utilised as lining (dunnage) of ships to protect and isolate cargoes, and they might with advantage be used to line the inside of iron roofing. The flowering stalks are beaten out and afford a useful rope-fibre.

14 *Succharum arundinaceum*—It is the *sera* of the classic authors of Indian, and bears the following vernacular names—sara, sarkanda, sarkara, ramsar, sar, ser, munja, ikar, pata, war, palwa-kanda, darga, gundra, ponika, etc.

MEDICINAL PLANTS

Sir William Jones says: This beautiful and superb grass is highly celebrated in the Puranas, the Indian god of war having been born in a grove of it, which burst into flame; the gods gave notice of his birth to the nymph of the Pleiads, who descended and suckled the child, thence named Carticeya. The casu (Kasa or Kans) vulgarly "Casia" (*S. Spontaneum*) has a shorter culm, leaves much narrower, longer and thicker hairs, but a smaller panicle, less compounded, without purplish tints of the sara: it is often described with praise by the Hindu poets for the whiteness of its blossoms, which give a large plain, at some distance, the appearance of a broad river. Both plants are extremely useful to the Indians, who harden the inter-nodal parts of the culms, cut them into implements for writing on their polished paper. From the munj, or culm, of the sara was made the maunji, or holy thread,

ordained by Menu to form the sacerdotal girdle, in preference even to the "cusa-grass."

Munj fibre is obtained from the leaf-sheaths; the blades are the sara or sar used in thatching houses and as a paper material; the contained flowering stem is the bind or vind; the panicle or flowering stem is the sirki, til or thili, used in thatching boats, carts, etc.; sentha or Kana is the lower, stronger portions of the flowering stem, used in the manufacture of chairs, stools, tables, baskets and screens; tilak, tilon or ghea are names that denote the flowers. Some of these names, such as munj and sara, have been supposed to denote the products of different species, instead of different parts of one and the same plant, hence has originated much of the confusion that prevails. (*Ibid.* p. 930).

15 *Several species of willow*—Sali.

VI

The Common Medicinal Plants of the State

[The second division of the wares imported from India into the countries subject to the Romans consists of products of the vegetable kingdom, either in their natural or in their artificial state ennobled by industry or art. As these goods were partly applicable in medicine, in their description also, two of the four genuine writings of Dioskorides may be used, who had lived before Pliny. The title of the first is: *Geritriches Ules* and treats of the remedies; and the title of the second is: *Geri enporiston argon te chai—sunueton tharmaehon* and contains, as the title implies, an indication of the easily preparable and of the ready-made remedies. Also cf. Klandios, Galenos. See Lassen: p. 26]

The Indigenous Vegetable Drugs in Midnapur. See Hunter, p. 246.

- 1 Kath: *Acacia Catechu*
- 2 Bakorh: *Adhatoda Vasica*
- 3 Bel: *Ægle Marbelos*
- 4 Ghrita Kumari: *Aloe perfoliata*
- 5 Hijli-Badam: *Anacardium occidentale*
- 6 Khas Khas: *Andropogon Muricatum*
- 7 China badam: *Arachis hypogaea*
- 8 Sial-Kanta: *Argemone Mexicana*
- 9 Nim: *Azadirachta Indica*
- 10 Madar: *Calotropis gigantea*
- 11 Jangli Badam: *Terminalia catappa*
- 12 Papaya: *Carica papaya*
- 13 Dad-mardan: *Cassia alata*
- 14 Pati Nebu: *Citrus acida*
- 15 Bhant: *Clerodendron infortunatum*
- 16 Galimcha: *Cocculus cordifolius*
- 17 Lalitapat: *Corchorus Olitorius*
- 18 Jaipal: *Croton Tiglium*
- 19 Sasha: *Cucumis Sativus*

- 20 Kankur: *Cucumis Utilissimus*
 - 21 Haldi: *Curcuma longa*
 - 22 Mutha: *Cyperus rotundus*
 - 23 Sada Dhutura: *Datura alba*
 - 24 Gab: *Diospyros embryopteris*
 - 25 Amlaki: *Emblica officinalis*
 - 26 Ayafan: *Eupatorium Ayapana*
 - 27 Manasa: *Euphorbia ligularia*
 - 28 Anantamul: *Hemidesmus Indicut*
 - 29 Nil: *Indigofera tinctoria*
 - 30 Masina: *Linum usitatissimum*
 - 31 Arrow-root: *Maranta arundinacea*
 - 32 Pudina: *Mentha sativa*
 - 33 Nageswar: *Mesua ferrea*
 - 34 Champa: *Michelia champaca*
 - 35 Alkusi: *Mucuna pruriens*
 - 36 Kaiwphal: *Flacourtia sapida*
 - 37 Swet (white) Karabi: *Nerium odorum*
 - 38 Khet-papra: *Oldenlandia Biflora*
 - 39 Gandha-Bhaduli: *Paederia Foetida*
 - 40 Kaladana: *Pharlitis Nil*
 - 41 Pan: *Piper Betel*
 - 42 Chita: *Plumbago Zeylanica*
 - 43 Dalim: *Punica Granatum*
 - 44 Bhela: *Semecarpus Anacardium*
 - 45 Sada Sarisha: *Brassica alba*
 - 46 Kala Sarisha: *Brassica Nigra*
 - 47 Kuchila: *Strychnos Nux-vomica*
 - 48 Tentul: *Tamarindus Indica*
 - 49 Bahra: *Terminalia Belerica*
 - 50 Haritaki: *Terminalia chebula*
 - 51 Paniphal: *Trapa bispinosa*
 - 52 Patal: *Trichosanthes dioica*
 - 53 Kurchi: *Holannhena antidysenterica*
 - 54 Adrak: *Zingiber officinale*
 - 55 Dhenus: *Abelmoschus esculentus*
- See Hunter: Midnapur, p. 246. Cooch Behar p. 325

MEDICINAL PLANTS

- | | |
|--|--|
| <p>56 <i>Apang</i>: <i>Achyranthes aspera</i>
 57 <i>Bach</i>: <i>Acorus calamus</i>
 58 <i>Chireta</i>: <i>Swertia chirata</i>
 59 <i>Kulinjan</i>: <i>Alpinia galanga</i>
 60 <i>Chatin</i>: <i>Alstonia Scholaris</i>
 61 <i>Kalap-nath</i>: <i>Andrographis paniculata</i>
 62 <i>Dhak or Palas</i>: <i>Butea frondosa</i>
 63 <i>Kat-Karanja</i>: <i>Caesalpinia Bonducella</i>
 64 <i>Ganja</i>: <i>Cannabis Indica</i>
 65 <i>Lanca Marich</i>: <i>Capsicum annum</i>
 66 <i>Son-alu</i>: <i>Cassia fistula</i>
 67 <i>Mom or Wax</i>: <i>Cera flava</i>
 68 <i>Bhant</i>: <i>Clerodendron infortunatum</i>
 69 <i>Dhaniya</i>: <i>Coriandrum sativum</i>
 70 <i>Jaipal</i>: <i>Croton tiglium</i>
 71 <i>Indrawan</i>: <i>Cucumis pseudo-colocynthis</i>
 72 <i>Katki</i>: <i>Cucumis utilissimus</i>
 73 <i>Bagh bharenda</i>: <i>Jatropha Curcas</i>
 74 <i>Mutha</i>: <i>Cyperus hexastachylus</i>
 75 <i>Dhutura</i>: <i>Datura alba</i>
 76 <i>Amla</i>: <i>Emblica officinalis</i>
 77 <i>Munsa sij</i>: <i>Euphorbia ligularia</i>
 78 <i>Jaishtha Madhu</i>: <i>Glycyrrhiza glabra</i>
 79 <i>Ajawan</i>: <i>Carum copticum</i>
 80 <i>Am</i>: <i>Mangifera Indica</i>
 81 <i>Pudina</i>: <i>Mentha sativa</i>
 82 <i>Karela</i>: <i>Memordica Charantia</i>
 83 <i>Sujina</i>: <i>Moringa pterygosperma</i>
 84 <i>Tamak</i>: <i>Nicotiana tabacum</i>
 85 <i>Saluk</i>: <i>Nymphoea lotus</i>
 86 <i>Amrul</i>: <i>Oxalis corniculata</i>
 87 <i>Bara Ghakru</i>: <i>Pedaliium murex</i>
 88 <i>Pipul</i>: <i>Piper longum</i>
 89 <i>Erendi</i>: <i>Ricinus communis</i>
 90 <i>Jangli piyaj</i>: <i>Urginea Indica</i>
 91 <i>Methi</i>: <i>Trigonella foenum-graecum</i>
 92 <i>Buch</i>: <i>Zinziber Zerumbet</i></p> <p>Drugs sold in the bazars: Hunter—Jalpaiguri, p. 325.</p> <p>1 <i>Babla</i>: <i>Acacia Arabica</i>
 2 <i>Atis</i>: <i>Aconitum heterophyllum</i>
 3 <i>Jangli Akrot</i>: <i>Aleurites triloba</i>
 4 <i>Jawasi</i>: <i>Alhagi camelorum</i>
 5 <i>Ilachi</i>: <i>Ammonum cardamomum</i>
 6 <i>Hijli badam</i>: <i>Anacardium occidentale</i>
 7 <i>Akarkora</i>: <i>Anthemis pyrethrum</i>
 8 <i>China Badam</i>: <i>Arachis hypogaea</i>
 9 <i>Gochru</i>: <i>Asteracantha longifolia</i>
 10 <i>Kotilla</i>: <i>Astragalus Virus</i>
 11 <i>Gugal</i>: <i>Balsamodendron mukul</i></p> | <p>12 <i>Mahua</i>: <i>Madhuca latifolia</i>
 13 <i>Rasut</i>: <i>Berberis lycium</i>
 14 <i>Gandha Berosa</i>: <i>Boswellia thurifera</i>
 15 <i>Jita</i>: <i>Carum album</i>
 16 <i>Long</i>: <i>Carophyllus aromaticus</i>
 17 <i>Tezpat</i>: <i>Cinnamomum tamala</i>
 18 <i>Dalchini</i>: <i>Cinnamomum Zeylanicum</i>
 19 <i>Nebu</i>: <i>Citrus</i>, numerous varieties
 20 <i>Golancha</i>: <i>Cocculus cordifolius</i>
 21 <i>Narikal</i>: <i>Cocos nucifera</i>
 22 <i>Bihidana</i>: <i>Cydonia Vulgaris</i>
 23 <i>Garjantel</i>: <i>Dipterocarpus laevis</i>
 24 <i>Takhm balanga</i>: <i>Dracocephalum rtyleanum</i>
 25 <i>Chhota ilachi</i>: <i>Elettaria cardamomum</i>
 26 <i>Panmuri</i>: <i>Foeniculum panmorium</i>
 27 <i>Chaulmugra</i>: <i>Gynocardia odorata</i>
 28 <i>Kala Kutki</i>: <i>Helleborus nigra</i>
 29 <i>Khorassani ajawan</i>: <i>Hyoscyamus niger</i>
 30 <i>Kapur</i>: <i>Cinnamomum camphora</i>
 31 <i>Halim</i>: <i>Lepidium sativum</i>
 32 <i>Tisi</i>: <i>Linum Usitatissimum</i>
 33 <i>Jaiphal</i>: <i>Myristica officinalis</i>
 34 <i>Jatamansi</i>: <i>Nardostachys jatamansi</i>
 35 <i>Hing</i>: <i>Narthex assafoetida</i>
 36 <i>Kala-jira</i>: <i>Nigella sativa</i>
 37 <i>Khet-papra</i>: <i>Oldenlandia biflora</i>
 38 <i>Salep Misri</i>: <i>Orchis mascula</i>
 39 <i>Aphin</i>: <i>Papaver somniferum</i>
 40 <i>Kala-Dana</i>: <i>Pharbitis nil</i>
 41 <i>Gandhaberoza</i>: <i>Pinus longifolia</i>
 42 <i>Kabab chini</i>: <i>Piper cubeba</i>
 43 <i>Kala marich</i>: <i>Piper nigrum</i>
 44 <i>Pucha pat</i>: <i>Pogostemon patchouli</i>
 45 <i>Alu Bokhara</i>: <i>Prunus Bokhariensis</i>
 46 <i>Majaphal</i>: <i>Quercus infectoria</i>
 47 <i>Riwan chini</i>: <i>Rheum emodi</i>
 48 <i>Manjit</i>: <i>Rubia cordifolia</i>
 49 <i>Rita</i>: <i>Sapindus emarginatus</i>
 50 <i>Bhalatak</i>: <i>Semecarpus anacardium</i>
 51 <i>Chaul Nadi</i>: <i>Sphaeranthus hirtus</i>
 52 <i>Kuchila</i>: <i>Strychnos nux-vomica</i>
 53 <i>Palwal</i>: <i>Trichosanthes dioica</i></p> <p>[For mineral drugs see p. 326, Hunter—Jalpaiguri.</p> <p>Catalogue of the contributions from India to the London Exhibition (1862): pp. 64—79.]</p> |
|--|--|

COMMON TIMBERS

VII(a)

The Common Economic Timbers of the State

1 *The Babul Tree*: (*Acacia Arabica*).

Quality.—Sap wood is white, the heart wood varies—light red to dull dark red-brown and in very old wood nearly black, the wood is hard and durable. 56 lbs. per cft: It is short fibred and somewhat brittle to work. Takes a smooth surface and good polish.

Agricultural Implements, all parts of carts, boats, oilmills, wells.

2 *Haldu*: (*Adina cordifolia*)—Haldus tree is found scattered in nearly all deciduous forests of India.

Quality.—Very even grained, moderately hard, lemon-yellow in colour when fresh cut, turning yellow grey on exposure if not polished at once. It works very easily and seasons well though liable to fine heart and cup shake cracks, fairly durable, weight 45 lbs. cft.

Use.—Furniture, packing, turnery, carving, brush backs, toys, bobbins.

3 *The Siris Tree*: (*Albizia Lebbek*).

Distribution.—A large deciduous umbrella crowned trees found both cultivated and wild in the Sub-Himalayan tracts from the Indus eastwards into Bengal and Burma and throughout the Peninsula, attaining a large size in the Andamans. It is a common tree in most deciduous forests and has been largely cultivated in gardens and long avenues.

Quality.—Sap-wood is yellowish white, the heart wood dark red brown. Often containing dark brown-black streaks, giving it a very handsome appearance when polished. It is hard and fairly durable. Weight: 42 to 61 lbs. per cft. Co-efficient of transverse strength 5.9 to the Sq. inch (Everett). Known on the English market as East India walnut.

Uses.—Has a handsome grain rendering it suitable for fancy work, such as panelling carving picture frame, toys, combs, and turnery, cart wheel, etc.

Minor product: Yields gum—not soluble in waer and of no great value.

4 *The Kala Siris*: (*Albizia Odoratissima*)

Distribution.—A large deciduous tree of the Sub-Himalayan tracts. From the Indus east-water and of no great value.

Quality.—Wood is similar to that of Siris: whitish sap-wood, dark red brown heart wood, streaked with longitudinal dark bands but harder than Siris wood: liable to split if not slowly seasoned: weight 54 lbs. per cft.: co-efficient of transverse strength, equal to 6.518 tons per Sq. inch.

Uses.—Suitable for opium chest: Strong packing box, oil-mill grinders, and barrels, furniture, posts, beams and rafters, wheels shafts:

Price: 15/- to 25/- per ton (1912).

5 *The Dhaura*: (*Anogeissus latifolia*)

Distribution.—Deciduous forest of India: where it occurs it is generally plentiful. Though not often found over 6 ft. in girth with a bole of over 30 ft. in length.

Quality.—Grey: with a small irregular very hard purple heart wood. It has a twisted fibre in radial section and a slightly wavy grain on the tangential section. Splits in radial direction with difficulty. Co-efficient of transverse strength is considerable. 5.40 to 6.25 Tons to the Sq. inch. Weight 62 lbs. per cft. The Timber is elastic and tough. Fairly durable under cover, liable to split in seasoning.

Uses.—Being elastic it is used in many parts of India, for cart shafts and to some extent for transport poles, for sugar-mills (Bengal), axe handles, ploughs, agricultural implements and yokes:

Minor Products.—Gums.

6 *The Chaplash tree*: (*Artocarpus Chaplasha*)

Distribution.—Large Deciduous tree. Nepal to Assam in Bengal, Chittagong, Burma and the Andamans.

Quality.—Wood is yellow to brown in colour. Showing a nice even grain not unlike rough satinwood, moderately hard and durable under cover. Coefficient of transverse strength 3.79 tons to the Sq. inch. Seasons well, liable to warp uses. Carving, turnery: house building, etc.: For furniture Gamble quoting Chevalier, Paganini, considers it equal to if not superior to teak:

Price.—Rs. 25 per ton (1912)

Enquiries: E. Bengal and Assam.

7 *The Dhan tree*: (*Artocarpus Lakoocha*)

Distribution.—Large lofty deciduous tree: From Kumaon east wards.

Quality.—Heart wood is yellow, and changes colour to a dull brown on exposure: fairly hard and durable, resists attacks of white ants and possibly those of marine borers. Coefficient of transverse strength 6.83 ton per Sq. inch. It works easily and presents a fair appearance when polished. It emits an unpleasant smell while being sawn, possibly from the resinous nature of the wood, weight 40 lbs. per cft. therefore lighter than teak.

Uses.—Piles in Sugar mills, posts, rafters:

Minor: Fruit.

8 *The Hijal tree*: (*Barringtonia acutangula*)

Distribution.—A moderate large sized ever-green tree, found from Jamuna eastwards to Oudh and Bengal.

Quality.—Nearly white in colour, even grained, fairly durable, moderately hard. The logs when cut radially have a handsome mottled appearance, due to the numerous broad medullary rays. Weight 40 lbs. per cft.

COMMON TIMBERS

Uses.—Suitable for cabinet work, being ornamental if properly cut for boat building, frames of carts, rice pounders, well curbs.

Minor uses: The bark is used for stupefying fish, otherwise the minor products which it yields are unimportant.

9 *The Uranian tree of Assam:* (*Bischofia Jorrancia* Blume).

Distribution.—A moderate to large deciduous tree: found from Jamuna eastwards to Oudh, Bengal and Assam: *Quality.*—Red, rough, moderately hard, weight 45 lbs. per cft. *Uses.*—Dugouts, well construction and piles for which it is especially suitable, lasts well under water.

10 *Semul:* or Indian cotton tree (*Salmalia malabaricum*).

Distribution.—A very large deciduous tree, found throughout India. It grows to a great size more so, in drier localities than in very wet ones.

Quality.—White when freshly cut, having no heart wood. When seasoned the log gets discoloured. This defect can be overcome by cutting the log into planks, while still green or by seasoning in fresh water, the wood is perishable if exposed to the air, but lasts well under water. Weight 23 to 25 lbs. per cft. Soft easily worked and seasons quickly.

Uses.—Used for light packing case for dry goods boxes, fruit crates, wooden toys, spoons, cups and drums: Roller of Berlin says it is one of the best match woods found in India and Raitt says that it yields wood-pulps about equal to that of poplar, bleaching easily. Used for scabbards, fishing floats, coffins, and well curbs.

Enquiry.—Local Divisional forest officers.

Minor products: Floss and seed.

11 *The Salai Tree:* (*Boswellia Serrata*-Rox 6).

Distribution.—A moderate sized to large tree. Common throughout the dry region of India.

Quality.—The Sap wood is white, heart wood dull brown to grey brown in colour, moderately hard; If cut on radial section, it presents a smooth, shiny surface of fair appearance. Weight varies ranging 28 lbs. to 42 lbs. per cft. Not durable.

Uses.—The wood being common and cheap, it is used for rough packing cases. Sometimes for construction work; such as frames of doors, windows, turnery work,—bowls and wooden vessels. Roller says it is suitable for matches. Troup mentions it as being used for mica boxes in Bengal.

Minor products: Gum.

12 *The Palas or Dhak tree:* (*Butea Frondosa* Rox. 6).

Distribution.—The palas tree is found throughout the plains of India. Often in poor deciduous forest, in open lands, and along the the edges of cultivation.

Quality.—Wood is nearly white when freshly cut, turning a grey brown colour on seasoning. It is not durable when exposed in the open. Lasts wonderfully well under water. Weight 35 lbs. per cft.

Uses.—Well-scoops, rough packing cases, wooden dishes, spoons, ladles. It yields poor fire wood and inferior wood pulp.

Minor Uses: Gum—Flowers.

13 *Carallia Tree:* (*Carallia integerrima*)

Distribution.—The tree is found in Semi-evergreen and evergreen forests and damp localities at the foot of Himalayas, in Bengal.

Quality.—Sap wood light brown, heart wood dark brown. It is hard, durable and not liable to insect attack though somewhat liable to radial shape while seasoning. The silver grain of the wood obtained by cutting it on a radial section is extremely handsome. Weight 45 lbs. cft. Co-efficient of transverse strength 4.083 and 5.1 tons per Sq. inch.

Uses.—Picture-frames, suitable for ornamental work, such as veneered panels for Railway carriages in place of "bird's eye maple", which timber is now largely employed for this purpose in India and which is more expensive than Carallia wood.

Minor products: Oil.

14 *The Indian Laburnum:* (*Cassia Fistula*)

Distribution.—A moderate sized tree found throughout the forests of India: often cultivated. A most useful tree and very ornamental. It rarely grows to a great size, and logs over 4 ft. girth and 20 ft. long would be hard to procure, though logs are naturally fairly straight.

Quality.—Generally red to brickred darkening to dullred on exposure very hard, not easily worked being brittle, weight 60 lbs. per cft. Coefficient of transverse strength is 4.72 and 6.77 tons per Sq. inch durable, very well suited for heavy work.

Uses.—House building as posts, beams and scantlings being strong, also for nearly all parts of the wheels of carts, for rice-pounders, boat-buildings, agricultural implements: Bed plates for machinery. It yields excellent fuel and charcoal:

Minor products: Pods & Barks.

15 *The Indian Chestnut:* (*Castanopsis Hystrix*).

Distribution.—A very large evergreen tree of the Eastern Himalayas in Sikkim and Bhutan Assam.

Quality.—Grey brown, fairly durable, hard weight about 46 lbs. to the cubic foot.

Uses.—Various.

Outturn.—Tree is fairly common at 5,500 and 7,500 feet in the Darjeeling district.

Minor: Fruit.

16 *The Shisham tree:* (*Dalbergia Sissoo*)

COMMON TIMBERS

Distribution.—A moderate sized to large deciduous tree of the sub-Himalayan tracts, extending from the Indus eastwards into Assam. Not often found above an elevation of 3,000 ft.,

Quality.—The heart wood is brown, with bands of darker coloured tissue. In general structure it resembles Blackwood (*Dalbergia latifolia*). The wood is hard, close grained durable and seasons well without warping or splitting. Weight 48 lbs. per cft. C. T. strength 7.2 tons per Sq. inch and minimum as 4.87 tons per Sq. inch.

Uses.—Chiefly used in furniture industry Cart wheels Carriages, shafts, frames of carts, agricultural implements, oil and sugar mills, poles, posts, game requisites, tennis poles, cricket stumps, turnery toys, carving, boat building.

17 *The Pangra, Dauldhak or Madara tree.*
(*Erythrina Suberosa*).

Distribution.—A moderate sized deciduous tree found in the dry forests of India.

Quality.—The wood is white to grey-brown in the centre, soft, fibrous with prominent medullary rays, giving it a mottled appearance if split or cut radially. In spite of the softness of this wood it is sufficiently durable and light to make it of use of many purposes. Weight 18 to 20 lbs. per cft. Durable under water, sieve-frames, packing cases, water troughs, planking, boxes intended for lacquer work, and scabbards for swords, match boxes—trays, also for match-splints.

18 *Jam:* (*Eugenia Jambolana*—Lam)

Distribution.—A branching, moderate sized to large evergreen tree found throughout India. Often cultivated. Frequently found in its wild state along river banks, in damp localities.

Quality.—Reddish grey in colour, coarse, moderately hard, fairly durable. It lasted five years and remained fairly sound when laid down as sleepers, nor was it attacked by white ants; weight 48 lbs. per cft. T. T. strength. 4.82 ton per Sq. inch.

Uses.—House building, posts, beams, and rafters: carts, especially all parts of the wheels. Boat building, well curbs.

Enquiry: Local Divisional Forest Officers
Minor.—Fruits, Barks.

19 *Banyan tree:* (*Ficus bengalensis*)

Distribution.—A very large tree: found throughout India. Often cultivated.

Quality.—The wood is grey in colour Moderately hard, not durable, though more so under water than when exposed to the air: The grain is moderately handsome if the logs be cut on a radial section. Weight 36 lbs. per cft.

Uses.—Harder wood of he aerial roots is used for yokes shafts:

20 *Kura or Dhudi Tree:* (*Holarrhena anti dysenterica* Wall).

Distribution.—A small deciduous tree, found, throughout India, and of great importance both for the value of the timber and also from a sylvicultural point of view:

Quality.—The wood is white, soft, even grained, easily worked taking a smooth surface and good polish. Weight 40 lbs. per cft. Tras strength 4.52 to the Sq. inch.

Uses.—The timber is used in India in the manufacture of toys, wooden spoons, forks, plates, combs, paper-knives, rulers, ornaments, bead necklaces, carved picture frame, tables and similar articles.

21 *Mango tree:* (*Mangifera Indica*)

Distribution.—A large evergreen tree found wild and cultivated. It is often found as a tall tree with a long straight stem of 10 and 12 ft. girth, 50 to 60 ft. to the first branch, and with a comparatively small crown.

Quality.—Grey brown to dark brown in colour, streaked with darker coloured tissue, hard, durable, and lasts, in water. Dugouts made of its last 12 years or more. It seasons well and does not warp or shrink when jointed. It is not a handsome timber, coarse and twisted in the fibre. Weight is 12 lbs. per cft. Co-efficient of transverse strength between 3.2 and 5.2 tons per Sq. inch.

Uses.—Extensively used for building purposes, in the shape of beams, rafters, and planks. Boats and ships are also made of this timber. Agricultural Implements, carts wheels.

Minor Products: Fruits

22 *Neem Tree:* (*Melia India.* Brandis)

Distribution.—It is doubtful if this tree is ever found in a wild state and though found in the forests nearly all over India, it has generally been sown or planted or sown itself from cultivated trees. Planted on roadside, near village sites.

Quality.—Sap wood grey, heart wood dull red in colour, fairly hard, durable, close-grained slightly scented. Weight 50 lbs. per cft. Co-efficient of transverse strength 2.55 to 5.125 tons per Sq. inch.

Uses.—Posts, beams, rafters, cart wheels, ploughs, oil mills, furniture, ship building, carved idols.

Minor products: Seed, leaves, barks.

23 *The Kusum tree:* (*Schleichera trijuga*)
Willd:

Distribution.—A large spreading tree of great economic importance owing to the value of its timber and seeds, and to the fact it is tree from which the best lac is obtained.

Quality.—Heart wood light red-brown, extremely hard and tough, durable, seasons on the whole well, a little liable to crack, generally only one crack forming. Weight

COMMON TIMBERS

68 to 70 lbs. per cft. Co-efficient of Transverse strength 7.64 tons per Sq. inch.

Uses.—Extensively used in oil mills and sugar cane rollers, axles, shafts of carts, naves, felloes, spokes and bolsters of timber carts, ploughs, tool-handles, rice-pounds, mortars and turnery.

Minor: Kusum oil and Kusum lac.

24 *Sal*: (*Shorea robusta*. See Forest Bulletin No. 46, 1921).

Distribution.—A large straight stemmed gregarious tree, and after teak the most valuable timber species found in Indian forests. It occupies two distinct regions:

The first forming a more or less continuous belt of forests at the foot of the Himalayas and running up the lower hills to 4,000 feet, the other occurring in central India.

The northern belt commences in the west with an outlying patch of *Sal* forest in the Kangra District of Panjab, the true forest belt first showing in the Ambala Siwaliks and running through the United Provinces, Nepal, the Darjeeling terai into the Nowgong District and Darrang Districts in Eastern Assam.

The Central Provinces group is more scattered, commencing in the east on the Ganges near Rajmahal and runs through the Santhal Parganas, Singbhum, Palamau, Sambalpur and Puri Districts. In Central Provinces, and also found in Orissa, the Northern circles and ending in Vizagapatam in Madras.

The total area covered by Government *Sal* forests, exclusive of the Madras areas, is computed to be 4,260,535 acres, or 6,657 Square miles.

Brandis states the *Sal* is capable of reaching a great size. Thus in gorges of Nepal Terai, it is found as a tree 100 to 150 ft. in height with a clear pole of 60 to 80 feet, and a girth of 20 to 25 feet.

It attains 60 to 80 ft. in height, with a 30 to 40 feet clear hole and 6 to 8 ft. in girth:

Quality: Strongest and most durable of Indian timbers. Sapwood whitish, heartwood light brown with a tinge of ink, darkening on exposure. Hard, coarse grained, fibrous, not easy to work to a smooth surface, and difficult to season—liable to split and warp. Weight 55 lbs. per cft. Co-efficient of Transverse strength, varies between 4.51 and 8.98 tons per Sq. inch, average 6.80 per Sq. inch. Darjeeling and Terai, *Sal*-planks are rather lighter, splitless, and cut into better planks than, Chota Nagpur and Orissa.

Uses.—Sleepers, House building, pile beam, rafter planks, agricultural implements, cart construction dugouts, helms, oars, masts, and in cooper's work for vats, wagons buffers, beams, brake blocks.

25 *Sagun Teak*: (*Tectona Grandis*)

Distribution.—Teak is found in India: western area—the northern limit runs a little above Rewa Kantha Agency, passing through Ratlam State, it turns northwards including outlying patches as far as Jhansi receding on the East coast. South of this line it occurs in varying quantities.

Quality.—Heart wood is golden yellow, when first cut, except that of old, twisted slow grown trees in which it is often dark-brown. On seasoning the colour turns brown to dark brown. C. P. and Deccan—it is streaked with darker bands: Weight 45 lbs. per cft. Coefficient of Transverse Strength: 4.53 tons per Sq. inch (by Everett)—7.66 tons per Sq. inch, pressure applied tangentially; when applied radially 6.91 per Sq. inch: with 10 per cent. moisture.

Lasts long.

Uses.—Various.

26 *Jarul*: (Syn. *L. Reginal Rox 6*). Natural order 1 Lythraceal, found throughout Assam, E. Bengal, and Chittagong.

Quality.—Very hard, Brown-red.

Uses.—Various, boat building.

27 *Sundri*: (*Heritiera*)

It is certain that the large sundri logs are no longer available from the Sundarbans though the timber classed as post and poles extracted from those forests finds a ready market in Calcutta.

28 *Gamhar*.

East Bengal & Assam.

Vernacular name: *Gomari*, *Gamhar*, *Gamri*, *Gambari*, *Gambhar*, *Bolkobak* (*Garo*)

Bengal: Jalpaiguri

The tree occurs in the forests of Assam. From 300 ft. elevation to 15,00 ft. as a rule, though it is reported at 4000 ft. in Garo hills. It grows in *Sal*, bamboo and evergreen forests but is never abundant and only the Garo Hills is it classed even as fairly common.

Trees, 12 ft. in girth, have been seen; 70 feet in height but the clear bole is as a rule not more than 30 ft. long, and the commonest maximum girth is 6 ft.

Yellowish or white, even grained, not very hard, light and strong, with handsome lustre, the annual rings being usually marked by a white line or pores in the spring wood. It is easily worked and takes varnish well, on the vertical section the pores show as fine wavy light brown lines. The rate of growth is fast, as few as two annual rings to an inch radius having been recorded. The Dehra Dun Specimens average four rings.

Durability.—The Timber lasts well as a rule in buildings and in fresh and tidal water, and does not warp or crack readily. Until it loses the bitter principle in the wood white ants do not seem to attack it.

Weight.—The average weight of the seasoned wood per cubic feet is about 36 lbs., the

COMMON TIMBERS

specimens weighed varying little, no example weighing more than 38 lbs. (Gamble). It can be floated after drying for a short time, but should not be kept long in rafts as it absorbs water and sinks.

Strength.—The value P, which represents the strength of a bar of timber calculated from the length between supports, breadth, and thickness of the bar, and the weight in pounds placed in the middle of this which causes it to break, is about 400, for sal it is 780; for Teak 600, for Shisham 796.

Fissibility.—From tests made by Puran Singh, when testing the Calorific power of 56 of the commoner Indian Timbers, found that the Gamhar comes about the middle of the list. The number of British Thermal units generated by this timber is 8,075. The same as one of the Gardenias. Yew gives 7,394. Bombay Malabaricum almost the same as Gamhar and Teak, Sal Deodar and Pines a good deal more.

Seasoning.—The timber seasons well and has long been known as a good wood to use when shrinkage is to be avoided. . . . It should not be used free as it shrinks to a certain extent when drying does not alter when seasoned.

Uses.—In Burma and Assam this wood is much used for dug-outs and elsewhere it is in great demand for planking, furniture, panels of doors, carriages, well work, decks of boat, toys, dolls, lacquered boxes, drums, yokes, grain measures, plane tables, carving, musical instruments. In Assam used for tea boxes, and suitable for match making sticks and inside boxes.

Extraction.—In Jalpaiguri, the tree is worked on coppice with standards but elsewhere the trees are selected by the permit holders subject to a girth limit, and the control of the forest department.

29 Gurjan.—Both in commerce and in ordinary forest work, the names Gurjan and Kangin are usually used in connection with several species belonging to the natural order dipterocarpaceae, and for practical purposes it is not important to distinguish the various species.

In the reports from which this note is compiled it is clear, even where this has not been definitely stated, that the information given has included more than one species.

The species covered by this note include:

- 1 *Dipterocarpus turbinatus*: Gaertu, Syn, *D laevis*, Ham.
- 2 *Dipterocarpus Alatus* Rox 6.
- 3 *Dipterocarpus Costatus* gaehtha.
- 4 *Dipterocarpus incanus* Rox 6.
- 5 *Dipterocarpus Griffithii* mig.

In London market the timber of *D. Tuberculatus* is also sold as Garjun, *D. turbinatus*, Gurjan, tiliya gurjan Bengal; Sal, Cacher,

Kanginni Burma; Maihao-Shan; Garjun Andamans.

Distribution.—*D. turbinatus*, occurs in the evergreen forest of Assam, Chittagong, Burma, the Andamans, and the lower levels of the western Ghats where it reaches an altitude of 1,500 ft. In the remaining regions it is more often found below 1,000 ft. though recorded at 3,000 ft. Mandalay division in Burma. In the evergreen forests *D. Turbinatus* and *alatus* are semi-gregarious tending to form pure patches.

All the species included above are amongst the largest of Indian trees. Trees of ten to fifteen feet B. H. girth, 120 ft. in height, with 60 to 80 ft. of clear bole are comparatively common. The stem is particularly straight and cylindrical and is sound up to large girths. The difficulty of moving the large girth butt logs is one of the chief causes of waste in exploitation. The crown is relatively small and compact.

Local Distribution.—

Bengal.—It is reported as growing in fairly pure patches in moist mixed forest on well drained soil up to 2,000 ft., mostly in Chittagong, and the adjoining Hills.

Assam, Bombay, Andamans, Burma.....etc.

Description of the Timber.—The wood is reddish brown and moderately hard, with slightly interlocked grain shown by the regular broad shiny bands on a radially cut longitudinal section. The pores on the cross section are moderate to large, circular, numerous, irregularly distributed, surrounded by soft tissue and connected by bands of wavy concentric light coloured fibre. The medullary rays are distinct, of two classes broad and fine, the former broadly and fairly regularly spaced, the latter unequally distributed and somewhat wavy. On the longitudinal section they are seen as small plates 1/8" to 3/16" deep.

Weight and strength.—The weight of various species included under the name of Gurjan range between 45 and 50 lbs. per Cu. ft. for ordinary air dry timber. No moisture percentage records have been recorded. Strength and durability: The value of P for Gurjan varies between 727 and 762 or from 5.84 tons to 5.93 tons per Sq. inch. The Strength under transverse strain is between 6.44 and 7.2 tons per Sq. inch. For compression the strength is from 2.20 to 2.46 tons per Sq. inch. For shear, from 0.48 to 0.52 tons per Sq. inch.

The above figures represent the nearest average to tests under standard conditions.

Gurjan timber is not durable when exposed to weather. Its decay is started by fungus which develops on the oleo-resin contained in the timber (Nisbet and Groom). Under cover it lasts well if protected from white

COMMON TIMBERS

ants. Rolertson has observed that Gurjan logs buried in the mud of road borrow pits after remaining there for three years showed no sign of decay even in the sapwood.

Use—Cheap planking for house building and stowing cargo a considerable amount being taken for rice cargoes. At present there is a steady demand for it in Calcutta, in London market, for flooring, parquetry, panelling.

Railway sleepers, untreated Gurjan sleepers have not given very satisfactory results.

Minor products—All the species referred to and specially *D. alatus* and *D. turbinatus* yield an oleo-resin obtained by cutting a deep notch or box towards the base of the tree. The notch is made pyramidal in shape, the lower surface, being hollowed to receive the oil. The flow of oil is stimulated by lighting a small fire in the notch, which is freshened at intervals by further chipping and burning of the upper faces. The yield is greatest during the hot weather.

On distillation the oleo-resin, yields an essential oil and a viscid resin. Owing to the oleo-resins of the various species being mixed in the ordinary trade oil the chemical constituents are not ascertained with certainty.

The chief indigenous use of the oil is for illumination purposes, usually in the form of torches made of rotten wood wrapped in the leaves of *Licuala peltata*. The oil cloth used for Burmese umbrellas is water proofed with this oil.

It can also be used for painting, a mixture of this oil and metallic paint having proved successful in the Andamans.

In medicine it is used for the treatment of ulcers. The crude oil is also used for the sores on the hoof in foot and mouth disease and the resin has been used as a substitute for copaiba in the treatment of Gonorrhoea. The resin has been tried as a varnish and in preparing lithographic ink but it is not certain whether in this there has not been confusion with the resin of *D. tuberculatus*.

30 *Sain* or *Saj* *Terminalia tomentosa* L:

Natural order.—Combretaceae.

General Distribution—This tree is one of the commonest and most widely distributed in India, being found in abundance in the U. P., Bombay, Madras, Bengal.

Locality and Habitat.—The range of this species is very wide as it is found almost from the Sea level in Peninsulas up to 4,000 ft. It grows best, however, between, 200 and 2,000 ft. becoming stunted on the higher levels. It prefers deep fresh loams containing more clay than sand, and is often found on low-lying moist localities, and in nullahs as it is able to stand a good deal of water logging. It is one of the few species which

grow abundantly on black cotton soil in the C. P. though it remains stunted in such localities. On laterite it is found in great abundance in certain districts but is often small and crooked.

It is a tall straight tree with spreading branches and heavy crown. May usually be recognised by the very thick rough dark-coloured bark which is deeply cracked longitudinally. It loses its leaves annually during the hot weather and produces a new flush after most of the surrounding species, sometimes not until the end of June the flowers appearing during the rains. On the higher and barer slopes the leaves are rather large and are covered with down, but in the localities which suit it best they are smaller, thinner and smooth.

Durability—It decays as a rule when used in the open, but has found to last well occasionally in the ground as railway sleepers, and in other exposed situations. It is very durable when used as beams inside houses, and in other airy sheltered spots. In damp, it is almost sure to be attacked by dry rot which destroys wood which has not been antiseptically treated.

Weight—Ordinary weight 59 lbs. very much the same as Sal.

Strength—The value of P. 827 (Gamble) Sal 790.

Fissibility—From tests made by R. S. Troupe the timber appears to be fairly easily split. The figure given by a number of tests made in different ways is 4.63 (Teak giving the figure. 1.75 Chirpine 2. Acacia catechu 2.98 and Sal 9.33).

Calorific Power—The heat producing power of the timber is very high, being with Sal almost at the top of the list of 56 common Indian woods tested by forest Chemist Puran Singh. Only two species, both conifers, are above Sal and Sain and it is a good fuel and charcoal wood.

Seasoning—In central and south India the timber is often soaked in water for a month or two after felling and barking which is said to increase its durability. The lighter heartwood between the centre and the outer circumference also becomes darkened in colour by this means.

Uses—The timber is used all over India for building purposes. Usually as beams, rafters, and occasionally ceiling planks. It is also used for carts, ploughs, dolls, irrigation water wheels, bedsteads.

Minor Products—The bark used for tanning skin, preserving Nets, and an astringent gum is obtained.

Fruit has been found to contain 4 per cent. of tannic acid. In western Bengal and Hyderabad the tree is the mainstay of Tasar silk Industry being pollarded before the rains to provide young leaves for the caterpillars.

COMMON TIMBERS

Natural Reproduction & Rate of growth—Few trees show better natural reproduction than this, both from seed and coppice shoots.

Artificial Reproduction.—Sowing and planting has been tried in all provinces with good results on the whole.

Eastern Bengal & Assam—

Vernacular names—*Amari, Asna, Sain, Paka Saj, Asan.*

Local distribution—The tree is rare almost all over the province and does not occur in many of the forests at all. It appears to be common only in the Jalpaiguri forests adjoining N. E. Bengal and is there found up to 700 feet above sea level, usually in mixed forests and rarely with Sal, trees 8 feet in girth being found with a clear bole of 40 feet.

WOODS FOR MATCH INDUSTRY

VII(b)

Woods Found Suitable For the Match Industry in West Bengal

The following woods have been considered for their suitability as match wood in West Bengal:

- | | |
|---|---|
| 1 <i>Anthcephalus Cadamba</i> : Kadam | 50 (Not known): Jamujya |
| 2 <i>Salmalia Malabaricum</i> : Simul | 51 (Not known): Lowsera |
| 3 <i>Duabanga Sonneratioides</i> : Lampati | 52 <i>Magnifera Langipes</i> : Uriam |
| 4 <i>Eleaocarpus Lanceaefolius</i> : Bhadrasi | 53 (Not known): Kalatali |
| 5 <i>Gmelina Arborea</i> : Gambari | 54 <i>Ficus Cunia</i> : Jogdumar |
| 6 <i>Hymenodictyon Excelsum</i> : Latikaram | 55 <i>Swintonia Helferii</i> : Chundal |
| 7 <i>Kydia Calycina</i> : Kubinde | 56 <i>Elaeocarpus Rugosus</i> : Titpoi |
| 8 <i>Mallotus Phillipinensis</i> : Sinduri | 57 <i>Ficus Benjaminia</i> : Jirbot |
| 9 <i>Erythrina Indica</i> : Phallida | 58 <i>Alnus Nepalensis</i> : Utis |
| 10 <i>Spondias Magnifera</i> : Amra | 59 <i>Lindera Pulcherrima</i> : Sisi |
| 11 <i>Sterculia Villosa</i> : Udal | 60 <i>Machilus Sp.</i> : Kawla |
| 12 <i>Trewia Nudiflora</i> : Pitalli, Ramritha | 61 <i>Phoebe Attenuata</i> : Lapcha Kawla |
| 13 <i>Garuga Pinnata</i> : Dabdabi | 62 <i>Litsaea Elongata</i> : Thulo Paieli |
| 14 <i>Odina Wodier Lannea</i> : Hollory, Bhadi (Chittagong) | 63 <i>Lindera Assamica</i> : Paielli |
| 15 <i>Cassearia grandis Glomerata</i> : Barkholi | 64 <i>Michelia Sp.</i> : Ghogay Champ |
| 16 <i>Macropanax Undulatum</i> : Chinde | 65 <i>Cyptomeria Japonica</i> : Dhupi |
| 17 <i>Ostodes paniculatus</i> : Bepari | 66 <i>Symplocos Sp.</i> : Kharani |
| 18 <i>Sterculia Alata</i> : Narikel | 67 <i>Symplocos Sp.</i> : Kholme |
| 19 <i>Sterblus Asper</i> : Sheora | 68 <i>Acer Sikkimense</i> : Lahara Kapasi |
| 20 <i>Buchanania Latifolia</i> : Chipit | 69 <i>Prunus Nepalensis</i> : Arupati |
| 21 <i>Swintonia Floribunda</i> : Boilan | 70 <i>Michelia Lanuginosa</i> : Phusre Champ |
| 22 <i>Crataeva Religiosa</i> : Barun | 71 <i>Abies Webbiana</i> : Gobre Salla |
| 23 <i>Vitex Glabrata</i> : Arsal | 72 <i>Tsuga Brunnoniana</i> : Thungre Salla |
| 24 <i>Macaranga sp.</i> : Mallata | 73 <i>Echinocarpus Dasycarpus</i> : Gobre |
| 25 <i>Disoxylum Binectariferum</i> : Lasunia | 74 <i>Acer Campbellii</i> : Kapasi |
| 26 <i>Amoora Rohituka</i> : Lasunia | 75 <i>Evodia Fraxinifolia</i> : Khanakpa |
| 27 <i>Bauhinia Purpurea</i> : Taki, Kanchan | 76 <i>Engelhardtia Spicata</i> : Mowa |
| 28 <i>Callicarpa Arborea</i> : Gochlo Bormala | 77 <i>Excoecaria Agallocha</i> : Gengwa |
| 29 <i>Alstonia Scholaris</i> : Chatiwan | 78 <i>Sonneratia Apetala</i> : Keora |
| 30 <i>Oroxylum Indicum</i> : Totila | 79 <i>Avicennia Officinalis</i> : Baeu |
| 31 <i>Dillenia Pentagyna</i> : Tatri | 80 <i>Bruguiera Gymnorrhiza</i> : Kankra |
| 32 <i>Schima wallichii</i> : Chilanni | 81 <i>Cynometra Ramiflora</i> : Shingra |
| 33 <i>Xanthoxylum Budrunga</i> : Timur | 82 (Not known): Bhayla or Bhadal |
| 34 <i>Engelhardtia Spicata</i> : Mowa | 83 <i>Carapa Moluccensis</i> : Fussur |
| 35 <i>Evodia Maliaefolia</i> : Khanakpa | 84 <i>Tetrameles Nudiflora</i> : Mayna |
| 36 <i>Litsaea Polyantha</i> : Kutmero | 85 <i>Beilschmeidia Sikkimensis</i> , King: Tarsing |
| 37 <i>Sarcosperma Arboreum</i> : Kalikat | 86 (Not known): Lapchebis |
| 38 (Not known): Setokat | 87 <i>Betula Cyliandrostachys</i> , wall: Saner |
| 39 <i>Holarrhena Antidysentrica</i> : Khira | 88 <i>Michelia Cathcarti</i> , KH.f.: Titechamp |
| 40 <i>Prunus Persica</i> : Aru | 89 <i>Leucosceptrum Canum</i> , Sm.: Ghurpis |
| 41 <i>Sapium Eugenifolium</i> : Siplikhan, Pipalpati | 90 <i>Eurya Japonica</i> , Thumb: Jhingl |
| 42 <i>Trema Orientalis</i> : Kuel | 91 (Not known): Amchure |
| 43 <i>Wrightia Tomentosa</i> : Dudhi | 92 <i>Stereospermum Chelonoides</i> : Parari |
| 44 <i>Premna Latifolia</i> : Gineri | 93 <i>Ailanthus Grandis</i> : Setogokul or Gokul |
| 45 <i>Elaeocarpus Robustus</i> : Bepari | 94 <i>Marlea Begoniaefolia</i> : Bangi |
| 46 <i>Polyalthia Simiarum</i> : Lapchakat | 95 <i>Cordia Myxa</i> : Bohri |
| 47 <i>Meliosma Pinnata</i> : Athalia | 96 <i>Eugenia Jambolana</i> : Jam |
| 48 (Not known): Khagulia | 97 <i>Ficus Gemella</i> : Dudhila |
| 49 (Not known): Surya | 98 <i>Meliosma Simplicifolia</i> : Patpati |
| | 99 <i>Pterospermum Acerifolium</i> : Hatipaila |
| | 100 <i>Canarium Sikkimense</i> : Gokul-dhup |

Department of Industries, Bengal, Bulletin No. 16.
 1923, Pp. 17-28

Report on the Investigations into the Possibilities of Match Industry in Bengal (1923), Pp. 17-28

Pith and the Pith Industry

The Malakar or Mali caste of Hindus as a rule acquire the hereditary and exclusive privilege of manufacturing garlands for ceremonial use and articles made of pith such as Topar, Sinthi, Mayur and other ornaments for ceremonial use during marriages and rituals. To ensure the supply of flowers needed for making garlands, many malakars have gardens adjoining their homes.

A mythological anecdote concerning the origin of this caste goes as follows. The founder of the caste was a person whose duty it was to supply garlands to the court of Kangsha, the demon king of Mathura. When God Krishna went to Mathura to kill Kangsha and was engaged in suitably disguising himself for the purpose, he saw the malakar on his way to the demon-king's court, carrying the customary garland. Krishna called him up and asked him to bedeck his head with the garland. The Malakar readily obeyed. But seeing that the garland was not properly fastened on the headdress, Krishna asked him to tie it up with a piece of string. Having no string handy, the malakar tore off a few strands from his sacred thread and used them for tying. At this sacrilegious act Krishna grew angry and uttered a curse that since the malakar did not recognise the sanctity of the sacred thread he had forfeited his right to wear it, adding that he would have to atone for his sin by becoming a sudra. Since then the descendants of that noble malakar have lost the privilege of wearing the sacred thread and have been relegated to the category of Sudras.

Malakars have often been mentioned in the writings of Bharatchandra. Although Malakars are considered by many as a hybrid caste, they are, nevertheless, legally included among the Navasakhs of the nine artisan castes of Bengal like the other higher caste Hindus, the Malakars also hold that they migrated into Bengal during the rule of Badshah Jehangir. One or two families of malis are seen practically in every Bengal village. Their job is to supply flowers and articles made of pith to the villagers.

The Malakars can be divided into two broad groups. First, there are the *Phulkata* malis. These make sola topees, *topars*, toys, ornaments and other articles. The second group is the *Dukani* malis. These malis run flower stalls and sell flower garlands, and articles made of pith such as topar, toys, etc. The *Phulkata* malis are, again, divided into three classes known as Rahri, Barendra and Atgharia. The groups belong to either of the four classes of Alprayan, Kashyap, Maudgalya, and Sandilya. Like the other higher

castes, intermarriage between the members of the same class of malakars is taboo.

According to Dr. Wise the Malakars of the Dacca District could be divided into two separate groups. Although similar in most respects the marriage and other rites of these two groups are seen to differ considerably. Inter-marriage between these two groups is disallowed—endogamy is the rule. If, however, an inter-group marriage takes place, the bridegroom is compelled to throw a feast and invite members of both the groups. In marriages, the bride's party does not have to pay a heavy dowry. Child-marriage was very prevalent and widow-remarriage is taboo. If a married woman sins, she is immediately made an outcaste. Even her husband has to undergo penances expiating himself of the sins of his sinning wife.

All malakars are Vaishnavas and they are initiated by Gossains, their family gurus or preceptors. In other rituals, the proceedings are conducted by the customary priests of the Navasakh castes. Those who own land do not till it themselves. They do it by hiring labourers.

Articles made of pith are mostly used in the various Hindu ceremonies and rituals and for making dresses and ornaments for clay images of gods and goddesses.

With the coming of the British in India, Sola topees or hats (sun helmets) came in vogue and Calcutta can be called the originator as well as the principal centre in India for their manufacture. Formerly it was not only in great vogue in India but used to be exported in large quantities elsewhere. These topees have, however, of late gone out of fashion.

The soft sola (*A. aspera*) is used in surgery for insertion into the opening of the sinus for abscess since it rapidly absorbs moisture, expands, and thus widens the opening. A long article on the *Chemistry of Sola* by Hannock and Dahl will be found in *The Chemical News* (July 12, 1895). The leaves of the sola plant are sometimes used as a pot-herb, and an Oil is extracted from the seeds.

Scientific name

ASCHYNOMENE INDICA, Linn., the Kat or Kath (hard)—sola, Kuhila, Kathl-adhendor, etc. The Chirmilli or sirmilli is *SEBANIA* and not *AESCHYNOMENE*—a plant often used as a substitute for sola.

Habitat: on land annually inundated or within the margins of tanks or lakes throughout Bengal.

Distribution and Season.—Not systematically cultivated, but in November and December

PITH INDUSTRY

the upper portions of *AE. aspers* bearing pods are severed and thrown on the water and the seeds thus become self-sown. The roots are also perennial. By February—March the pods are ripe and the pith-yielding shoots over-ripe; the stem then becomes dry, shrunk, and discoloured, whilst a large cavern forms along the centre. The plant usually grows in form 2 to 4 or 6 feet water.

Cork—Substitutes.—Roxburgh recommended its adoption as a substitute for cork in the manufacture of swimming-jackets and life-boats.

Preparation.—The thicker portions of the stems only are cut into lengths of 2-3 feet. These are tied into bundles and stirred until dry, when the brown bark is removed and the pith cut up as required. If intended for the manufacture of hats, caps, or frames of puggies, it is split into thin sheets for this purpose, the stem is held in front of the operator and with a long thin, sharp knife is stripped spirally, the knife being made to travel round and round within the thickness until the whole stem is reduced to a sheet not much thicker than note-paper. Hats, etc., are worked up on wooden or clay moulds and are built up layer upon layer of sola sheets pasted one on the top of the other.

Pith today is largely used for making topar, sinthis, toys, *dac* dresses, i.e., dresses made with pith and tinfoils and threads for images of gods and goddesses, for lining the tops of palanquins, for seats and cushions and also for the ornate tajias used in Muhurrums.

The introduction of matches has practically rendered obsolete the domestic use of sola as a tinder with flint, but the pith is now made into covers for water-bottles, stoppers for medicine-bottles, and plugs to widen earing holes in the ears. It is also employed as a lining for the tops of palanquins and for seats and cushions, as also for the ornate Muhammadan tazias used at the Muharram. The cheaper pith of *AE. indica* is usually employed for fishing floats, fishing baskets, rafts and swimming belts, as it is supposed to be specially durable in water. Where procurable in abundance it is said to be especially useful in firing pottery, and the charcoal made from it is highly prized in the manufacture of gun powder.

Sola is also used in making gums by mixing it with Gandhabiraja flower and wax or the gum of tamarind seeds.

Malakars are said to lease fields growing pith. The rates are from Rs. 5 and Rs. 6 to Rs. 8 and Rs. 10 per bigha. The pith plants are first collected and dried in the sun. Previously a standard roll of kaap used to be sold at about three annas; now the prices are between six and eight annas a roll.

The following is an account of dyes used in the manufacture of sola articles in the nine-

teenth century (taken from Francis Buchanan Hamilton, 1810).

The colours which these people (Sola workers) employ are orpiment, vermilion, white lead, red lead, verdigris, and white talcose earth called khori, which is brought from the West India, and is similar to that which is prepared at Mailcotay, of which I have given an account in my travels into Mysore. The garland makers use also ink, such as is employed by the natives, and the best kind is prepared as follows:—Take 20 sicca weight of rice, parch it in pot until it becomes quite black, put in it 60 S.W. of cold water, and allow it to remain a quarter of an hour. Then pour off the water, and mix it well with lamp black, by rubbing it in an earthen pot with a stick or wooden pestle. On sicca weight (179½ grains) of lamp black is sufficient. For fine writings a little gum of the *Mimosa indica* (tree No. 59) is added. What is commonly sold in shops, however, is made of soot in place of lamp black. The garland makers use also vegetable dyes. The inner bark of the *Nyatantis Arbor tristis* (tree No. 16) is beaten in a mortar. Its juice is expressed, mixed with lime, and by means of a brush is applied to a sola, to which it imparts a red colour. Another red is prepared by 12 parts of the same bark, with 16 parts of the inner bark of the *Agtocarpus* (tree No. 103) and 8 parts of water. These are well beaten, and then the water is expressed and used as a dye. The glue which these artists employ is made by boiling the inner bark of the tree No. 107, then beating it, and expressing the water, which has a glutinous quality. The tinsel which these artists use is partly tin foil of various colours, and partly plates of mica.

Ornaments and other objects made of flower

Hand-fans, bouquets, garlands for wearing on hair-dos, ornaments used by the bride on the night of the Phul Sajja or the flowery bed, Gor-garland or the garland worn by the bridegroom, garlands, ornaments for wearing on the head and the forehead like crowns, tiaras, Sinthis, etc.

The following is a list of ornaments, etc., and toys made of pith.

Ornaments

Gharbeni—for the coiffure

Makarmukh—ornaments

Chandani—worn on the ear

Kanbala—ear rings

Paijor—for the feet

Pancham

Baju—for the arm

Tabij—for the arm

Churi—for the wrists

Bichha—for the waist

Chandmala—moon and stars for the forehead

Kalka—paisley patterns

Mukut—tiara

PITH INDUSTRY

The ornamentation for covering the wooden background behind the goddess Durga, made in the shape of a border about a cubit.

Sari—cloth
Anchla—border
Set of Ornaments
Mayurmukh—peacock
Kadamphul—Kadamba flower

Sola toys sold at the Rash mela or other Melas

Cockatoo
Parrot
Lalmohan
Hiramohan
Flowers
Loldins, etc

PLYWOOD

IX(a)

Plywood

All woods tend to be too narrow in width to serve all purposes. Consequently when timbers of a specific width above their natural breadth are required, it is necessary first to saw them lengthwise into several pieces and then join them up sideways as required. So rare are the broader varieties of timbers that their prices are almost three times as much as the same width made up by joining two or more separate pieces.

Plywood was devised as an inexpensive expedient to do away with the natural disadvantage of inadequate breadth, common practically to all kinds of timbers. Plywood is made not from teak or mahogany but from ordinary timbers, most of which in fact were so long considered as practically unsuited for use. This is done by seasoning the timbers properly.

Plywood manufacture in India, for all practical purposes, may be said to have begun from the period of World War II. Although the industry has made some headway, the quality of locally made plywoods still remains rather poor.

Raw materials—

The main raw materials required in the industry are wood and glue. The commonest varieties used are mango and sishu timbers which are not only plentiful in supply but lend themselves well to peeling, the principal operation in the making of plywoods. Most of the supplies of these timbers come from the districts of Nadia and 24-Parganas and are brought to Calcutta mainly by country boats. Wholesale timber godowns are mostly localised at Ultadangi, Manicktola and Beliaghata and a few other places. Some plywood manufacturers get their supplies direct from mofussil areas. The market rates are quoted on the basis of maunds or tons. The owners of plywood factories buy timbers to suit the sizes of their peeling machines. These machines are of various sizes ranging up to 5 or 6 feet and although timbers of smaller sizes can be peeled on them, timbers of big sizes cannot be peeled in small machines. The peeling operation begins with the fixing of the centre of the timber and cutting a groove at the centre to drive in the punch. The punches are generally made by skilled mechanics. Next, the timber is placed on the peeling machine and the outer bark is peeled off. The actual peeling then starts when the peeler is set to the proper thickness and the wood comes off in the shape of a continuous strip of the thickness of paper usually 1/16" thick. The peeling machine has to be manipulated very dexterously otherwise the wood is liable to be broken during the opera-

tion. There is usually quite an amount of waste and the plywood comes out in the shape of thin sheets ten to twelve feet long or even longer. The thin paper-like rolls or sheets of plywood are then put out in the sun to dry. If the wood is injured or damaged or is wormed, the plywood will be of a poor quality. If the machine is not steadily worked during the peeling, the plywood suffers in quality.

When these pieces of plywood are a little dry, they are joined up. Normally moisture meters are not used by the operators to ascertain the exact degree of dryness; the rule of the thumb prevails.

Glue—

Cassein serves as the principal base of the glue used for joining plywood. The composition of 6½ lbs. of glue is as under:

Cassein	4 lbs.
Lime	1 lb.
Caustic soda	1 lb.
Copper sol	½ oz.

Cassein has to be first soaked in cold water and then the other ingredients are mixed. A little copper sulphate sol is used which serves to make the glue insect-proof. Application of glue is not a very difficult job, the only consideration being its economical use. The pieces of plywood are cut up into appropriate sizes and are then glued together. The strength of the plywood depends largely on the quality of the glue, and the skill of pasting. When pieces of plywood are arranged lengthwise, it is necessary to place another set of plywood breadthwise to act as supports. The texture of the plyboards thus resembles the warp and woof in weaving. The maximum number of pieces used to make a plywood board is 7 and the minimum 3. After the plywood is glued, it is kept in a press for 2 or 3 days. After the boards are removed from the presses, they are spread out in the open and if possible in the sun. After being kept for a while in the open, plywoods are sawed into the sizes required.

The rejected pieces of plywood are not useful for any other purpose except perhaps for making match boxes and are consequently disposed of at a cheap rate for serving as fuel. A maund of them costs between 12 annas and a rupee. Plywoods are sold either by the hundred or by the dozen or in sets.

The principal consumer of plywoods is the tea industry. Plywood chests are now the standard containers used in exporting tea though it should be mentioned that inferior qualities of tea are often packed in sacks. Tea chests are available in a number of sizes,

PLYWOOD

Plywood chests—

6 pieces of plywood are required to make a chest—one each for the four sides and two for the top and the bottom. It is hardly necessary to add that the sizes of the sides are always equal. The capacity of the chests vary—they are available in 90 lbs., 120 lbs. and other sizes. In addition to the plywood the chests have a thin iron frame and hinges made of thin sheet iron fixed on the outside of the chest for convenience in opening. A hole, about 2" in diameter, is left at the top of the chest to pour in and pour out the tea. The opening is fitted with a cap made of tin.

Plywood furniture—

Thick varieties of plywood are used in making chairs. Plywood can be sawed and drilled but cannot be chiselled. It is always necessary to handle the plywood with care. Plywood seats can be fixed on to the frame of a chair by means of screws and nails. Plywood boards can also be mounted on the frame at the sides of cupboards, racks, and almirahs. Table tops are also often made of plywood but locally made plywoods are not quite suitable for the purpose. Plywood is widely used in buses and in the ceiling of rooms by mounting them on suitable frames. Small boxes, the back of picture frames, etc., provide other uses of plywood.

Indoor games—

Carom and bagatelle boards are mostly made of plywoods and they help to consume large quantities of them. The plywoods used for such purposes have to be chosen carefully to ensure that they lend themselves to perfect smoothing and finish by absorbing the varnish applied. The standard sizes of carom boards are 2 ft. square and 3 ft. square. The carom board is framed by a wall about 2" or 2½" in height and the board is mounted on a frame consisting of strips of wood intersecting each other at right angles, in order to prevent the board from warping. The boards are fitted with four pockets at the four corners which are 2" to 2½" in size. The surface of the board is marked as required. The carom men are made of simul or sishu wood and are turned. A set of nine white and nine black carom men and a red one make a complete set. The cost of an ordinary board today varies from Rs. 5 to Rs. 10 and are sold at stationers' or at sports dealers'. Sometimes orders for such boards can be placed direct with small carpentries. The finishing is given by synthetic paints. Chess boards are also made of plywood, the standard size is 16"×18". Prices vary from Re. 1 to Rs. 1-8 for the chess men extra. Tea trays made of plywood are sold at Re. 1 or Rs. 1-8 per piece. The earnings of

a skilled worker are Rs. 3, Rs. 4 a day—sometimes more.

Plywood is also used for making boxes with ornamental designs, wall shelves, soap cases, lampstands, incense covers and many other products.

Various perforated designs are also made by means of fret-saws on plywood. The design is first pasted upon a piece of plywood. It is then sawed off along its outline by means of a fret-saw and mounted upon a pedestal, about 1 to 2 inches in height. The framework resembles lacework in execution has a wide demand, and is sold in large numbers at places of pilgrimage, melas, stationery shops, etc. Prices vary from eight annas to a rupee. Another useful article made from plywood is the box or small chest to hold homoeopathic medicines. The mechanism is simple. The inside of the box is covered with a board which has anything between ten and hundred holes with a diameter a little bigger than the size of the homoeopathic phials. Customers sometimes supply their own wood. The fees charged for making a box vary from 2 as. to 8 as. depending on the amount of the work.

Covers for pocket or desk mirrors are also made of plywood.

Matchbox trays—

Many people are under the impression that one-ply woods or small pieces of plywood cannot be put to any useful purpose. But rejected one-ply woods are used for making trays for matchboxes. These trays are made by contract workers out of raw materials—plywood, paper, etc.,—supplied by the match manufacturers, and are sold to them by the thousand. Both male and female workers are engaged in making these trays. The wage rate for making trays is about 12 annas a thousand. As to the outer case of the matchboxes, the manufacturers make it for themselves. (Even trays are now mostly machine-made at the factory—A.M.)

Slate pencil boxes—

The top and bottom of these boxes are made of wood while the four sides are of plywood. Large numbers of these boxes are made as there is a wide demand for them. Prices of boxes range from 2 annas upwards.

Templates for tailors are made of plywood. Prices are Rs. 2 or Rs. 3 each.

The inner board for bolts of shirtings and piecegoods are made from plywood 8" in width and 48" long. Price Rs. 2 each.

Models—

Models of houses and buildings, workshops, relief maps, etc., for display at exhibitions, are made of plywood.

Frames, partitions, doors, etc., are also made of plywood.

BOBBIN INDUSTRY

IX(b)

The Bobbin Industry

Cylindrical hollow bobbins have been manufactured for handlooms in our country for a long time now. The demand for these bobbins was, however, limited. Consequently no groups of people were exclusively engaged in their manufacture. As a matter of fact people who used to make the cylindrical hollow stems for hubble-bubbles also manufactured bobbins as a side line. The only tools used for their making was the bow string lathe. Even until recently machinery driven by either electricity or oil engines was not used.

Until World War II all bobbins used in jute mills were imported. It was during the war years that attempts were made for their manufacture here. When, like many another useful product, the imports of bobbins were restricted during the last war, its manufacture received the necessary fillip. The first sample bobbins were made with the help of simple lathes. Later, some machinery was improvised to make them. For shanks, grooves are made on pieces of wood, the punch driven in to mount them on the machine. When the machine operates, chiselling is done as required and are manufactured according to specifications, regulated by the use of a compass. The shank is hollow inside.

Bobbins were made in a rough and ready manner, not devoting much attention to precision work and even a standard weight was not thought to be strictly necessary. The main concern was to meet the wartime requirements of the jute mills, and keep them going. The Indian Jute Mill Association encouraged some local manufacturers to undertake the job and it was at the request of the I.J.M.A. that the Industries Department of the Bengal Government helped in establishing the bobbin manufacturing industry.

There are many jute mills in and around Calcutta and their total annual demand of bobbins is around 73,500 gross. In 1946-47 the output of the local manufacturers reached the figure of 39,900 (roving bobbins 13,500 and spinning bobbins 26,400) gross; in other words about half of the total demand was met.

Before the war, the yearly imports of bobbins were about 2,300 tons which means 55,000 gross complete bobbins and 20,000 gross bobbin ends. At present imports have practically been stopped. It is difficult to import anything from dollar or hard currency areas and even in the case of sterling areas, there is a monetary ceiling to imports.

According to the I.J.M.A. imports of bobbins were cut down by about 63 per cent. during

1948. But the All-India Jute Mill Bobbin Manufacturing Association contend that although the imports of complete bobbins are restricted, there is nothing to prevent the import of bobbin ends and parts. Thus practically all jute mills have recourse to the latter, thus undermining the import restrictions on bobbin. It appears that in making this statement the Bobbin Manufacturing Association have the foreign jute mills in view. To assess the situation correctly the Tariff Board has suggested that "in order that the extent of competition between imports and indigenous bobbins may be correctly assessed we recommend that the annual statement of the Seaborne Trade should also record separately the numbers of (i) Jute mill bobbins and parts (ii) Cotton mill bobbins and parts, (iii) other types of bobbins such as those required for woollen, silk and rayon mills".

In their Memorandum published on June 22, 1948, the I.J.M.A. published statements detailing their annual bobbin requirements. According to these statements the annual requirements could be computed at 74,500 gross in case of Indian bobbins and 41,600 gross in case of foreign bobbins. No mention of bobbin ends was made in these statements.

The above statements were, however, not accepted by the Indian Jute Mill Bobbin Manufacturers Association. They do not agree with the I.J.M.A.'s view of the interior durability of Indian bobbins. Apart from the I.J.M.A., the Priority Assistance Advisory Panel on Jute Industry also submitted a report on the requirements of bobbin of the Indian Jute Mills basing their calculations on the data supplied by the I.J.M.A. for the year 1944. According to the Panel Report the yearly demands were found to be 75,000 gross bobbins (roving bobbins—10,000; spinning bobbins—40,000; bobbin ends—25,000).

The Tariff Board has, however, accepted the findings of the Panel Committee and has made its recommendations on that basis.

Taking the total demand of bobbins to be 75,000 gross a year, we have seen that in 1946-47, the year of peak production, the Indian manufacturers were able to meet only about half of the demand. It should be mentioned here that the quality of Indian bobbins is still considered to be very poor by the Jute mills. Even during the war, only about a third of the jute mills used India-made bobbins, the rest used imported ones. Even if it is admitted that the market is equally divided between Indian and imported bobbins, the foreign jute mills hold that they are only half as durable as imported bobbins.

BOBBIN INDUSTRY

The Bobbin Manufacturers' Association, however, do not agree with this view. They add that if the millowners buy their bobbins they are in a position to meet the entire requirements of the country.

The controversy over the quality of locally manufactured bobbin still persists. The consensus of opinion of the users including both Indian and foreign jute mills, hold that Indian bobbins are of an indifferent quality. M/s Gourepore Co., Ltd. (Calcutta), stated that the wood used for making bobbins locally were not properly seasoned. Besides, the workmanship is also careless. They are not accurately manufactured nor properly finished. The result is that many bobbins do not conform to the standard gauge in the matter of sizes, bore and shank. It is estimated that sometimes nearly fifty per cent. of the materials supplied are rejected on the above ground. The Company agree that the Indian bobbins have, of late, shown some improvement in the matter of quality but there is still plenty of room for improvement.

M/s Hukumchand Jute Mills state that the locally manufactured bobbins are doubtless usable though the quality of the wood and the workmanship are poor. They too hold that in the matter of durability Indian bobbins are not even half as good as foreign ones.

The Bobbin Manufacturers' Association, while admitting the fact that these statements contain some truth, assert that bobbins manufactured by firms affiliated to the Association are in no way inferior to foreign products. They go on to add that jute mills instead of buying bobbins directly from the bobbin manufacturers get their supplies at a cheaper rate from mill stores suppliers whose products are not always dependable. Accordingly they hold that the only way out of the present impasse lies in jute mills placing orders directly with bobbin manufacturers. If the latter can have an idea from beforehand of the requirements of their clients, they can plan their output accordingly and season the wood as required. The Director-General of Industries and Supplies also hold that some bobbin manufacturers get their supplies of wood regularly while others do not, as a result of which they are unable to season them properly.

Raw Materials—

Wood is the most important raw material for the manufacture of bobbins. The principal timbers used are mango, Haldu and Kalam. The selection of these trees is fully endorsed by Mr. C. Purakayastha, Development Officer (Timber) of the Directorate of Industries and Supplies and Mr. M. A. Rahaman, Wood Seasoning Officer, Forest Research Institute, Dehra Dun. It may

be mentioned in this connexion that during the wartime, the manufacturers of cotton mill bobbins used exclusively Haldu and Kalam timbers for making bobbins. But since 1946, some bobbin makers have been importing birch and beech timbers from abroad. They feel that bobbins made of these timbers can only compete with foreign products. Others, however, feel that locally available timbers like Haldu have been found wholly satisfactory by millowners. It is their opinion that there is nothing wrong with these timbers as such, the defects that arise are because of mistakes in handling, preserving and seasoning the timbers. It has been found that "in many cases the logs of wood suffered serious deterioration owing to long exposure to sun and rain before being used for manufacturing bobbins. . . . many of the bobbin factories did not have a seasoning kiln and proper machinery and tools". Mr. Rahman and Mr. Purakayastha are of the considered opinion that Haldu and Kalam timbers are also ideal for manufacturing cotton mill bobbins. Excellent bobbins can be made with them if only the logs of wood were properly treated and the necessary machinery were available.

The trees mentioned above grow all over the country and given proper transport facilities would be plentifully available. Most bobbin manufacturers get their supplies of timber from the villages adjacent to Calcutta. Before partition, Calcutta manufacturers used to import these timbers in boatloads from East Bengal.

Even now the supplies come to Calcutta in country boats. These are brought to wholesale stockists of mango logs in Ultadingi, Beliaghata, Manicktola, Nimtollah and other places, and are sold by the ton. The timber merchants move from village to village looking for suitable trees to buy. The price depends on the condition of the tree and naturally come cheaper when bought in quantities. The wholesale rate for a tree is anything between Rs. 150 and Rs. 200—sometimes even more. It has been found that on an average each tree yields between a ton and a half of usable plank. Besides each tree yields a similar quantity of wood suitable for fuel used in bakeries, smithies, etc.

Hewing the Wood—

There are a group of workers whose job is to cut the tree after it is felled. They work in batches of four to five people. They generally work on a piece rate basis and earn between Rs. 10 and 20 per tree. Sometimes instead of cash wages the labourers are paid in kind. For instance, it is sometimes so arranged that the trunk goes to the owner while the branches of the tree go to the

BOBBIN INDUSTRY

labourers as their part of the share. The trunks are cut into sizes from three to five feet in length. Generally it takes a day or a day and a half to cut up a tree.

After the tree is duly cut up the timbers are sent to Calcutta wholesalers by means of lorries where there are road facilities or in boats where rivers exist. The freights for despatch by boats are rather high.

The prices of timbers are fixed either in accordance to their cubic feet, arrived at by multiplying their girth by length or in accordance to their weight. The prices are paid when the timbers reach the workshops.

The sawing of the planks is done according to the sizes required. In every case the sawing leaves an extra margin of $\frac{1}{4}$ " to $\frac{3}{16}$ " over and above the actual length. In the case of shanks also an extra margin is necessary because the shanks are found in shape while the timber is rectangular. If there are defects in the timber, if they are not wholly straight, the price is lowered to compensate for the defect. After sawing, the timbers are dried in the sun. Workshops which possess moisture meters generally allow about 12 per cent. moisture to remain in the timbers. The smaller establishments do not have kilns attached to them.

The ends are joined together in rectangular pieces of identical sizes and are placed in the pressing machine. Twelve sets of these three piece plywood ends are pressed at a time. They are kept on the pressing machines for at least 12 hours at a stretch.

The shanks are turned on the turning machines and the boring is done by drills. Ends too are turned and have two holes

bored at each end. The top of the ends are generally plain while one end of the high speed bobbins are half-round in shape.

Glue—

The glue is made by mixing cassein, caustic soda, lime and copper sulphate in the following proportions:

Cassein	2 lbs.
Caustic soda	$\frac{1}{2}$ lb.
Lime	$\frac{1}{2}$ lb.
Copper sulphate	$\frac{1}{4}$ oz.

Sizes

Rove bobbins—	
Shanks	Ends
10"	5"
6"	3 $\frac{1}{2}$ "
Spinning bobbins—	
4"	2 $\frac{3}{8}$ "
4"	2 $\frac{1}{4}$ "

Bobbins made of mango wood (cost of a tree=Rs. 240 approx.) and Haldu (cost of a tree=Rs. 300/400) are sold at the following rates per gross.

Rove bobbins—	
Size 10"×5"	Rs. 185 to Rs. 190
Size 6"×3 $\frac{1}{2}$ "	Rs. 100 to Rs. 165

Ends of Rove bobbins—	
10"×5"	Rs. 45 to Rs. 50
6"×3"	Rs. 38 to Rs. 40

Spinning bobbins—	
4"×2 $\frac{3}{8}$ "	Rs. 52 to Rs. 55
4"×2 $\frac{1}{4}$ "	Rs. 55 to Rs. 57

The details of cost for 1946-7 as given in the Report of the Cost Account Officer, submitted to Government are shown below:

Estimated cost of production and fair selling prices per gross of the following jute mill bobbins and bobbin ends:

	Sizes	Total cost	Return on fixed capital	Fair selling Price
Rove bobbin	10"×5"	Rs. 179.19	Rs. 1.66	Rs. 180.79 or Rs. 182-12-0
Ends of Rove	10"×5"	Rs. 41.80	Rs. 0.36	Rs. 42.16 or Rs. 42-3-0
Spining bobbin	4"×2 $\frac{3}{8}$ "	Rs. 49.48	Rs. 0.46	Rs. 49.94 ro Rs. 49-15-0

Imported Bobbins CIF Price

	Sizes	CIF Indian Port	Customs duty at 10%	Clear	Landed cost
Rove bobbin	10"×5"	Rs. 239-13-0	Rs. 24-0-0	Rs. 13-0-0	Rs. 277-0-0
Ends	10"×5"	Rs. 70-3-0	Rs. 7-0-0	Rs. 4-0-0	Rs. 81-3-0
Spinning	4"×2 $\frac{3}{8}$ "	Rs. 75-5-0	Rs. 7-5-0	Rs. 4-2-0	Rs. 84-12-0

Thus it is found that the prices of the imported bobbins are considerably higher than those of the locally made products whose selling price, including profit, is Rs. 180-12 (Tariff Board Report).

In addition to the Mistries, a typical bobbin manufacturing establishment employs many workers, both male and female. Their main job is to move logs of wood and timbers required in the workshop. The daily rates of

BOXES OF VARIOUS KINDS

wage are fixed and are paid weekly. Irregularities in attendance are adjusted by wage cuts. The rates are given below:—

Head Mistry	Rs. 3 to Rs. 4 per day
Ordinary Mistry	Rs. 2-8 to Rs. 3 per day
Male worker	Rs. 1-8 per day
Female worker	Rs. 1-4 per day

A working day consists of 8 hours. Over-time is paid for extra work. Besides fixed

rates, workers are also engaged on piece-rate basis. The system of paying bonus is absent although workers get some extra cash on the day of the Viswakarma Pujah and on certain other festivals observed by the owners.

Below is given a statement showing the value of imports of bobbins into British India during the year 1937-38 to 1946-47.

	VALUE OF IMPORTS				
	1937-38 1	1938-39 2	1939-40 3	1940-41 4	1941-42 5
U.K.	2,639,006	1,872,229	2,354,227	2,852,353	4,433,533
CANADA	..	..	13,720	..	..
FINLAND	71,172	37,159	30,126	..	..
SWEDEN	35,698	34,112	24,043	4,563	..
GERMANY	332,421	482,997	185,105	..	..
CZECHOSLOVAKIA	1,040	208	..	..	..
JAPAN	1,129,529	1,357,506	1,131,780	1,610,355	1,407,840
U.S.A.	75	..	47,040	203,874	83,668
OTHER COUNTRIES	65,045	7,676	2,702	119,276	537,808
	4,273,986	3,791,957	3,788,743	4,790,421	6,462,849
	1942-43 6	1943-44 7	1944-45 8	1945-46 9	1946-47* 10
U.K.	5,365,119	6,232,438	7,689,419	8,681,664	7,650,246
CANADA	117,962	..	..	..	..
FINLAND	..	..	..	..	..
SWEDEN	..	..	..	..	..
GERMANY	..	..	..	..	..
CZECHOSLOVAKIA	..	..	..	..	..
JAPAN	..	..	..	..	..
U.S.A.	95,096	84,836	..	..	..
OTHER COUNTRIES	75,421	401	421,793	787,218	612,817
	5,653,598	6,617,314	8,111,212	9,468,882	8,263,063

* For 11 months only: April, 1946 to February, 1947.

IX(c)

Small boxes of various kinds

(a) Jewellery cases—Expensive and varied were the jewellery cases manufactured in our country in the past. Ivory, Sandalwood, quills of porcupine, shells, gold and silver were used to make them. Hitherto, however, particular pieces of ornament did not have their special types of containers. This individuation in jewellery cases was introduced in India by British Jewellery firms and it is stated that the firm of M/S Lavchand Matichand were the pioneers among Indian Jewellers to adopt this mode of packaging. At present a considerable number of people are engaged in the making of jewellery cases. This trade is run as a cottage industry and unless imitation jewellery comes to enjoy an unprecedented vogue it will remain a cottage industry up to the foreseeable future.

Raw Materials—Wood; Brass hinges and bolts; cloth or Rexine.

The wood used is generally pine which is obtained by the jewellery case makers by buying up, second hand, pine wood boxes which bring goods from Britain and elsewhere. Prices are fixed according to the sizes of the boxes. Boxes measuring 2 ft. × 1 ft. or 1 ft. × 1 ft. are generally sold at the rate of Re. 1-8 each. The planks used in such boxes are about $\frac{1}{2}$ " in thickness. The boxes are carefully dismantled by taking out the nails with the help of wrenches. After dismantling planks are very carefully sawed by means of thin saws into pieces varying from $\frac{1}{4}$ " to $\frac{1}{5}$ " in thickness. Then they are cut up into square pieces by means of tan saw. These are next rubbed with emery paper and polished until the surfaces are perfectly smooth. These square pieces serve as the bottoms of the cases and the sides are made of thicker pieces of wood. These

BOXES OF VARIOUS KINDS

Woods are joined together with the help of *Serish* glue. Sometimes they are joined by means of pins but this is a rather risky procedure as the wood is apt to crack at the touch of the hammer. The sides are joined with each other either by making them fit into each other at the angles or by means of a series of comblike teeth (dovetail). The outer wall of the boxes are covered with rexines. The top lid is fitted to the box with the help of hinges at the back and is opened and closed by means of a push button or a latch in the front. These hinges, etc. are now locally manufactured and are sold by the gross. After the outer surface is finished, the inside is given the finishing touches. The inside of the tray box is fitted with soft velvet while the inner lid is covered with satin. Some makers put their names and trade marks on the satin covering the inner lid. In the wristlets, armlets, bracelets cases, etc., the centre portion of the velvet roughly approximating the diameter of the bracelet is raised and the piece of ornament rests around it.

Ring cases have slots of appropriate sizes made inside them. Cases for earrings and similar other ornaments have a pinhole in the velvet surface into which an end of the earring is inserted.

Prices (Approximate)

Cases for Necklace, Chains, etc. Rs. 5 or Rs. 6 or more.

Bracelet cases Rs. 3, Rs. 4 or more.

Ring cases As. 12 to Re. 1 or more.

Cases for Medals have a wide demand and the prices range between As. 12 and Rs. 2 each.

Knitting boxes, Toilet cases, etc. are also made, more or less, in the manner described above. The trays of these boxes are divided into a number of small compartments. In some boxes even the inside lids are so divided or are fitted with mirrors. The outsides are covered with imitation velvet. The prices of such boxes are much lower when they are made with a kind of paste board instead of wood.

The principal customers for jewellery and other boxes are the important stationery shops and jewellery shops in Calcutta. They place orders with the manufacturer who makes boxes according to their specifications. Stationers use these boxes as containers of their particular brands of products. These types of products are generally bought for presentation on birth days and marriage ceremonies.

Boxes for coffee sets, tea sets, icecream sets, flower vases, etc. are also generally bought for presentation purposes. These boxes are generally divided into compartments to suit the sizes of the cups, etc. These boxes are fairly big in size, a standard size

being 25" × 20" × 5". Prices are Rs. 3, Rs. 4 and upwards.

In this industry the craftsman is generally the master of his shop and is found to earn, on an average, Rs. 4 to Rs. 8 per day. Usually they work on commission which they either procure by calling on their clientele or vice versa. It is hardly necessary to point out that the turnover of jewellery boxes and other boxes depends on the state of business of the products for which they are used. Of late with an increase in the sale of ornaments and other products and with the custom of selling them in cases and boxes, the box-making industry has registered a reciprocal expansion in business.

Survey Instrument boxes, instrument boxes, spectacles cases are also being made on a fairly large scale these days. Except for the spectacles cases there are no fixed prices for other boxes. Estimates of costs are first tendered and on the acceptance of them orders are executed. The prices of spectacles cases are approximately Re. 1 to Rs. 1-8 each. Very recently wrist watch cases and clock cabinets are also being made here but their output is still negligible.

(b) Spectacles cases—These are either made of thin strips of wood or thin steel sheets (24 B.S.G.) or leather. The steel sheet is first cut out approximating the size of the case leaving the necessary margin for the fixing of the hinges. The making of these cases is a rather difficult job and calls for the use of the Pressing Machine. But here all the operations are virtually done by hand. The inside of the case is lined with velvet and the outside is covered with rexine. Steel spectacles cases are fitted with spring and have to be opened by pulling and pressed hard for closing. Much care goes into the finishing of these cases. Prices of these cases are fairly high and sell at even Rs. 5 to Rs. 7 each.

(c) The making of Survey Instrument boxes is a job requiring much care and skill because these boxes are meant to hold a large number of instruments of different shapes and sizes. Prices are fairly high—Rs. 15, Rs. 20 or more.

(d) Boxes for Sound Boxes and Gramophone Records:

Each record case holds 20 to 25 pieces of records and these cases are much in demand. Prices are Rs. 4, Rs. 5 or more. The case for the sound box is hollow and is lined with velvet and sometimes fitted with spring. Its making is a skilled job. Prices Rs. 1-8, Rs. 2. Rexines generally used for covering cases and boxes described above are usually Indian but imported rexines of high quality are also used when necessary. The making of rexine is a difficult job demanding much technical competence. In Calcutta there are about 50

BOXES OF VARIOUS KINDS

establishments employing about 400 workers engaged in the manufacture of rexines.

(e) Wooden Boxes and miscellaneous cases :

Boxes made of soft wood are in demand for use as medicine cases, containers for parcels, etc. Although generally made of soft wood boxes are sometimes made of hard wood also. These boxes are available in a variety of sizes from 1" × 1" or 2" × 2" and upwards. Some of the important customers for these types of boxes are the makers of slate pencils and chalks for blackboards who pack their ware in them.

These boxes are made by first cutting up wooden planks into strips of 1/8" or 3/16" in thickness and are joined together by nailing. They are generally made by dealers in 'Kerosene' or packing wood as a side line and also by individual craftsmen in their own homes. They are not highly finished because they sell at a very low price beginning from As. 1-6 and more depending on the size of the container. It is needless to add that the use of nails is also restricted to the barest minimum.

People who are engaged in the making of wooden boxes and containers are generally known as packing case-wallahs because, as has been pointed out already, their mainstay is the making of packing cases. The packing cases that they make are used for the despatch of a host of products such as instruments, medicinals, cloths, vests, crockery, lanterns, biscuits and similar articles of daily use. These cases are sometimes big enough to hold a maund or a maund and a half of goods for despatch from one point to another. They are generally made of pine wood, at least 1/2" thick, salvaged from imported packing cases bought second hand from importers of foreign goods. These planks are sold by the maund at Colootolla. This business is mostly run by Muslims of the Howrah dis-

trict. Their daily earnings range from Rs. 3 to Rs. 4 approximately. Since these boxes are not very strong the users generally strengthen them by using a band of hoop-iron running along the sides. The makers of packing cases are also engaged in making various other products. In the past they used to make inexpensive tables, chairs, shelves, brackets, etc. from pine wood. Now-a-days they also make bedsteads and other pieces of furniture and various other articles from better quality timbers. A list of some of the principal articles and their approximate prices are given below :

Name of article	Approximate price		
	Rs.	As.	P.
Ladder or scale for electricians	10	0	0
Hen coop	4	0	0
Pigeon-cote (for four pairs)	3	0	0
Letter Boxes	1	8	0
Pitcher stand	1	0	0
Stool	1	8	0
Jal Chauki—a small low table	1	0	0
Shelf	1	4	0
Soap-shelf	0	6	0
Bracket	0	8	0
Almirah—3' × 2'	5	0	0
Almirah—3' × 5'	14	0	0
Ink stand	0	4	0
Bird cage fitted with wire	8	0	0
Bench—6'	14	0	0
Table	5	0	0
Rack for Biris	6	0	0
Partition—6' × 6'	12	0	0
Cup rack	10	0	0

In many cases the packing box-wallahs go and execute their commissions at the house of the client. Most of these people have some lands in their villages and visit their homes practically every week-end.

LAC

X(a)

Wax

The following account of commercial bees-wax is inserted from Francis Buchanan-Hamilton's account of the District of Dinajpur (1808-1812). pp. 775-777. Vol. II.

The only wild insect which produces any thing of value is the bee, and it is the wax alone that is an object of commerce. Mr. Fernandez has rented the whole, except some portion of what is produced in Maldeh, and to each landholder he pays a certain sum, which must be very inconsiderable, as the whole wax which he procures, is said to be only 100 mans, probably 70 or 80 cwt. Mr. Fernandez employs people in different parts to collect the wax; and these who are called Sirdars, employ servants to cut the combs. At Nawabgunj, which is one of the most productive districts, and which gives 10 or 12 mans, each of 3,840 s.w. the people told me, that he allowed them Rs. 25 for each man (about 82 lbs.) delivered at Dinajpoor, and they had all the honey; but this is of little value. In other places however, it was said, that the Sirdars contract to give him a certain quantity of wax, and take the surplus and the honey for their trouble.

In this district there is only one kind of bee, which so strongly resembles the insect domesticated in Europe, that I should consider it as of the same species, were not its manners very different. The natives of India have no where tamed this industrious creature, and in Bengal, every kind of which the honey is collected, is usually called a honey-fly; nor could I discover that the people had any appropriate name for this species. It frequents the forests in the rainy season, and in some districts the people employed in collecting the wax suppose, that the bees do not then build, nor live in society; but that they take shelter from the rain under leaves, and that a great part of them perish from the severity of the weather. This is probably a mistake, and is believed only owing to these people having never frequented the woods to look for the bees; for I found, that at Nawabgunj a considerable part of the wax is procured in the woods about the end of September, and must have been formed in the rainy season. Besides

at Ghoraghat, which is said to be the most productive district, and yields near 30 mans a year, most of the wax is gathered in the rainy season, and the people say, that the bees breed then, and live in society just as at other times. In the dry reason the bees frequent the vicinity of villages, and form their nest on the branches of the neighbouring trees. Each nest consists of a single semi-circular comb attached to the lower side of the horizontal branch by its diameter. One which I measured, and which was said to be of the usual size, extended about two feet in radius. On each face is a series of cells, and in some parts of the comb there are three rows, with passages conducting to those in the centre. The bees when at rest, cover the whole surface of the comb. Near the villages they begin to build in November, when the cruciform plants resembling mustard, that are cultivated for oil, begin to flower. In January when they have brought up a brood of young, they eat the honey and desert their nest, which is collected for wax. In the middle of December I examined a comb. The greater part of the cells were filled with young bees, a small portion was filled with honey; and a larger with a yellow powder, which the natives, I believe, justly consider as the food for the young bees, and as the pollen of various plants. The bees begin to build again in March, when most of the trees come into blossom; and, having bred in June, they consume the honey, and retire into the woods. The combs formed at this season are most valuable, and contain most honey. In order to procure this the people chase away the bees, which is easily done by a little smoke occasioned by some burning husks of rice held under the comb, in a basket that is made of a green plantain leaf. I saw this practised with great success before a multitude, who imagined, that the wax-gatherer was possessed of a spell or prayer, which saved him from being stung. A comb, such as I have mentioned, is said usually to give about a pound of wax, when cleaned and melted; but those collected in spring are said to give 20 lbs. of honey and wax.

X(b)

Lac

Lac is a resinous incrustation formed on the bark of the twigs and branches of various trees by an insect, commonly called the lac insect and known to entomologists as the *Coccus lacca* appertain-

ing to the natural order Hemiptera, family Gallinsecta.

[Lac. by J. E. O'Connor (1876)
Calcutta International Exhibition (1883/
84) Vol. II, p. 23].

LAC

The incrustation formed by the insect is cellular, of a more or less deep red or orange colour, semi-transparent and hard, breaking with a crystalline fracture. The substance is mainly formed by the female insects, which generally largely outnumber the males.

Lac appears to be formed spontaneously in the jungles of most parts of Bengal to a greater or less extent; the only districts in which any extensive cultivation takes place being apparently Bankura, Birbhum, Murshidabad and Malda.

[Calcutta Exhibition of Art-Manufactures (1882) p. 274—Nos. 280; No. 325; No. 577].

The trees on which lac is cultivated in Bengal are:

- 1 Schlischera triguga, Wild. (Kusum)
- 2 Butea frondosa, Roxb. (Palas)
- 3 Ficus religiosa, Linh. (Pipal, Aswat or Pakur)
- 4 Zizyphus Jujuba. (Kool)

The first two trees (Kusum and Palas) are those most generally used for the purpose, and are said to produce the best lac.

For the average annual produce for the 5 years preceding 1875 in West Bengal districts see Report on the Dyes and Tans of Bengal, compiled by Hugh. W. M'cann, P. 51. The best information of lac is supplied in J. E. O'Connor's pamphlet entitled, "Lac: Production, Manufacture and Trade".

The following account is quoted from the Settlement Report on Malda by M. O. Carter (1939).

Lac cultivation is an industry which has declined since the war far more rapidly than the silk industry, and is now in danger of total extinction. The lac-growing area is a strip, six or seven miles broad, and about seventy miles long, following the bank of the Ganges. Commencing from Ratua thana in the north, it extends southwards through Manikchak, Kaliachak, Shibganj and Nawa-bganj thanas, down to the junction of the Mahananda with the Ganges. The soil in this diara tract contains a large proportion of sand, and produces great numbers of plum and babul trees. The pakur, peepul and dumur trees are also suitable for lac production, but in Malda its cultivation is confined entirely to the plum tree.

The word is derived from "Lakh" meaning a hundred thousand, and refers to the thousands of lac insects which swarm over the trees. The product itself is a resinous incrustation secreted by the lac insect (laccipir lacca). The method of cultivation is simple, and consists of infecting the plum tree at certain seasons with brood lac. There are two crops—the *Kartiki* and *Baisakhi*. For the former the trees are selected in the latter part of February: for the latter they

are generally pruned in the second half of April, but in some places trees pruned in February are used, as they put out larger shoots.

There are two methods of infection. The cultivator can either remove the branches when they are well-covered with the lac insects, allowing a number to remain for the self-infection of the next crop; or he may select the branches that are covered with the best crop, remove them, and cut them into pieces about fifteen inches long. These are tied in bundles to the main branches of other trees and allowed to remain there for about a fortnight. During this period the trees become covered with lac insects, and the bundles are removed and scraped, unless they are required for further infection. When the crop is ready the resinous substance is scraped off the branches and collected for the first refining process. This is carried out by melting the lac and passing it through melting bags. The bag is held at either end and twisted in opposite directions, so that the molten lac is squeezed out, and the impurities remain.

It is not known when the lac industry originated in the district. From the absence of any mention of it in Hunter's Statistical Account, it may be presumed to be later than 1875; but it was certainly in existence before the war, and it was during this period that the industry leaped into prominence. During the boom years that followed the war, lac sold for as much as Rs. 80 a maund or ten times the present price. It is estimated that the annual value of the crop at that period was as much as Rs. 32 lakhs, as against the present value of Rs. 1 lakh. The price of lac-growing land had decreased proportionately. Land which used to sell during the boom years at Rs. 50 or Rs. 60 has dropped to Rs. 2, or Rs. 3.

There is no market for lac in the district. The crude lac, or stick lac, is sold mostly at Kotalpukur, Pakur and Barharwa in the Santal Parganas; and on a small scale in Murshidabad district, where it is further refined and sent to Calcutta for foreign export.

The present condition of the industry is due to two factors—adulteration, resulting from the crude form of production (and sometimes deliberately carried out); and the competition of synthetic products. The commonest form of deliberate adulteration is to mix sand, ashes, or even sugar with the grain lac in the melting bag, thereby increasing the weight of the product. Adulteration also occurs when the melting bags are made of coarse drill, because the texture is not sufficiently close to prevent impurities from passing through the cloth along with the molten lac. Crude packing and refining tend

further to produce an article which is unreliable in quality; and this, coupled with the great fluctuation in prices, has increased the demand for synthetic resins at the expense of natural lac.

Of the various industries which consume shellac, the most important is the gramophone record industry, which absorbs roughly half the output. Of the remainder, about one-third is taken by the spirit varnish and electric paint trades. The balance is divided among a number of industries, such as sealing wax manufacture, leather and rubber finishing, photographic work, tinfoil finish, and a number of others. With the exception of gramophone records, synthetic resins have made a great advance in all other trades. A manufacturer, confronted with a choice between a raw article of unreliable quality, and a manufactured article of guaranteed purity and reasonably stable price, will naturally select the latter. Indeed, the lac industry would be in a worse position than it is to-day, were it not for the present low prices. If prices are forced up again, there will be a still further demand for synthetic products, and they may successfully invade the gramophone record industry. Natural lac might then share the fate of indigo.

It is evident therefore that if the industry is to survive, it will have to be organised. Under present conditions it cannot hope to compete with the scientific research and commercial propaganda of synthetic products. In the first place the output is most uncertain. Unless it is known what are the requirements of the manufacturing concerns and what is the capability of the lac-growing area, it is not possible to adjust supply and demand.

A more controlled output might result in a more controlled price.

Secondly, the crude methods of production will have to be improved. So long as adulteration continues, the industry can never hope to compete with synthetic products. It must be able to guarantee an article of absolute purity. Lastly, there is no liaison between the industry and the manufacturing concerns. The cultivator sells his product in the market, the purchaser refines it, it is sent to Calcutta to an agent, and may pass through several hands before it reaches the manufacturer. Nobody in the district has any idea what the manufacturer wants, or how much he wants: there is no organisation for finding out. Some trades require a shellac that is entirely free from any ingredient of wax; some, principally the polish manufacturers, require a larger proportion others smaller proportion. What is needed therefore is an organised natural lac industry which will keep in close touch with the various lac consuming concerns, and study their requirements. If the industry continues in its present haphazard uncontrolled state, only some turn of good fortune can save it ultimately from extinction. It might be mentioned that the Gramophone Company at Dum Dum uses shellac to which a natural resin called copal is mixed in certain proportions. The supplies of natural lac are obtained chiefly from Manbhum and Ranchi districts, and at the moment of writing the price is double what it was at the end of 1933. With organisation, there is no reason why the lac producers of Malda should not compete in the same market.

The following books are informative:

- Annual Reports of the Indian Lac Research Institute, Namkum, Ranchi, Bihar.
- Bulletin No. 134 Manufacture of Lac and Shellac by Haralal Bhattacharyya, Directorate of Industries, West Bengal, 1951.
- Lac Cultivation in India by P. M. Glover, Indian Lac Research Institute, Namkum, Ranchi, 1937.

FIBROUS PLANTS

XI

The Commonly Known Fibrous Plants of the State

- 1 **Ulatkambal:** *Abroma augusta*
The stalks yield a fine, strong fibre, a cord made of which bore 75 lbs., while *San* broke with 68 lbs. A very good substitute for hemp.
- 2 **Potari:** *Abutilon indicum*
The stalks yield a strong fibre.
- 3 **Anaras:**
The leaves sometimes 3 yds. long, yield a fine white fibre, which is made into strings and ropes.
- 4 **Nona:** *Anona reticulata*
A good fibre can be extracted from the branchlets, which is suitable for the manufacture of rope, cordage.
- 5 **Bans:** Bamboo
- 6 **Rakta-Kanchan:** *Bauhinia purpurea*
A fibre is extracted from the bark.
- 7 **Kiah:** *Boehmeria nivea*
The plant has of late attracted considerable attention for its beautiful, soft, glossy fibre, suitable for the manufacture of textile fabrics, and which promises to be one of the most important of the economic products of India.
- 8 **Simul:** *Salmalia Malabaricum*
A large quantity of cotton is every year obtained from the tree, which is chiefly used in stuffing pillows and mattresses. It is too short for the manufacture of textile fabrics, but is very valuable as a paper-material, and as such it deserves the attention of paper manufacturers.
- 9 **Tal:** Palmyra tree: *Borassus flabellifer*
The fibres of the petioles of the leaves are used for making rope and twine.
- 10 **Bet:** Rattan cane: *Calamus* spp.
- 11 **Akanda:** *Calotropis gigantea*
- 12 **Pat:** Jute: *Corchorus capsularis* and *C. olitorius*
- 13 **San:** Indian hemp
- 14 **Madur Kati:** *Cyperus tegetum*
The smooth, elegant mats, commonly found in Lower Bengal, are made of this sedge, which is cultivated in Midnapore.
- 15 **Karpas:** (*Gossypium Herbaceum*)
- 16 **Antmora:** *Helicteres Isora*
The branches yield a fibre suitable for the manufacture of coarse cordage and a kind of gunny bags.
- 17 **Kasturi:** (*Hibiscus abelmoschus*) Musk Mallow
The stalks yield a white, glossy fibre, which in Dr. Roxburgh's experiments broke with a weight of 107 lbs. (Hub-ul-mushk—Arabic.)
- 18 **Dhenras:** *Hibiscus Esculentus* Okhro (Sans: Gandhamul)
The stems yield a good fibre which, however, has not yet been much utilised. The fibres can probably be obtained cheaper than many fibres now in use, should a market be established for it.
- 19 **Ban-Dhenras:** (*Hibiscus ficulneus*)
Dr. Balfour states that "it grows abundantly in the black cotton soils of India, and the bark contains a large proportion of white reticulated fibre similar to that obtained from the mulberry, and useful for gunny bag and paper".
- 20 **Sthalpadma:** (*Hibiscus mutabilis*)
The Stems yield a fibre, of which the inner layer is soft and silky.
- 21 **Jaba:** (*Hibiscus rosa-sinensis*): Shoe-flower
The stems yield a fibre, of which the inner layer is soft and silky.
- 22 **Mesta:** (*Hibiscus Sabdariffa*): Roselle; Red Sorrel
The stems contain a good silky fibre.
- 23 **Bola, Chebwa:** *Hibiscus tiliaceus*
The fibre of the inner bark is made into cordage.
- 24 **Pati:** *Maranta dichotoma*
- 25 **Kala:** The plantain: *Musa Sapientum* var *paradisica*
M. Sapientum: The Banana
- 26 **Phani-Mansa:** (*Opuntia Dillenii*): Prickly Pear
- 27 **Khejur:** (*Phoenix Sylvestris*)
This species of date palm is cultivated largely in Bengal for its juice, which is obtained by notching the head of the tree.
The leaves are woven into mats and baskets. The fibrous petioles of the leaves are suitable for the manufacture of paper and cordage.
- 28 **Akh:** (*Saccharum officinarum*): Sugar Cane

No. 1. See Calcutta Exhibition of Art-Manufacturers (1882), Compiled by James W. Browne: p. 148; Numbers 76 to 78; 80 to 88.
No. 2. See Calcutta Exhibition of Art-Manufacturers (1882), Compiled by James W. Browne: p. 148; Nos. 90 to 115 and 124 to 129.
No. 9. A tamil poem of Ceylon mentions eighty purposes to which this tree can be put.

FIBROUS PLANTS

- Sugar-cane stalks, out of which the juice has been extracted, and the leaves, are suitable for the manufacture of mats and paper, but at present they are used only as fuel.
- 29 *Sar*: (*Saccharum Sara*)
The fibre is inferior to munj.
The reeds are used in matting, thatching, and to make chairs.
- 30 *Kush*: *Saccharum spontaneum*
Common in Bengal. The grass is used to make rope and mats and for thatching.
- 31 *Murvamul*: (*Sansevieria Zeylanica*)
A soft white fibre is obtained by scraping off the pulpy part from the leaves, which is firm, hair-like and silky, and according to Dr. Royle, "may, from its fineness, combined with tenacity, be applied to a variety of purposes." In Dr. Wight's experiments a rope made of this fibre bore a weight of 316 lbs. It has been made into fine cloth and twine.
- 32 *Dhanicha*: *Sesbania aculeata*
A strong fibre is obtained from *Dhanicha* Stalks which is made into ropes and fishermen's nets, and it has been found to be very durable under water. At an experiment made in Fort William, a 3½ in. rope made of it broke with a weight of 75 cwts. the Government proof required of such rope being only 40 cwts.
- 33 *Jainty*: *Sesbania Aegyptica*
The bark is made into a rough cordage.
- 34 *Kareta*: *Sida Carpinifolia*
A good fibre is obtained from the stems.
- 35 *Bala*: *Sida Cordifolia*
The plant yields a fine white fibre.

See Hand-Book of India Products, by T. N. Mukherjee, pp. 127-159.

COTTON

XII(a)

Cotton in West Bengal

Mention of Cotton in the ancient literature of India.

Manu: Mention is made of the fibre in the Institutes of Manu, and the present vernacular term Kapas is most probably derived from the Karpasi mentioned in the Institutes of Manu, as the fibre from which Brahmanical thread was prepared.

Rig Veda: It would appear from many passages in the Rig-Veda that many arts were carried to a high state of excellence, weaving was well known of course, and deft female fingers wove the warp and the woof in ancient times as in modern days (II 3, 6; II 38, 4, etc. etc.). Quoted by R. C. Dutt.

Reference to cotton by Western writers:

Herodotus: The wild trees of that country bear fleece as their fruit, surpassing those of sheep in beauty and excellence; and the Indians use cloth made from these trees.

Arrian: Arrian quotes a passage from Nearchus, and says that the Indians wear an under-garment of cotton which reaches below the knee half way down to the ankles, and also an upper garment, which they throw partly over their shoulders and partly twist in folds round their head. The same author (Arrian), who was also a merchant and traveller, is referred to in Dr. Watt's Dictionary of Economic Products as being the first to make mention of Indian Cotton as an article of commerce in his time. Broach, Mausilipatam and Dacca are mentioned as centres of the Industry.

From India, the industry spread to Persia, Arabia and Egypt and then gradually into south Europe, where delicate fabrics began to be manufactured about the 12th Century.

The cotton plant is grown on an exceedingly limited scale in these provinces. The districts which exported cotton during 1876-77 were reported to be the following in order of importance:

Jalpaiguri	66,755 Mds.
Tipperah	2,045 "

Burdwan	300 Mds.
Bankura	300 "
Darjeeling	84 "

Varieties of Cotton: There were two crops in Bengal—the early crop, which was sown during the monsoon rains and harvested during the cold weather, and the late crop which was usually sown at the close of the rainy season and harvested in the hot weather.

In the report of 1878, the following vernacular names appear for the different forms of cotton grown:

- 1 Achna; 2 Banga; 3 Bansa; 4 Bashoria;
- 9 Boria; 10 Bonga; 11 Bercti; 12 Bouja;
- 13 Bochra; 14 Brocti; 15 Bori; 16 Borio;
- 17 Borea; 18 Buri; 19 Budhobario;
- 20 Chengti; 21 Chundobyro; 22 Deshi;
- 23 Gajja; 24 Garo; 25 Gatch; 26 Gola;
- 27 Guli; 28 Gulwa; 29 Haldia; 30 Jagri;
- 31 Jathri; 32 Joargurwa; 33 Jitna;
- 34 Jorgura; 35 Khoewa; 36 Kherha;
- 37 Khoratia; 38 Khorjithia; 39 Koer;
- 40 Kokti; 41 Langataputa; 42 Magai;
- 43 Molongo; 44 Mormah; 45 Noorka;
- 46 Pani; 47 Pachi; 48 Phulsuta; 49 Ram-Kapas; 50 Redhia; 51 Romati; 52 Rorhya;
- 53 Sundi; 54 Thengya; 55 Tourbari.

The mart which derived its name from the Ganges appears from the circumstance of the five Gangetic muslins being mentioned as an export from it, to have been an emporium situated in the vicinity of Dacca, where the finest cotton fabrics in all India have been made from the earliest times. It is likely that it stood in the neighbourhood of Sonargang, situated about twelve miles to the south-east of the city of Dacca*. Sonargang (Suvernagrama) is mentioned in the sanscrit work called JATIMALA, as one of the countries in which the descendants of certain brahmins from Sacadwipa settled in early times.

It is probable that these fabrics (muslins) were exported from Sonargang from a very

See Monograph on The Cotton Fabrics of Bengal, by N. N. Bauerji. 1898.
 Paris Universal Exhibition, 1878: p.p. 93 to 101.
 Calcutta International Exhibition (1883-84) Vol. II: p. 26.
 Calcutta Exhibition of Indian Art Manufactures (1882): p. 68; p. 80; p. 82 No. 581.
 Indo-Colonial Exhibition, London 1886: p. 18.
 The First Letter Book of the East India Company (1600 to 1619): Do-'patta': p. 75.
Ibid.; p. 81 'bleu Callicoes'. 'Etoffe bleu de Chandannagar(?)' Cf. Alfred Martineu (Introduction).
 Cotton Hand-Book for Bengal being a digest of all information available from official records and other sources on the subject of the production of COTTON in the Bengal Provinces. Compiled by S. G. Medlicott, Calcutta 1862.
 Reports and Documents connected with the proceedings of the East India Co., in regard to the culture and manufacture of Cotton-wool, Raw silk and Indigo in India. Also see appendix: p.p. 302-356.
 Descriptive and Historical Account of the Cotton Manufacture of Dacca, by James Taylor.
 Prachin Silpa Parichaya Compiled by Girish Chandra Bedanta-Tirtha. Calcutta 1329 (B. S.) p.p. 1-33.
 See Dr. G. Watt.
 * Modern Panam, adjacent to the inland port of Mirkadim in Munshiganj sub-division. It still is the home of very rich and ancient families of merchants, some of whom are weavers by Caste—A. M.

COTTON

early period, and that they constituted the delicate vestures so frequently alluded to by Latin authors, under the names of vestes tenusvel pellucidæ, ventus textiles, nebula. The extreme tenuity of texture, which these terms imply, is a quality that belongs, rather to a cotton, than to a silken fabric.....The term KAPTABOS—derived from the sanscrit Karpassu.....

Number of persons engaged in cotton industries in each district: See Census Report 1891.

It will appear that the total number of persons dependent on the cotton Industries in 1891 amounted to 511,665 males and 580,912 females making a total of 1,092,577 persons. (See Appendix I Cotton Fabrics of Bengal—N. N. Banerjee).

In the same year of 1891, 462,483 persons were engaged in earthen pottery, 333,503 in carpentry, 322,708 in gold and silver, 325,723 in iron, 308,358 in cane, bamboo and matting, 345,766 in leather, etc. (See the District Report of the same year).

The district reports clearly point to the languishing state of the industry.

Extracts from district reports are given by N. N. Banerjee on pp. 7—11.

Cotton Manufacturers—their social and professional status:

The following castes take part in cotton manufacture:

- 1 Acharjas ; 2 Bagdis ; 3 Bauris ; 4 Bostoms ; 5 Chamars ; 6 Chandals ; 7 Chootars ; 8 Dafalis ; 9 Dhobas ; 10 Dhurniyas ; 11 Goallas ; 12 Golas ; 13 Jolahas ; 14 Jogis ; 15 Kai-bartas ; 16 Kalinbafs ; 17 Kamars ; 18 Kaoras ; 19 Kasais ; 20 Kaya-ssthas ; 21 Kunai Castes ; 22 Maghs ; 23 Metees ; 24 Momins ; 25 Pans ; 26 Patras ; 27 Pods ; 28 Rajputs ; 29 Santals ; 30 Sub-arnabaniks ; 31 Tamilis ; 32 Tantis ; 33 Telis ; 34 Telingas.

Of the above, the principal manufacturers of cotton cloths are the Tantis or Tantwas and the Jogis among the Hindus and the Jolahas, sometimes known as Mamins or Momins among the Muhammadans. (See p. 17 *op. cit.* and also pp. 20-23).

* See A calendar of the Court Minutes, etc., of the East India Co. (1655-1659), by Ethel Bruce Sainsbury. P. 366 (Index). P. 177. Pp. 53, 160, 284, 177, 262, 263, 77, 337, 18, 177.

Gingham=Guingan (Fr.) ultimately from Malay ginggang (orig. adj.=striped 277 ; longcloth 44 ; 55, 66, 154, 177, 274 (2), 277, 281, 303, 321, 327, 337, 346.

Morees (?) 18, 154, 177, 263, 277, 284, 337, 346.

Niccanees (?) 77.

Percallas(?)=Percalle or Percahl(?) (Fr.) 154 ; (South Indian).

Pintadoes=Painted orig. port. p. 55.

..... that Muslim entered in early cuneiform lists under the name of Sindhu

(The Sadin of Judges, XIV, 12, 13, Proverbs XXXI, 24, and Isaiah III, 23.

See Introduction to The First Letter Book of the East India Company (1600-1619), Edited by Sir George Birdwood: p. XXIV, Capassia in Bhawal is the home of carpas. See The Calcutta Review Vol. CXI, 1900, p. 123 (last paragraph).

PRACHIN BANGLA DAINANDIN JIBAN—Nihar Ranjan Roy, p. 2, 22 (Nakas).

Ibid., p. 27.

COTTON FABRICS

The Cotton fabrics manufactured in these provinces may be conveniently classed under the following heads:

- a Cloth of thin texture ; b Cloth of thick texture ; c Towels, dusters, bed-sheets, etc. ; d Daris and satrangis ; e Kalins and galichas ; (Carpets) f Newar (Tape) ; g Dori (Ropæ) ; h Mixed cotton and silk (Bafta) ; i Chikan (Embroidery).
- 1 Betteels ; 2 Oringall ; 3 Chintz ; 4 Cossaes ; 5 Dereubands ; 6 Dimities ; 7 Gingham ; 8 Khanders ; 9 Longcloth ; 10 Morees ; 11 Nassapores ; 12 Niccanees ; 13 Percallas ; 14 Pintadoes ; 15 Sallampores ; 16 Salpicadoes ; 17 Sannoos ; 18 Adatoy ; 19 Sayes ; 20 Hunscoot ; 21 Tapseiles*, etc.

CENTRES OF THE INDUSTRY IN 1893

Burdwan : Nelpur : Katwa : Kalna :

Birbhum : Villages of Supur : Raipur : Nam-bazar in thana Bolpur : Alunda and Tantipara in thana Suri :

Bankura : Bankura town : Gopinathpur : Barjora : Rajagram : Bisingspur : Kenjajura :

Midnapur : Golgram : Pathra : Patnabazar (Town Midnapur) : Mohanpur : Mia Bazar (Town Midnapur) : Balarampur : Jalibanda : Nandakishorepur : Amdoi (Sadar Div.) : Ghatal : Radhanagar : Irpala : Narajole : Chandrakona : Kalma : Kunapur : Ramjibanpur : Hajipur : Khirpai : Jaipur : Malidanga : Kharsur : Rajanagar : Gaurhati : Mugra : (Ghatal Sub-division) : Panchkura : Barkhoda (Tamluk) : Charabarh : Khondrai : (Contai) :

Hooghly : Villages of Khanakul : Kristonagar : Ramjibanpur : Myapur (Jahanabad Subdivision) : Haripal : Dwarhatta : Atpur (Serampore Subdivision) : Dhaniakhali (Sadar Subdivision) : Tantiabazar (Sadar Subdivision and Kulet ; Koiapat—Badanganja : Khanakul ; Balidewanganja.

COTTON

- Howrah:** Some of the villages in thanas Amta and Bagnan in Uluberia Sub-division:
- Nadia:** Santipur: Kushtia: Kumarkhali: Harinarayanpur: Meherpur: Krishnagar:
- 21-Parganas:** Baranagar: Jaynagar: Bankra: Parna: Khorgachi: Santra: Bhabla:
- Murshidabad:** Sadar Subdivision: Jellinghi P. 3.—Chakchetan: Barsabari: Sadi-khandiar: Dhanirampur: Chuchamora: Faridpur: Nilambarpura: Debipur: Srikrishnapur: Bagnanpara: Chakrarainpur: Gowripur: Raipur: Basudebpur: Nowadapara: Chak Ramprasad: Kupla: Saheb-nagar:
- Azimganj outpost:** Romna: Etwarnagar: Fatepur: Lokhinathpur: Jot Bhikhari: Malatipur: Hariharpura—Swaruppur: Dangapara: Sabdalpur: Tartipur: Nutan Saruppur: Lochanmali: Choa: Joy Krishnapur:
- Kandi Subdivision:** Khargram: Nagar: Gopinathpur: Balia: Mahisar: Dhani-gram: Kagram: Sonarundi: Shiv-pura: Shemulia: Bonwaribad: Ezara: Kagram: Talipur: Burwan: Sapaldaha: Kamamoli: Paluti: Jugsarah: Satlara: Kooli:
- Jangipur Subdivision:** Suti—Sultanpur: Gopalganj: Aurangabad: Nurpur: Fateullapur: Ishpara: Sankarpur: Sadikpur: Bahadurpur: Aseran: Samserganj: Mamrezipur: Arjunpur: Chancharpur: Uparchanchar: Mahadevnagar: Serpur: Bhabanimati: Mahesliathali: Kristopur: Joykristopur: Loharpur: Raghunandanpur: Samsheganj: Mohespur: Sib-tala: Hoglabani: Dhulian: Arup-nagar: Polashbona:
- Darjeeling:** Phansidewa:
- West Dinajpur:**
- Malda:** Kaliachak: Ratua: Old Malda: Kaligram: (See Appendix IV N. N. Banerjee for Vernacular and English names of the principal parts of the weaver's loom.)

[Cotton Yarn—See Court Minutes, etc. (1655-1659), pp. 33, 35, 45, 66, 77, 106, 110, 113, 177, 277, 301, 304, 310.

Commercial Relations between India and England (1601-1757), by Balkrishna, p. 158.

Cotton Wool—Cotton wool, see Int. Dict.

Ibid., pp. 44, 66, 99, 116, 160, 277, 323, 325.

Cotton Yarn—See *op. cit.*, pp. 33, 35, 45, 66, 77, 106, 110, 113, 177, 277, 301, 304, 310. (Cotton yarn.)

Carpets, Hangings, Tapestry, Furniture Stuffs, Matting, Paper-Hangingt—See Calcutta International Exhibition (1883-84), Vol. II, pp. 19-20.

A Monograph on Carpet-weaving in Bengal, by N. G. Mukerji (1907).]

XII(b)

Weavers and Weaving in West Bengal

The use of woven cloth as garment for the body has been known from very ancient times in every civilised region of the world, whether in the West or the East. There is mention of it in the *Rigvedas* (1/26/11). The ancients were thoroughly conversant with the art of weaving, even in those early days.

A study of *mantras* 1/140/1, CI/152/1, II/13/3, IX/8/6 and IX/96/1 confirms the extensive use of vestment cloth in religious altars and ceremonial stages and platforms. Such cloth was usually white and beneficial (Rg. III/39/2) and courtly and essential (Rg. I/134/4, V/29/15). It was regarded in those days as an item of public wealth (Rg. VI/47/23). The mother herself used to make the weaving apparel for her son (Rg. V/47/6) and the yarn of the warp and weft of the cloth was closely woven. There are references to cloth in the *Atharva Vedas* (V/1/3, IX/5/25, XII/3/21, XIV/2/41). Besides, the necessity for, and the various uses of, cloth have been set down in the *K tyāyana Srauta Sutra* (XIV/1/20), *Asvatayana Grhya Sutra* (1/8/12), *Gohila Grhya* (III/2/24) and *Paraskara Grhya* (III/10). References to the use of black-coloured cloth in the *Kaushitaki Brahmana* (11/29) seem to indicate that the sages in those days used to treat the white cloth with black dyes and that the processes of dyeing were known to them.

In the ages of the *Puranas*, the use of multi-coloured cloth was widely prevalent. Rama made a gift of *Kausheya* cloth to the Brahmins and on the eve of their exile Rama and Lakshmana exchanged their wearing cloth for barks. A reference, again, in Sloka 2/52/82 of the *Ayodhyā Kanda* of the *Ramayana* to the gift by Sita of various kinds of cloth and food to the Brahmins, suggests that cloth was then made of different fibres and dyed to different shades.

The description of the royal costumes and that of the dis-robing of Draupadi in the *Mahabharata* provides ample evidence of the existence of a wide range of cloth and clothings in these ancient times. Kausalya, Sumitra, Kaikeyee and other queens, as described in the *Adikānda* of the *Ramayana*, used to go to the temples for worship, accompanied by four of their daughters-in-law, all attired in linen cloth. White and coloured *Kausheya* as also linen were sanctioned for use on auspicious occasions.

The importance that was attached to cloth is evident from the *Manu Samhita* in which it was laid down that a person found guilty

of theft of cloth should be punished with a capital sentence. If a person stole any yarn or cotton, he would be liable to pay double the value of the article stolen. If a weaver accepted 10 *palas* of yarn from anyone for weaving cloth for him and did not hand him back cloth weighing 11 *palas*, allowing for the admixture of sizing materials, he would be legally liable to pay 12 *palas* as a penal measure (*Manu* 8/397). The proportion between the quantity of yarn and the cloth obtained from it, as indicated in these codes of *Manu*, indicates that the measurement of cloth in these days was similar to the length and breadth of cloth of later times. The codes of *Manu* (5/118 to 5/121) further confirm that cotton, silk and woollen fabrics were very widely used and that while cotton fabric was washed in clean water, silk and woollen clothings were treated with alkaline earth.

The use of weaving appliances and the knowledge in the art of weaving made considerable progress from the Vedic till the Smṛiti era. Further advancement was recorded in the succeeding eras. There is no dearth of references in the religious scriptures to substantiate the antiquity of weaving and confirm its progressive development throughout the ages.

Weaving demands on the part of the weaver a large measure of skill and patience and also quick and adroit movement of hand and foot. He has to weave a pattern out of many thousand strands of fine yarn which are liable to snap and, therefore, he cannot afford to be haphazard or hasty.

Both Hindus and Muslims practise handloom weaving in West Bengal. The Hindu weavers are commonly called *Tanti* and the Muslim weavers are known as *Jola*. Although weaving is the hereditary profession of both of them, it is somewhat surprising that the two communities have always followed distinctively different methods of weaving.

The handloom is a very old equipment and in its simplest form is known as the throw-shuttle loom. The main component of the loom is the sley which is made of timber obtained from the palmyra tree. The other parts of the loom are made with *sal* wood and bamboo. In its entirety, the loom lasts very long and but for the periodical replacement of the bamboo parts and posts, its life extends to more than one generation of the user. The shuttle of the loom is propelled through the shed of the warp by one hand and caught up by the

WEAVERS AND WEAVING

other hand, as soon as it is released from the shed. It is not possible to weave with these looms beyond limited widths but it can be used for weaving both with fine and coarse yarns. A great advantage of these looms is that breakages are infrequent. Though the finest type of weaving can be done on these looms, the process is necessarily slow and, consequently, the output is small. The mechanical drawback of these looms lie in the fact that there is no provision for lateral rests of the shuttle, as a result of which the shuttle may drop down and has to be picked up, and also the propulsion of the shuttle at a uniform speed and pressure is not ensured.

Fly-shuttles were introduced by John Kay in England towards the end of the eighteenth century. Fly-shuttle looms cannot be called entirely

foreign; on the contrary, these are improvements on the throw-shuttle looms. The principles of working of throw-shuttle and fly-shuttle looms are fundamentally akin. The drawbacks of the throw-shuttle looms, which limited the output in size and quantity and caused manipulatory disadvantages, have been eliminated in fly-shuttle looms by the addition of a few attachments.

The primitive sley is an important part of the loom, holding, as it does, the reed in order to enable the weft being placed in the required position during the weaving. The improved sley consists of a shuttle-race with a shuttle-box at each end and has arrangements for holding the reed, which is necessary for keeping the warp-ends in proper position and also beating up the weft to the fell of the cloth. The shuttle-race is so-called because the shuttle travels over it. The sley must be very straight and the shuttle-race as smooth as possible. The sley has to be constantly drawn by the weaver towards him in his effort to beat up the weft thread. For coarser weaves, the sley should be heavy, made, preferably, of sal wood; for finer weaves, however, lighter sleys are required, made with teak wood.

At the ends of the shuttle-race are what are called shuttle-boxes. The shuttle is propelled from one box to the other where it rests for a moment before travelling back. The dimensions of the boxes should be just big enough to hold the shuttle.

There is a square piece of timber within each box, which is called picker. An iron rod, passing through the upper portion of picker, is fixed at one end with the end-wall of the shuttle-box and its

other end is attached to a wooden bracket fixed on the sley-sword. The picker maintains a rigidly vertical position, resting, as it does, in a groove at the bottom and being held tight at the top by the iron rod. A string is tied to the picker through two holes bored in it. This string is connected with the picking string which suspends from the top of the sley-swords till it reaches the centre of the cap of the sley. A pull at the picking string makes the shuttle fly. The wooden pickers are being gradually replaced by buffalo hide pickers, which last much longer.

The sley cap is a simple piece of seasoned sal or teak wood, 2 to 2½ inches thick, with a semi-circular top and a flat bottom having a groove similar to that in the shuttle-race. The cap serves to keep the reed in proper position. It is placed parallel to the shuttle-race and so loosely dove-tailed at both ends with the sley-swords that it can be moved up and down, as required.

In some of the looms two pieces of battens are attached to the sides of the sley. The battens add to the strength of the sley. They have grooves of varying depths carved at their lower ends, which fit in with the projections of the sley cap. The groove at one end is made larger than at the other, to permit the cap to slide out when it is necessary to take it out. These battens are called side bars.

The long bar at the top of the loom is called the top bar. It holds the side bars in position. Being parallel to the sley, it forms as if a square. There are two iron pins projecting from the ends of the top bar and the entire body of the sley suspends from these pins.

The frame should be made to the measure of the sley and beams. It is held in position with wooden battens fixed at its top and bottom. The posts which form the frame, should have grooves cut in them to permit the adjustment of the position of the sley either upwards or downwards.

Shuttles in common use in West Bengal are made of wood or steel. A hollow is carved out in the middle of a piece of wood, about 14 to 15 inches long, with tapering ends. At one extreme of the hollow space is fixed a screw to hold the weft pirn. The weft yarn passes through an opening called the eye at the other end of the hollow of the shuttle. There are two rollers at the bottom of the shuttle which enable it to

WEAVERS AND WEAVING

move fast and without any friction. The surface of the shuttle should be highly finished. It should neither be too heavy nor too light. For finer weaving, smaller shuttles are generally used. In order to prevent the pirn from slipping off the fast-moving shuttle, there is a spring attachment in the shuttle which is known as the shuttle tongue. The shuttle requires lubrication now and then.

The handle is a very simple contrivance made of teak wood. All the strings of the loom, including those of the pickers, are attached to the handle. It is the medium for originating motion to the shuttle. As the weaver pulls down the handle, the shuttle begins to move.

To wind the weaver's beam two holes are made at right angles at the right end of the beam. A small but strong rod is put in the holes and as it is turned the cloth beam rolls. Similar arrangements are made to release the warp from the warper's beam. But, for the warper's beam the rod should be considerably longer than that for the cloth beam. If the beams are fitted with ratchet wheels and catches, the rods are not necessary.

Beneath the frame of the loom is the treadle which is worked by foot. It is connected to the heald with strings. Pressure is applied to the treadle by foot, according to the requirements of weaving.

In every loom there are two beams, namely, the weaver's beam and the warper's beam. The beam is made of teak, sal or

deodar wood and is either square or round in shape. The length of the beam should be the same as that of the frame and must be related to the width of the cloth to be woven. The beam should be so carefully fixed to the frame that it does not move sideways in the least but is able to rotate freely on its axis. It is essential that the beam should have an absolutely smooth surface and it must be straight and true from one side to the other. Generally, for the convenience of weaving, a mark is given at the middle of the beam and also several other markings, equidistant from its centre, are made to show the various widths in which cloth is woven. Both the beams have grooves, running from one end to the other, which hold the warp threads tight during winding. The weaver's beam is nearer the weaver and the treadle is just underneath this beam. The woven length is wound up over the weaver's beam, as and when necessary. The warper's beam, which has around

it the warp threads, is farther away from the weaver. To maintain the width of the cloth constant, its selvages are kept at fixed distance with the help of stretcher looking like a bow.

The healds are placed just after the reed and the warp threads pass through them on their way to the reed.

The heald moves up and down, as pressure is applied to or released from the treadle. As the heald moves up and down, a passage, called the shed, is created in the warp through which the shuttle is plied. Efficiency in weaving depends on the ability of the weaver to obtain a co-ordinated movement of the treadle, handle and the healds.

The reeds are made of very thin strips of bamboo and indigenous reeds and look like a comb. The bamboo strips must be fixed at precise intervals depending on the density of the cloth to be woven. The reeds are commonly specified in terms of number. Usually, when a reed is known as 1,000 it means that in a space of 40 inches, there are 1,000 slits in between the bamboo strips. The number of reeds is an indication of the quality of weaving, whether it is coarse or fine. The reed is lubricated off and on, not only to allow for the smooth passage of the thread but also to strengthen its life.

Of other minor parts and accessories of the loom, mention may be made of levers and lever arrangements, needles, shafts, top shafts,

lease rods, swifts, reels, winding grooves, spindles, spinning wheels, bobbins, prin, bobbin frame, lease-taker brush, shuttles and brush. It is important to bear in mind that all these parts and accessories are made indigenously. While the mechanism of weaving has been standardised, each region of handloom weavers has its own system, adopted to the local circumstances, and also uses such parts and accessories as have been enjoined by the local traditions. There is no common nomenclature for all the parts and accessories and the names widely vary from district to district.

WEAVING

The first stage in the art of weaving is the preparation of the cotton. It is generally the womenfolk who undertake the preparatory processes. The weavers begin the weaving when the warp is made ready. In the old days spinning was practised even by women of the higher sections of society. The thread spun by the Brahmin maidens is still used in such ceremonial functions as the sacred thread ceremonies and marriage.

WEAVERS AND WEAVING

In fact, spinning as a custom or profession was once universal and extensively practised. It also fetched the spinners a decent earning. As people used to spin according to their requirements of clothing, there was then no scarcity of cloth. Not only that there was plenty of yarn available from the spinning wheels, but the quality of the yarn was also highly satisfactory. The cloth woven with such yarn used to last very long.

A cloth is made of two series of thread. The thread that runs lengthwise is known as **Warp and Weft** examined. It is then loose-across is called weft. It is of utmost importance that the warp thread should be adequately sized. The preparation of the warp requires much more care and caution than the weft.

Firstly, the hank of the yarn is to be unfastened and the knots and breakages properly examined. It is then loosely tied and placed in a reservoir, the water in which has to be changed every day. If the yarn is for the warp, it has to be kept immersed for at least three days. But the weft yarn need not be kept in water for more than a day. The object of wetting the thread is to remove from it foreign matters and make it suitable for the absorption of sizing. The dyed yarn requires to be wetted for only a short while.

Wetting over, the yarn is to be wound on reels. This is done by separating the skeins and taking care that during winding the individual strands of thread do not get mixed up. It often happens that the thread breaks off during winding. The ends of the broken threads are sometimes tied by knots. But the other process, known as piecing, is to bring the ends together and twist them into a continuous thread.

Sizing is made of starch from rice, parched rice and fried paddy. For finer type of weaving the starch of fried paddy is used. The hanks are put in the starch and thrashed so that the starch penetrates fully into the yarn. Thereafter the sized hank is placed on a swift. The strand of yarn pulled out of the hank, is wound on a smaller swift and dried in the sun. During the rainy season the hank is dried by placing it by the side of an oven.

The next stage is the preparation of the warper's bobbin. The sized hank is twisted and untwisted several times to get rid of the adhesive remnants of the

starch. Then it is wound on warper's bobbin. The bobbins are placed on a creel and the ends of thread of the bobbins are pulled out and made to pass through a leasing frame. The ends, emerging out of the leasing frame, are taken together and tied to a post.

Warping now begins. The length of the warp is determined by the requirement and convenience of the individual weaver. Generally, the warp is made, long enough for four to twelve pair of dhoties or sarees. The over-all length of the warp should be about a yard longer than the aggregate length of the cloth proposed to be woven, to allow for wastage and shrinkage. The warp is prepared either in full length or in circular layers. Two posts are fixed on the ground, the distance between them being equal to the warp length. One end of the warp is then tied to one of the posts. The warper then starts moving towards the other post with the creel in one and the leasing frame in the other. At suitable intervals between the two posts are placed pairs of lease rods to enable the warp threads being maintained in their respective positions. As the warper reaches the lease rods he raises the lease-frame held in his left hand which results in a division of the warp thread, putting an equal number of threads up and down. Thus proceeding he reaches the other post round which he turns on his return journey to his starting post. The process is continued till the required number of threads, enough for the width of the cloth to be woven, is secured. The warp should be finished at the starting point. The number of threads required per inch of the warp is determined by the density of the cloth to be woven. To allow for shrinkage, the width in the reed should be at least two inches more than the actual width of the cloth to be made. The warp is then wound in the shape of a ball without affecting the leases which are maintained by inserting thicker threads in place of the bamboo lease-rods. The bamboo lease-rods are retained only at the ends of the warp.

The next process is denting which means drawing the warp ends through the reed. Two persons are required for this purpose. One of them picks up the threads in twos in succession and the other one draws them through the reeds with the help of a hook. The process is repeated until all the warp ends pass through the reeds.

Beaming is the next stage. Warp is now stretched to full length. The ends of the threads nearer the reed are fixed

WEAVERS AND WEAVING

to a rod which is placed in the groove within the beam. The beam is then wound. The other end of the warp is held tight either by a man or by tying it to a sufficiently heavy piece of wood or stone. The beam is wound by manipulating the peg placed in the holes bored at its extreme. As the warp is wound, the reed is moved forward which makes more of the warp available for further winding. The winding must be done with considerable care and caution so that the threads do not get loose and uniform tension is maintained in the entire stretch. To prevent the layers of thread from slipping at the extreme ends of the beam, either thick paper strips or thin bamboo strips are put in between the layers.

The beam so prepared is then put on a frame and a yard of it is stretched out and held tight by fixing it to temporary posts.

Heald Knitting It is essential that the threads should be in uniform tension. Lease-rods are placed in the warp causing a slight opening in it. One end of the thread, with which the healds are to be knitted on the warp, is passed through this opening from the right to the left. The knitting, which must not be confused with knitting by thread and needle, is done with the help of a tapering piece of wood. To it is tied a thicker thread, about four cubits in length. This thread follows the piece of wood as the healds are knitted, the object being to reserve the space for the edgeway insertion of the heald stave. When the piece of wood, around which the healds have been knitted, is taken out, loops are formed through which the warp ends are passed. The healds are knitted in halves. When the knitting of the upper half is complete, the warp is turned upside down and the lower half is similarly knitted. The warp thread passes in between the two halves. Care should be taken to see that not more than one thread of the warp passes through one heald.

The next stage is looming the warp. The warper's beam being ready, it is placed in its appropriate position in the loom. The reed and the healds are then drawn nearer the weaver's beam. The upper staves of the healds are attached to the lever of the loom by means of cotton ropes and the reed is placed in the groove of the sley. The sley-cap is fitted on the top of the reed to keep it in its due position. The warp ends, which have emerged through the reed, are taken in small bunches and tightly tied to a rod, which has been placed in the groove in the weaver's beam. The lower staves of the

heald are connected to the treadle with cotton ropes. Lastly, the picking strings of the loom are to be properly-tied and adjusted to their respective positions, to enable the shuttle to function freely.

Looming of the warp being over, preliminaries to actual weaving should be taken in hand. The shuttle will contain the pirn for the weft. The yarn for the weft is wound on the pirn from the swift. A uniform tension should be maintained during the winding process. The pirn should be tapering in form so that the yarn may come out of it easily when pulled. The pirn is then put in the shuttle and the end of the weft yarn is drawn through an eye of the shuttle. As one of the treadles is depressed by the foot, the healds connected with it go down, while those connected with other treadle go up, forming an opening in the warp known as shed. The shuttle moves through this shed and weaves. Each movement of the shuttle is immediately followed by a forward movement of the sley to beat up the weft to the fell of the cloth.

These are, in brief, the components, parts and accessories of the handloom and how they function.

Before beginning to weave, the weaver must keep with him handy such accessories as stretcher, shuttle, hook, handsbrush and water, so that no avoidable waste of time occurs once the weaving is commenced. It is also important to test if the loom and all its parts are in working order.

The fly-shuttle loom can be used not only for plain weaves but with slight adjustments various types fanciful textiles can be produced with it.

Motions in Weaving Adroit movement of both hand and foot is called upon for efficient weaving. There are three primary motions which govern the art of weaving, namely, the shedding motion, the picking motion and the beating motion. The shedding motion consists in depressing the treadle by one foot, which results in making an opening in the warp thread. The picking motion consists in propelling the shuttle by giving an oblong pull to the handle. The beating motion means drawing the sley forward with the object of beating the weft yarn to the fell of the cloth. Efficiency in weaving depends on how quickly these three motions are effected in a co-ordinated manner.

To be able to weave to perfection one cannot be too careful in implementing the individual processes. For instance, mere

WEAVERS AND WEAVING

movement of the shuttle is not all. It must be propelled in proportion to the speed of the other processes associated with it. Too much pressure on the treadle will break the yarn; while inadequate pressure will fail to make the proper shed, making it difficult for the shuttle to travel. Either the shuttle will slip down or the pirn yarn will break. The handle, again, must not be pulled too strongly; otherwise, the shuttle will recoil sharply from the shuttle-box and the weft yarn will turn to be loose. The pull on the handle should, therefore, be so regulated that the shuttle just travels from one box to the other and rests there until pulled again. The sley should also be drawn forward and released according to certain principles. If the weave is not intended to be dense, the sley can be lightly drawn. But for other types of weave the sley requires a harder beat-up. After a few inches of cloth is woven, the warper's beam is released to enable the woven length being wound on the weaver's beam. Before the woven length is wound on the beam, a thin layer of thin starch is applied on it and the surface is rubbed with stone so that the calendaring so done leaves a glossy and smooth look on the cloth. Where the weaving is required to be done to various shades, shuttles are prepared with pirns of yarn of different colours. The borders of a cloth are generally thicker or more dense than the body of the cloth. Care should, therefore, be taken to see that for borders several warp yarns are put together in the reed instead of two threads per dent and the width of the cloth, including the borders, is duly maintained by applying the stretcher edgeways.

For coarse weaving starch made of rice is used; for fine weaving the starch is made of parched rice and poprice (*Khoi*). The liquid starch is put in a clean piece of cloth and rinsed out. The poprice (*Khoi*) starch is prepared by making a paste of it in a brass or stone container. In addition to rice starch, many other types of starch made from potato and barley are also in use. Whatever kind of starch is used, the object is to add to the strength of the yarn without making it sticky. To eliminate the stickiness, sometimes some oily substance such as coconut, til or groundnut oil is also used.

IMPROVEMENTS IN LOOMS AND ACCESSORIES

Ever since the beginning of this century numerous improvements in looms and accessories have been effected by incorporating the principles of the working of foreign looms. Mention may be made of the devices for winding yarn on six or twelve swifts at a time, of the contrivance for preparing

simultaneously six, twelve or twenty-four bobbins and of the warping drums. Improved charkas, some of them portable and some of them capable of being worked by treadle, have helped to increase the output of the worker and reduced the drudgery of spinning.

There are several types of looms in current use in West Bengal. Firstly, there is the Hattersley domestic handloom. To be able to ply it for hours on end one must be sturdy and strong. Anything between 40 and 45 yards of cloth, 44 inches wide, can be woven on this loom in eight hours with 20s yarn. Though it can be worked manually, the Hattersley's loom is more suitable for use with power. Then, there is the Chittaranjan semi-automatic loom, which is now most popular, capable of weaving 30 to 40 yards in eight hours with 32 to 40s yarn. Thirdly, there are ordinary fly-shuttle looms with a capacity of 10 to 15 yards in eight hours. While a pit loom with throw-shuttle producing 5 yds. in 8 hours costs about Rs. 60, a frame loom costs Rs. 150 and a semi-automatic loom is priced Rs. 300.

Considerable improvements have also been effected in attachments. Multiple shuttle-boxes contain shuttles with yarn dyed to different shades and are convenient for use when yarn of more than one colour is necessary for weaving. Dobby attachments help in weaving designs on the borders of dhotis and sarees. For ornamental designs, on body, borders and also on cross-borders, the Jacquard machine is of great advantage.

HANDLOOM WEAVING INDUSTRY

Handloom weaving has been practised in this country since the misty past. Though until lately the looms were primitive and the processes of weaving slow and laborious, the cloth produced by the handloom weavers reached an excellence which had never been equalled, far less excelled. For various reasons, economic and otherwise, the industry has declined but even now there are artisans whose workmanship is at once the envy and wonder of the world of arts and crafts. It is an interesting feature of the handloom weaving industry of this country that if it had reached the zenith of its career during the days of the East India Company, it met its ruin also during the British rule. The partition has deprived West Bengal of some of the traditional handloom products for which the country was famous. Dacca and Tangail are now in East Pakistan and the production of dhoties and sarees, named after Dacca and Tangail, has been seriously disorganised.

No story of the handloom industry of Bengal will be complete without a reference to the muslin of Dacca. It was the envy and

WEAVERS AND WEAVING

despair of the textile world. Authorities from the West were often baffled in their endeavours to find out how so delicate a weave could be accomplished by the human hand. Mr. Taylor recorded that the yarn for the muslin used to be spun on the *charka* with meticulous care and caution and that the yarn was so fine that a bundle of it, weighing only $7\frac{1}{2}$ *maattaks*, would contain a crore of strands and if drawn out lengthwise, would cover a distance 150 miles. As humidity had had a direct effect on spinning, the spinners used to complete their job of fine spinning even before the sunrise. From the sunrise till ten o'clock in the morning they spun the medium counts and

continued again from three o'clock in the afternoon till dusk. Dr. Watson conducted microscopic examinations of the muslin yarn produced in Dacca and the finest yarn spun in France and England and was of the opinion that the Dacca yarn was of the finest count even though the diameter of the cotton fibre of the Dacca yarn was larger than that of the British or French yarn. These causes, combined with the ascertained result, concluded Dr. Watson, that the number of twists in each length in the Dacca yarn amounted to 110.1 and 80.7 while in the British yarn it was only 68.8 and 58.6, not only accounted for the superior fineness but also for the durability of the Dacca over the European fabric.

XIII

Silk in West Bengal

LOCALITIES WHERE SILK IS PRODUCED

A Monograph on the Silk Fabrics of Bengal, by N. G. Mukherjee.

Lassen's Indian Commerce.

See Bulletin No. 85, Dept. of Industries.

Paris Universal Exhibition 1878: Handbook to the Indian Court, by George, C. M. Birdwood (2nd Edition) pp. 101/108. Also p. 93 for *Defundato & Stragulatae*, p. 149 for *TASAR*.

Calcutta International Exhibition (1883/84) Vol. II, p. 30.

First Letter Book of the East India Company, p. 78, *Tzinde: Chinz(2)*.

Note on Sericulture in Bengal (1908-09).

Calcutta Exhibition of Indian Art manufactures (1882), p. 2; p. 80, Nos. 5, 7, 8, 9, 10; *Bilkali* (Maldah) Nos. 12, 13, 14, 15, 16, 17, 18, 19, 20, 21 to 24, pp. 92, 94.

Reports and Documents connected with the Proceedings of the East India Co., London, 1836: Re: *Raw-Silk P. III to XLIII* and pp. 3-4 and 7-8 *organzine=organsin* (Fr.), pp. 11-222.]

The following was the position of the silk industry at the beginning of the present century:

Murshidabad District.

Mulberry-growing and cocoon rearing in the thanas of:

- (i) Burwa
- (ii) Burwan
- (iii) Gowas
- (iv) Raghunathganj

Silk-weaving carried on within the jurisdiction of the following thanas:

- (i) Sujaganj
- (ii) Daulatbazar
- (iii) Bhagawangola
- (iv) Gowas
- (v) Manullabazar
- (vi) Asanpur
- (vii) Mirzapur

Other important silk-weaving centres:

- (i) Baluchar
- (ii) Islampur
- (iii) Kadai
- (iv) Saidabad
- (v) Beldanga
- (vi) Hariharpara

The two chief centres of Silk trade:

- (i) Baharampur
- (ii) Jiaganj

Nadia and Jessore were at one time recognized as silk-producing districts.

Burdwan Division: Silk-weaving is reported to be carried on in all the districts.

Hooghly District: *Jahanabad, Dwarke-swar* (See p. 2, Monograph on the Silk Fabrics of Bengal, by N. G. Mukherjee). In those early times the trade was almost exclusively an inland one, and was chiefly in the hands of *Bunnias* from Upper India. Camels were the only means of transport; and traces of an elevated highway used by the caravans of these merchants are still in existence. (See the Appendix containing H. T. Colebrooke's Remarks on the Husbandry and Internal Commerce of Bengal earlier in this volume—A.M.)

Sushi and *Sheosakhar* (from which later came the word, *Seersucker*—A. M.) cloth of *Dhaniakhali* and *Boral* in the *Sadar* subdivision and *Badanganj* in *Arambagh* subdivision are worth noticing. These are mixed fabrics woven alternatively with silk and cotton yarn. They are all exported to foreign countries. About 200 looms in both the subdivisions are engaged in weaving this cloth. The total annual output is estimated to be worth about two lakhs of rupees.

Pure tussar and silk dhuti, sari, *kete chadar* are extensively manufactured in the villages of *Kayapati, Badanganj, Fului, Kristoganj, etc.*, in the *Arambagh* subdivision. There are about 3,000 weavers in these villages and they weave both silk and cotton. The cheap, coloured tussar and silk dhuti and sari woven here known as "*chellis*" are chiefly used in marriage and other ceremonies by the poorer middle classes.

Cocoons come from *Chaibasa, Midnapur* and *Bankura* Districts through local (*Hooghly*) dealers.

Market: *Howrah hat*

Local people do not know the bleaching process. Rejected silk waste (of tussar) is exported to foreign countries at nominal price, and reimported as high class finished bleached thread.

[Silk in India compiled by J. Geoghegan, pp. 1-34.]

Report on an enquiry into the Silk Industry in India, Vol. I, by H. Maxwell Lefroy, Calcutta—1917.

Ibid.: Vol. II, by E. C. Ansorge, I.C.S., Calcutta—1917.]

In the *Burdwan* [see *Hunter* (*Burdwan*) in connection with *Brass Work: Jahanabad* and *Dewanganj*] district the silk industry is carried on in the *Sadar, Katwa* and *Kalna* subdivisions, but not in the *Raniganj* subdivision. In *Satgachia* thana in the *Sadar*

SILK

subdivision as per "Report on the Survey of Cottage Industries in Bengal" (1929), p. 11.

1	Memari	about	50	families
2	Radhakantapur	"	23	"
3	Tantigantar	"	8	"
4	Sripur & Khya			
In Galsi thana at :				
1	Khana	about	19	families
2	Jaikrishnapur	"	19	"
In Sahebganj at :				
1	Jogdabad	about	22	families
2	Panchkula	"	25	"

KATWA SUBDIVISION

[Report on the Survey of Cottage Industries in Bengal (1929): p. 12]

Tussar cloth is made at Bagtikra, Ghoranash, Musthali, Chanduli, Singi, Sribati, Gopekanji and Madhabpur in Thana Katwa. [Present position and future of the Silk Industry of Bengal, by C. C. Ghosh, Dept. of Industries, No. 85.]

Cocoons are brought from Chaibasa, Bahoragora, Mayurbhanja, and Singbhum, and thread spun locally. Dhuties, saris and thans are prepared by throw-shuttle handlooms in these villages.

The cloths are mostly exported to Madras and are also sold locally.

Tussar weaving is also carried on at Dainhat, mulberry silk weaving at Jagadabad and Dainhat, and at Dhenu (Manteswar police station) and Mankar: Kete cloths are made from refuse tussar.

(Memorandum on Silk in India, by L. Liotard, Pt. I: 18, 79 and Introduction.)

MIDNAPUR DISTRICT

Mulberry cocoon rearing is carried on in Ghatal and Tamluk subdivisions, chiefly within the jurisdiction of Ghatal, Daspur, and Garhbeta thanas. The village of Chandrakona in Ghatal subdivision is almost as important a centre for silk-weaving as Mirzapur and Baluchar in the district of Murshidabad and Shibdanga in the district of Maldah.

The products of the native reel from all parts of Midnapur and even from parts of Howrah are utilised in the looms of Chandrakona and the neighbouring villages.

Anandpur: Keshpur P. S., Nimtola: Ghatal P. S., Keshiary: Keshiary P. S., Ibid.: p. 24.

In Howrah, the silk rearing industry is of minor importance.

Birbhum, see "Report on the Survey of Cottage Industries of Bengal" (1929), pp. 14/15. In the jurisdiction of Rampurhat thana at:

- (1) Ganutia
- (2) Baswa
- (3) Bishnupur
- (4) Margram

BANKURA

The silk-weaving industry of Bankura is of greater importance than the cocoon rearing and spinning industries. Silk-worms are reared and spun in the following villages:

- (1) Dhanda
- (2) Punishole
- (3) Kesavpur
- (4) Chingann
- (5) Tilaghagri
- (6) Simlapal
- (7) Pakhurduba
- (8) Pathardoba
- (9) Barakhutia

At Vishnupur silk-weaving is carried on by about 1,000 families.

Market: Calcutta, Bombay and Madras.

The weaving of tussar is also carried on at Vishnupur though not as extensively as the weaving of mulberry silk. Owing to the competition of artificial silk the market is now less favourable.

The tussar silkworm is generally grown in the districts of Manbhum, Singbhum, Dumka, Giridih, Bankura, and at Kalna on the banks of the river. The seed is generally imported from the markets of Chaibasa, Jamtara, Narainpur, Giridih and Dumka. Another favoured centre is Mourbhanj in Orissa.

Sonamukhi: There are about 200 weavers most of whom weave a mixture of silk and cotton.

MALDAH

In Maldah, cocoon-rearing and silk-spinning are carried on more or less extensively throughout the district.

Silk reeling is the most important industry of the district. It is conducted on both a small and a large scale. The dried cocoons are procured from hats and also from rearers direct. Reeling is entirely conducted on country ghais.

Name of the village	No. of families	No. of basins	Maxi- mum No. of men engaged
ENGLISHBAZAR THANA			
Rajanagar	17	70	160
Lakshmipur	70	233	520
Amriti	7	46	75
Pirajpur	21	68	145
Fulbari	4	12	28
Bibigram	17	37	85
Hyderpur	40	116	250
Mirerchak	17	59	135
Mehedipur	5	12	28
Makdampur	2	7	16
Purapara	2	4	9
Bashbarikaltapara	3	8	18
Bangalgram	1	8	18
Atgama	2	14	20
Raipur	8	31	70
Gopalpur	2	10	13
Shakarma	5	20	25

SILK

Name of the village	No. of families	No. of reeling basins	Maximum No. of men engaged
KALIACHAK THANA			
Agamilki	1	12	27
Alipur	1	10	22
Nazirpur	7	11	25
Shershahi	1	22	50
Brommettra	2	4	9
Chandpur	3	54	125
Sujapur	70	132	300
Lilampur	1	12	27
Bakharpur	17	130	300
Lakshampur	4	120	270
Mahampur	11	26	70
Bamangram	14	26	70
Baktiarpur	1	2	5
Chaspara	37	72	165
Gandarpapara	5	10	22
Goyeshbari	97	205	470
Golabgunj	5	124	290
Charianantapur	4	60	130
	504	1,737	3,992

The number of ghais shown above include those concerns which are conducted on a large scale. (Report on the Survey of Cottage Industries in Bengal: pp. 138/139.)

Mahajans: Marwari.

Markets: about 400 mds.

Consumed by the silk weavers of Bishnupur and Birsingha in the district of Bankura.

The great bulk of silk goes to Madras. It may be mentioned that the merchants dispose of silk mostly by post to merchants of Berhampore (Ganjam), Trichinopoly, Salem, Triplicane, Masulipatam, Travancore, Secunderabad, Belgaum, Surat, Sujanagar (Gurudaspur), Mobarakpur (Azimgarh), Bijnour, Amritsar, Anantapur (Madras) and Southern Maharatta Railway, North Arcot, Bangalore, Tanjore, Bhandara, Akyab, Kayts (Ceylon), Chittagong, Bankura, Benares and other places.

Mulberry silk-rearing is a very important industry in the districts of Murshidabad, Rajshahi and Maldah. In the districts of Midnapur and Birbhum, it is also an industry of some consequence. In Bankura the silk-weaving industry still holds its own, though cocoon-rearing has dwindled into insignificance.

Mulberry and Mulberry growers (1903)

Districts	Area under Mulberry & Coc growers	No. of Mul growers	Acreage per individual
I	II	III	IV
Birbhum	2,000	8,249	1/4
Bankura	200	978	1/5
Midnapur	18,500	3,566	5
Hooghly	200	83	2
Murshidabad	62,900	31,698	2
Rajshahi (PAK)			
Maldah	50,000	38,433	1 1/2

[A Monograph on the silk Fabrics of Bengal: N. G. Mukherji: p. 6.]

Cocoon-rearing and cocoon-rearers.

Mulberry silk-worms reared in Bengal are:

1. Nistari or Madras (Bombyx crosci) for worm and rainy seasons.

2. The chhota palu or deshi (Bombyx fortunatus, for the cold season.

3. Bara palu (Bombyx textor) an annual variety, of which the egg stage continues for 10 months instead of 8 to 16 days as in the case of the chhotapalu and the Nistari.

4. Cheena Palu (Bombyx sinensis)—reared chiefly in Tamluk subdivision.

The respective qualities of the three principal kinds of Bengal cocoons for textile purposes may be best ascertained from the following figures.

	Bara palu	Chhota palu	Nis-tari
1 Average length of fibre in a cocoon in metres	270	215	210
2 Weight of unreelable portion in each cocoon in millegrammes	20	16	16 1/2
3 Weight of reelable silk in each cocoon in millegrammes	60	45	36
4 Proportion of reelable silk in the fresh cocoon per cent	8	7 1/2	6
5 Diameter of fibre (bave) in millemetre	16 1/2	20 1/2	20
6 Average weight of test skeins of fibre (bave) 476 metre long, in deviers	2 1/2	2	1 3/4
7 Tenacity of fibre (bave) in grammes	6 1/2	6 1/2	4
8 Percentage of elasticity of bave	16	12 1/2	12
9 Percentage of loss in weight due to "bailing off"	24	30	25

Usually three or four crops of cocoons are reared during the year out of eight that are possible, viz., three of Nistari and one of chhota-palu.

A conjectural estimate of production of cocoons in West Bengal Districts.

District	Produce of green cocoons
	Mds.
Burdwan	20
Birbhum	16,000
Bankura	2,000
Midnapur	37,000
Hooghly	200
Howrah	100
24-Parganas	20
Nadia	200
Murshidabad	72,000
Rajshahi } PAK	18,000
Bogra }	400
Malda	70,000
	<hr/>
	215,940

The above quantity, i.e., 215,940 or roughly speaking 220,000 mds. would produce

SILK

12,000 mds. of raw-silk (flature-reeled and 'Khamru), of which about 5,000 to 6,000 mds. are used in the country looms. Besides raw-silk (Tasur and Endi) and a great deal of 'waste', altogether not less than 12,000 mds. of undivided Bengal silk are used in India for weaving purposes.

Cocoon rearing

Cocoon-rearing is done in almost the same way all over Bengal, the variations in methods and appliances being insignificant. Mud-walled houses are the best for rearing works, but those who can not afford such houses do the rearing in mat-walled ones. The seed-cocoons are placed, thinly spread out on dalas, or flat bamboo trays, which in some districts are circular and in others square or oblong. In eight or nine days in hot weather, and in 15 or 16 days in the cold weather, the moths come out, and they remain paired for the greater part of the day; that is, until they are separated in the afternoon. Unless they are separated the males do not allow the females to lay eggs uninterruptedly. The males are known from their smaller size and their constant fluttering of wings. After being separated, the males are thrown away and the females left to lay eggs on the dala. In the case of the Bara palu, the female moths are transferred to a piece of rag, and they deposit their eggs there. Pieces of rag with eggs adhering to them by means of a natural gum are folded up and kept inside a handi or earthen vessel, the mouth of which is closed by means of an earthen cover and sealed with mud. If the moths cut out of the Bara palu cocoons for three or four days successively, three or four pieces of rag with eggs are obtained. The vessel in which they are kept is of sufficient size to prevent asphyxiation of the eggs. It is kept suspended from the roof in a cool part of the house. The moths finish depositing the eggs in about 24 hours, and on the 3rd or 4th day the female moths are thrown away. In the case of the polyvoltine silk-worms (Nistari, Chhoto palu, and cheena-palu), the eggs are left on the dalas on which they are laid, and allowed to hatch there, the hatching takes place in eight to nine days in the hottest weather, and in 16 or 18 days in the coldest. The Bara palu eggs do not hatch till next spring; the eggs remaining in the handi from the end of March to the end of January, i.e., when the weather begins to get warm. The fixed day for opening the handi is the Sripanchami or Saraswati Puja day. The hatching of Bara-palu eggs does not take place so evenly and completely as that of the polyvoltine silk-worm eggs. It goes on for 8, 10 or 12 days, and the cocoons afterwards go on forming for a similar period. This is a great disadvantage, and when there is any epidemic among the

worms ripening first, the late worms fall a complete victim to it. After the worms have hatched out, the same system of rearing is followed in the case of every kind of mulberry silk-worm. Tender leaves of mulberry are cut up very fine and sprinkled over the newly hatched worms. Three or four hours afterwards the worms are removed to another dala with the help of a little brush made with grass or feathers. The worms with the refuse leaves are then made into a neat flat circle or chaki (disc) of uniform depth of about 1/12th of an inch, and fresh leaf, finely cut up, is sprinkled over this chaki. Feeding is done at 5 or 6 a.m., 10 a.m., 3 p.m. and 8 or 9 p.m. Sometimes, specially in the wet season, only three feeds are given. In the dry season five feeds are sometimes given in the early stages of the worms. The refuse leaf is cleaned once in four or five days, i.e., a day before and a day after each moulting period. The moulting period lasts each time from 20 hours in the hot weather to 48 hours in the cold weather, when the worms are left without food and untouched. Feeding is recommenced when the worms are well out of the moult. The special art in rearing silk-worms consists in stopping feeding at the right time and recommencing feeding at the right time. Women do most of the work in connection with the rearing house, while men look after the mulberry, cut and bring it home for the silk-worms, and assist the women at feeding and cleaning. After the fourth moult the worms become very voracious, but the regular three or four feeds are adhered to, and it is not considered right to give extra feeds at this last stage. Three to nine days intervene between moult to moult according as the season is warm or cold, and the last stage before the worms make their cocoons lasts from five to twelve days according to the season. Bara palus eat for four or five days more and the Chhoto-palus two days more than the nistari, and the nistaris two days more than the Cheena-palus, before they commence making cocoons. So, altogether from the time the worms hatch out of the eggs to the time they begin making cocoons, the nistari silk-worms have constant care bestowed on them for 20 days in the hottest weather and 55 days in the coldest weather; the Chhoto-palus 22 days in the hottest weather and 57 days in the coldest weather; and the Cheena palus for 13 days in the hottest weather and 53 days in the coldest weather, and the Bara-palus (which are reared only once a year in the spring) for 30 days. When ready for spinning the silk-worms cease eating, look about restlessly, spit out silk-fibre and appear translucent. They are then picked and placed on chadrakies—called also talias, chanches or singas—a kind of bamboo screen.

SILK

Spinning

MATKA AND KHAMRU SILKS

The pierced cocoons which accumulate normally in every cocoon-rearer's house after seeding is done, that is, after the moths have cut out of the cocoons and laid eggs, are utilized for weaving matka cloth. Matka-spinning and matka-weaving give occupation to the poorest of women and the least artistic among the weavers. The Rajshahi matkas are not so coarse as Murshidabad or Malda matkas. The empty cocoons, i.e., the pierced cocoons, are kneaded with a little clay or with a paste for a little while, then they are taken up one by one with left hand while a strand of fibres is drawn out of it with the thumb and index finger of the right hand and attached to a spindle variously called teko, tekia, takur, jamta or jamtakur. The fibres are kept twisting with the revolution of the spindle. Women doing the work during their leisure time at home, do the spinning of about 400 cocoons per day. When the day's spinning is done, the thread is taken out of the spindle and gathered on to a latai or natai.

Matka-spinners are amongst the poorest of the poor and they are usually Muhammadan women who try to keep up their purdah by means of this sedentary toil which brings poor return.

A little more than half the quantity of mulberry cocoons raised in Bengal is spun into thread by the country method of reeling. This is known as Khamru, Khangru or bank silk. Bank is the name of the machine by which Khangru silk is made. The machine is more commonly known as ghais, which properly means simply the pan in which cocoons spin in hot water. Ghais are chiefly worked by Muhammadans, but in Malda and Birbhum silk-spinning on the native method is largely done by the Hindus. The processes employed are mainly the same in every district. In Malda there are regular native filatures consisting of 40 or 50 ghais. In some of these, six skeins of silk are turned out at a time on each reel.

In some places as in Murshidabad and Rajshahi there is more masonry, wood and iron used in the construction of native reeling machine; in others, as in Bogra and Midnapur, mud and bamboos are used wherever possible.

The principal parts of a native reeling machine

- (i) Taphil or tahabil.
- (ii) Janta or wheel.
- (iii) Khelana.
- (iv) Kal.
- (v) Karai.
- (vi) Strap or string.
- (vii) Iron hooks for conducting thread to reel.

- (viii) Small crank (khelana tar) on wheel.

This crank imparts a reciprocatory motion to the khelana in order that the thread may be evenly distributed on the reel.

- (ix) Flue.

Filature system

The raw silk of superior quality—superior, that is, to khamru silk, is nearly all exported to Europe. This silk is spun in filatures.

The principal differences between the khamru and the filature methods are:—

- (1) The boiling and heating of water is done in filatures from a central boiler with steam, and not by fire kept under each basin as is done in the native ghais.
- (2) The discipline under which the spinners and winders are kept by constant check of their work by means of special testing machinery and a special supervising staff renders the silk turnout of even size than khamru silk.
- (3) When there is a break a knot is put, which is not done in khamru silk.
- (4) Crossing of two adjacent threads to give them roundness and firmness is invariably done in filature-reeling, though it is only rarely done in khamru-reeling.
- (5) Filature silk is finer than khamru silk.

Phiran or unwinding

Native weavers, as a rule, employ khamru silk in their looms. It is only rarely that they employ European filature silk or 'Latin' silk for turning out superior fabric. In weaving 'pakwan' silks (i.e., silks made out of twisted thread) the weaver first unwinds the skeins to a number of latais and then gets this unwound raw-silk twisted, and finally gets it warped before he commences weaving. In weaving kham silks (i.e., those made out of raw or untwisted silk) the weaver gets the thread unwound and gathered on to latais, and then warped before commencing weaving. If the thread is bleached, dyeing is done after warping. The thread for the weft is gathered on to latais from the skeins, two or three fibres from the skeins of a raw silk going to form a weft-thread. The weft-thread is taken out of latais and bleached and dyed, if necessary. In other words, whether the raw silk is twisted or untwisted, whether it is bleached or not, whether it is dyed or not, it must be unwound before it is used.

The unwinding is done with two objects:

- (1) to gather the thread of the same thickness or size in the same latai, and
- (2) to get one uninterrupted thread in each latai. The skeins

SILK

of raw silk are loosened out and put round a frail bamboo wheel called 'polti' or 'chorki'. The end of the skein is attached to a latai and the thread transferred to this latai by keeping it turning with the right hand, while the thread is made to pass between the thumb and the index finger of the left hand. The operator can judge the thickness of the thread as it passes through his fingers. Women are usually employed in this work.

Throwsting

"Throwsting or twisting"

The raw silk of a thread on to latais may be used for warping in untwisted condition for manufacturing kham silks or silks of poor quality. For manufacturing superior silks, twisted thread is employed. Superior silks are therefore styled 'pakwan', i.e., twisted.

In twisting, sticks are planted loosely in holes in the floor. The threads are passed through an iron guide called loibangri khunti, firmly planted on the floor; they are then carried up in front of the operator through a bamboo and cane erection called Dol, and then through the first space of the uppermost series of a number of thhaks or bamboo erections, back through the first spaces of the lower series of spaces of the same thhaks and the second space of the Dol, when the threads are snapped at the iron guide, and a takur tied at each end, the two ends being then made to hang vertically at equal heights from the floor. Another length of thread is then taken exactly in the same way from the latais, passed through the guide, the third space of the Dol, the second spaces of the upper and lower rows of the thhaks and the fourth space of the Dol, the two takurs being again tied at the two ends in front of the operator. In this way seven lengths of threads with 14 takurs attached to their ends remain hanging in front of the operator. From the Dol to the last thhak being 27 yards, 378 yards of thread are twisted at the same time by each operator. Sometimes 16 takurs are used instead of 14. The takurs are simply slender pins of bamboo with mud weights attached to their bottom which help to keep the threads straight while the twisting is going on. The operator keeps rubbing the pins of the takurs successively between the palms of his hand, so as to make them spin fast and uninterruptedly which serves to twist the threads, when the takurs are only nine inches from the Dol, by the shortcoming of the threads by 9 inches as a result of twisting, the operator considers the twisting done. The seven pieces of twisted thread are then

gathered on to a latai as one continuous piece by knotting them together. In the native system of weaving the weft is never made of twisted thread.

Silk-twisters are called chambulias. There is a chambulia-para or silk-twisters' quarter in Berhampore. They are either Hindus or Musalmans—usually the latter. In social position they occupy a place intermediate between weavers and spinners.

Silk-weaving and Dyeing

Bleaching

The art of bleaching silk is a very ancient one, and it is mentioned in the institutes of Manu (c.f. Konshikalikayorushai—silk and shawl are to be bleached with urine and water—Quoted by N. G. Mukherji). The ancient method, though recognised by dhobis, is not practised by weavers in bleaching yarn. Whatever the yarn used for weaving, European filature-reeled silk or khamru, twisted or untwisted, or matka thread (which is always twisted), bleaching usually precedes weaving. In the case of 'corahs', however, bleaching follows weaving. The colour of the raw Bengal silk, both of European and native manufactures is yellow, that is like that of the cocoons out of which it is made. This however is not a permanent colour, and it has to be removed by bleaching it white before it is dyed. In bleaching a seer of silk (a) one pow ($\frac{1}{2}$ lb.) of saji (crude carbonate of soda) is powdered and mixed up with $2\frac{1}{2}$ seers of hot water, and the liquid strained through the same piece of cloth for a number of times or (b) half-a-seer of ashes obtained by burning plantain leaves is mixed up with $2\frac{1}{2}$ seers of hot water, and the liquid strained as before or (c) half-a-pow of saji and one pow of the ashes are mixed with the water and then strained as before. A piece of cloth is spread over a basket, and the water to which the powdered saji or ashes or a mixture of the two has been added is poured on to the cloth and gathered in a vessel underneath. This liquid is again poured into the basket and strained a second time. The straining is repeated until the liquid looks like oil. This liquid or lye is mixed with about half-a-maund of water and boiled. Into this boiling water one seer of silk is introduced, out of which it is taken when the bleaching is done and washed in a tank of clean water. After the silk is dry it will be found on weighing that it has lost about a quarter of its weight by bleaching operation.

Weavers usually do their own bleaching and even their own dyeing, but corahs are bleached by dhobis or professional washermen, and there are professional bleachers in Murshidabad as there are professional dyers.

The process of bleaching is somewhat different in Bankura and Bogra (see the respective District Monographs).

SILK

Dyeing

After bleaching the dyeing. Dyeing is usually done by the weavers themselves, but where, as in Murshidabad, silk-weaving is done on an extensive scale, there is more division of labour. As there are special twistors of yarn, so are there special dyers' establishments. These are miniature factories in brick-built houses each consisting of eight or ten workers. Each factory contains a number of vats embedded in the floor and also a number of brass and copper pans. The men who work in these factories are chiefly Tantis and Kaibartas.

Dyeing is done either in the thread or in the piece. In both cases bleaching (of the thread or of pieces of cloth) and in most cases mordanting precedes dyeing. The following seventeen colours are recognised in Bengal: (1) Indigo; (2) Black; (3) Blue; (4) Green or light blue; (5) Red; (6) Light-red or anardana (promegranate-seed colour); (7) Yellow; (8) Orange; (9) Green; (10) Purple; (11) Banesh (Chocolate); (12) Pitambari; (13) Sonali; (14) Hiraman-kanthi; (15) Mayurkanthi; (16) Dhupchhaya; (17) Ashmani.

The last five colours are in each case the effect of the combination of two colours—one employed for the warp and the other for the woof. Pitambari colour, for instance, is produced by red warp and orange weft.

As a rule, bleached silk needs mordanting before a dye can be permanently fixed into it. The silk is put into the boiled alum water when it is still hot and turned about in the solution for half-an-hour to get the fibre mordanted evenly. It is then wrung out and put in the dye in a moist state. This preparatory mordanting is not required for dyeing silk with lac, annatto and indigo.

Warping

Warp threads for 5, 10 and sometimes 20 pieces are rolled round the warp-beam before weaving is done. Before arranging the loom therefore, it is necessary to get the warp (50 to 80 yards long) ready. The bleaching and dyeing are done in the warp. The thread for the weft is bleached and dyed in small skeins as they are taken out of latais. In warping the thread from the latai is laid along bamboo laths called joas fixed in a row in the ground. The latai is held with the right hand, and with the left a stick with a glass ring at the end. The thread is passed through this ring and laid alternately against the two

sides of the laths in a neat manner. When the proper number of threads have been laid against the bamboo laths, they are drawn out of the laths, tape bands being substituted for the laths. The warping being finished, bleaching and dyeing are done, or the unbleached warp used for feeding the loom. When the loom is set, the tape-bands are taken away, and in their place thin laths of bamboo called joa-kathis are substituted, and the warp tied to and warped round the off-beam or the wrap-beam. The use of the bamboo laths has two objects: (1) to keep the threads of different colours separate and (2) to allow the bows or "healds" to work without interruption. The introduction of these laths at regular intervals makes the different sets of threads required to come up or go down with the healds, do so in a neat manner, forming a shed for the introduction of the shuttle. In weaving check pieces 200 of these laths are used for a 50 yards warp. The threads of the warp are passed through the dentations of the 'reed' and tied to the 'cloth beam'. As the weaving proceeds the cloth is wrapped round this beam, and the warp set free from time to time from the other beam.

The skeins of weft thread are transferred to little pieces of reed called nalis (spools) with the help of a wheel. These, with a small quantity of weft thread charged on them, are introduced into shuttles. In weaving thin muslins the weft comprises of a single thread, in other cases of two threads gathered from two latais. The two weft threads in this country are not twisted together, but in Europe a certain amount of twisting is given to the weft threads also. As the warp is used, either bleached or unbleached, dyed or undyed, so is the weft.

Weaving

Looms for weaving silks are exactly like looms for weaving cotton cloths. The looms for making figured silks of Baluchar (Murshidabad) however, are of a special kind. They are extremely complex in construction. The figured saris ordinarily made at Baluchar are not neat, and they are no longer in fashion. Dubraj (DUBRAJ) was the last weaver (he was eighty in 1899) at Baluchar who knew the principles of construction of looms for bringing out any desired pattern*. The looms we ordinarily see are worked with 'healds' (for separating the different sets of warp threads) and shuttles (for introducing the weft). In

* He was the last to weave on a commercial scale and used to 'sign' his saris. But he had a pupil called Hemchandra Bhattacharyya, (of Bahadurpur, P.O. Jiaganj, District Murshidabad) who is still alive and knows how to set up a Baluchar Buttidar loom and produce the particular Baluchar technique. In 1949, the undersigned, while working as District Magistrate of Murshidabad, raised an endowment and commissioned Sri Hemchandra Bhattacharyya to set up a loom and weave a sample Baluchar cloth at the Local Government Silk Institute. Partly on account of his age and partly because he had no competent assistants he took fourteen months to produce a good specimen of Baluchar Kerchief—A. M.

SILK

the 'naksha' loom, that is, loom for weaving figure silks in addition to healds and shuttles there are used 1) a series of cords connected with loops with the warp thread and (2) spools for introducing the weft for bringing out the figures. In an ordinary loom one operator does the whole work. In the naksha loom one man works the healds with the treadle, introduces the weft first with the shuttle, and then with the spools, and finally presses the weft close with the reed, while another person handles the cords one after another, so as to bring the proper threads of the warp up, to enable the other man to introduce the spools in the right places. The arrangement of the cords is extremely complicated. It is by working these one after another and introducing the weft with the spools that the figures come out.

Waste Silk

The following substances are comprised under 'waste' or waste-silk:

- (1) The phensua or Frisson, the loose silk adhering round cocoons, which is separated out when one gathers cocoons from the spinning screens (Chandrakies). The frissons cannot be regarded as a portion of cocoons. It is not sold with cocoons.
- (2) The chhenia or flimsy cocoons. These are also sold separately along with frisson and not with good cocoons.
- (3) The jhut or ribbon-waste, i.e., bundle of silk fibre that come out and get rejected in the reeling basin in getting the clean ends of boiling cocoons when they are beaten with a clump of sticks for this purpose.
- (4) The telette or topa, the inner portion of a cocoon which cannot be reeled off, but which sinks in the basin with its chrysalis.
- (5) Double cocoons, i.e., those made jointly by two or three worms which cannot be reeled.
- (6) Pierced cocoons, that is, cocoons that have been used for seed, and out of which moths come out. The continuity of their fibres has been broken. Such cocoons cannot be reeled.
- (7) Pierced cocoons of the tussar.
- (8) Eri and other inferior cocoons.

[See A Monograph on the Silk Fabrics of Bengal by N. G. Mukerji, pp. 103-146.

Tussar silk, Bengal, Bengal Govt. publication.

Hand-Book of the collection Illustrative of the Wild Silks of India—Thomas Wardle.]

Caste

The hereditary silk-worm-rearing caste of Bengal is known as the Paundra (Punro) caste, who live mainly in Malda, but who are also found in parts of Murshidabad and Rajshahi they are the best, the most intelligent, and the most prosperous of all cocoon-rearers. Other castes have also taken to cocoon-rearing, and Muhammadans form the largest proportion of cocoon-rearers in almost all the districts of Bengal, cf. Tuntias, Tuntia-kaibartas, Tantia-chasas, Tunt being the Bengali word for mulberry, and Kaibartas and chasas being a generic name for cultivators. The total number of cocoons-rearers is about 90,000.

Silk-weavers

Weavers are more wholly dependent on weaving than spinners on spinning, or cocoon-rearers on cocoon-rearing. About half the cocoon-rearers of Bengal are also cultivators in the ordinary sense. It is only the old caste of Pundras, who more or less depend exclusively on cocoon-rearing.

Weavers are considered superiors to cultivators in social position. Silk-weavers as a class are far more prosperous than cotton-weavers.

Silk Fabrics

The principal types of Murshidabad silk fabrics are:

(A) Fabrics made with ordinary looms, such as may be used for weaving cotton cloths also come under this class:

- (1) Plain fabrics, either bleached, unbleached or dyed
- (2) Striped fabrics
- (3) Checks
- (4) Bordered fabrics
- (5) Printed fabrics
- (6) Banhus

(B) Fabrics made with naksha loom for weaving figured silks

(C) Embroidered and other hand-worked fabrics.

HOOGHLY

- (1) Swagaji pieces
- (2) Muska
- (3) Selai-khata
- (4) Phularu
- (5) Jarda or sujasdi
- (6) Sushi: Red and blue checks

In Burdwan "the silk is made into pieces with embroidered edges, and are used for dhutis, saris, chadder, napkins, mooka (turbans)".

In Birbhum "the products which generally consist of dhutis, saris, with printed and plain borders, pieces of 10 yards and 7 yards (thans), and handkerchiefs, are sold locally and sometimes exported to other parts of the Province through agents.

SILK

In Maldah "Silk saris, dhutis, handkerchiefs, sheets and pieces of coating are manufactured

The following kinds of cloth are also made of silk or of mixed silk and cotton, the warp being of silk and woof of cotton:

- (1) Maldahi Gultishi katar
- (2) Maldahi Udakatar
- (3) Maldahi Belkhali Fuldar
- (4) Chaqi Mujlahar
- (5) Sada
- (6) Nangfuli
- (7) Fulam senaja
- (8) Kadumfuli
- (9) Chandtara
- (10) Pattadar seraja
- (11) Sarhor Seraja
- (12) Bulbul Chasma
- (13) Maldahi Katar Hiradana
- (14) Maldahi Katar Kalbali
- (15) Masru
 - (a) Lalsahana
 - (b) Likiar
 - (c) Qundlal
- (16) Chanfulia
- (17) Kashida

[NOTE—The Editor regrets the arrangement of this article, which is a string of extracts and quotations without much coherence from books mentioned. The information, therefore, is not up to date.]

BAZARS AND MAHAJANS

OR

DISPOSAL OF SILK FABRICS

No uniform plan exists for the disposal of silk fabrics in the different districts. Individual weavers going to Mahajans (money-lenders) or merchants or shop-keepers, carrying their goods in their own hands, is the general rule.

[For countries to which Bengal silk fabrics are exported, see *A Monograph on the Silk Fabrics of Bengal*, by N. G. Mukerjee, Table E, p. 74.

For the population of Bengal which depend on the silk industry, see p. 70, Table A, *op. cit.*

For Export of Raw Silk, see Phipps: *Guide to Commerce of Bengal*, p. 215, also *Commercial Relations between India and England* by Bal Krishna for, export figures of wrought and Raw Silks from 1698 to 1760, the earliest export figures we could get hold of. Bal Krishna has got these figures from the East India Company Records.

For the History of Silk Industry in Bengal, see N. G. Mukherjee, *op. cit.*, pp. 59-68.]

XIV(a)

The Umbrella

Although not of the modern type the umbrella has been in our country for centuries. Princes and noblemen maintained in their courts retainers called Chhatradhars or umbrella-holders, whose duty it was to accompany their masters with umbrellas whenever the latter went out on ceremonial visits or tours. It was not mere ostentation. Umbrellas were big and heavy. They were not collapsible and resembled the *toka* or the umbrellas made of talipot and bamboo strips used by cowherds in Bengal; the rod used to be of bamboo and not cane.

With the establishment of the British rule in India, English umbrellas made their appearance in this country. Although these umbrellas were used in large numbers in cities and towns, the villagers continued to use *tokas* or indigenous umbrellas. Even as late as fifty or sixty years ago, umbrellas used to be let on hire in the streets of Calcutta during the rains. Enterprising men used to stand at street corners armed with huge umbrellas capable of accommodating several persons under them at a time. During a shower, they either helped people to cross the streets or to their destinations for a fixed charge which ranged from half-anna to an anna.

Among the local manufacturers of umbrella the firm of Mahendranath Datta easily leads. This firm is well-known not only in Bengal but throughout India because Mahendra Datta was actually the pioneer in this line of manufacture. It is difficult to say exactly how Mahendra Datta came to take up this industry. Mahendra Datta was an interesting character known practically to everybody in musical circles in his time because music was his all-absorbing passion. When he was looking for a means of livelihood some friends advised him to start a small-scale trade. Mahendra Datta took up the making of umbrellas probably as a hobby but he knew how to make them. He began by making umbrellas with his own hands. This was around 1862 and marks the beginning of the umbrella industry in India. Unfortunately we do not have any specimens of these early umbrellas and therefore it is difficult to say anything about their mechanism. In those days most of the components were imported from abroad and were merely assembled locally. The emphasis was then on decorative handles and many were the varieties in demand. Some handles were curiously carved and had patterned knobs. Other varieties had the handle and the knob inlaid with gold and stones, some umbrellas

had exquisitely carved handles of ivory. Indeed the traditional craftsmanship of Bengal found expression in only the workmanship of the handles of umbrellas—the rest was foreign.

For a few years Mahendra Datta's firm made steady progress and when his business expanded he employed a number of workers to help him. In 1868, however, he was forced to close down his firm. It is difficult to say whether this was because of the low rate of profit or mismanagement. However, the firm was re-opened a few years later and since then the firm has made uninterrupted progress. Simultaneously various other firms came into existence and the industry as a whole made such great headway that from 1882 to 1928 imports of umbrella were virtually stopped. Although umbrellas are now made also in other parts of India, Bengal still holds the field. In Bengal the firm of Mahendra Datta is still the biggest. This firm is so well-organised, its method of manufacture so thorough that it is almost impossible for other firms to compete with it. As a matter of fact even the ladies of the Datta family know the art of making them and even the new bride has to pick it up when she comes to live in the Datta family.

The Umbrella industry does not fall under the purview of the Factories Act. It is still considered a cottage industry. In Bengal there are about 70 to 80 umbrella manufacturing firms and about thirteen to fourteen thousand people are employed in this industry. Although umbrella making is considered a cottage industry each individual unit has a workers' union attached to it. The usual custom of these establishments is to pay the workers on a piece-rate basis. The rates are rather high and the workers maintain these rates by preventing the entry of newcomers into the trade. The result is that the cost of production of umbrellas in Bengal is higher than elsewhere. Consequently Bengali manufacturers are gradually being pushed out of the market owing to their inability to compete with firms outside the province. Of late many non-Bengali umbrella manufacturers have shifted their firms from Bengal to other provinces where wages are lower.

As has already been mentioned, in the past the raw materials required for the making of umbrellas were imported from abroad. Wood, steel rods and cloth are the three basic materials. Wood is used for making the rod, the steel the ribs, etc., and the cloth the top.

UMBRELLA

It is hardly necessary to point out that there are two varieties of umbrellas—one for gents and the other for ladies. The main difference is that of size—the gents' size being much bigger than the ladies'. The latter is also somewhat different in shape. There are also small umbrellas for children. Another variety of umbrella is made for the use of the police; it is bigger and has a straight and plain handle with no knob. The standard sizes of gents' umbrella are 22", 24" and 26".

Cloth

The cloth for umbrella is made of silk and cotton. Good quality umbrella cloth is known as paramatta. Formerly English, Italian, German and Japanese paramattas were imported by local manufacturers. Imports have now been stopped. In addition to the above varieties, ordinary 'markin' cloth, dyed in black was also used in cheap umbrellas but it was unsatisfactory because the colour used to run after a few showers. Imported cloths were, however, of a superior texture with satin finish borders. At present Indian mill-made cloths are used and these are of fairly good quality. These cloths have a width ranging from 22 in. to 44 in. and are sold in bolts. All umbrellas are invariably black except police umbrellas which are white and have also a lining of white cloth underneath.

State Umbrellas

These umbrellas are made to order and various types of cloths such as *kingkhab*, *Banarasi*, etc., are used as desired by the customer. Sometimes various patterns and designs are embroidered on the cloth with gold and silver threads.

Many varieties of cloths are used for ladies' umbrellas, sometimes with printed or embroidered designs.

An umbrella normally consists of nine pieces of cloth or panels which are cut in the form of isosceles triangles. These triangular pieces of cloths are sewn together sideways and after being joined resemble a circle with a hole on top. The length of the pieces varies vertically as necessary. The police umbrellas have twelve instead of nine panels. The price of an umbrella depends mainly on the quality of the cloth used in its making. The cost of the cloth varies from As. 12 to Rs. 4 or Rs. 5 a yard.

The rod or the stick

The rod or stick used in umbrellas is made of various types of materials such as, bamboo, cane, wood, iron, etc.

Bamboo

Bamboos used in Bengal for making umbrella rods mostly come from Agartala.

The commonest variety used is *talta* bamboo of an uniform diameter. These bamboos are generally between 8 ft. and 10 ft. in length and at least two pieces of stick are cut from each of these poles.

The poles are generally cut about 10" longer than the actual size of the rod. The handle is bent by heating the bamboo mildly and bending one end of it with a vice-like tool made of iron, into the desired shape. After the handle is bent, poker works are done on them. The designs, which resemble tattoo marks, are of many kinds such as flowers, birds, creepers, leaves, etc. Sometimes names are also written on the handles by means of poker work. Gas is used to heat the instruments and the handle before executing the designs.

Wood

Sundri wood is ideal for the making of umbrella rods. There is a plentiful supply of this wood in Bengal. The requisite diameter sizes of this wood are 5/8" and 3/4". The wood is cut into pieces with four facets and are rounded off on turning machines. The diameter of the rods is generally 9/16". In wooden rods a separate piece of wood is joined to the rod for making the handle as distinct from bamboo and cane rods where rods and handles are all of a piece. Sundri wood is excellent for the purpose of making umbrella rods because it is springy without being brittle.

Cane

It is mostly brought from Assam and the process by which it is seasoned for making umbrella handles is akin to the seasoning process of Singapore bamboo. This type of cane is very strong but unfortunately it is liable to swell and get out of shape, which is why many people do not like umbrellas with cane handles.

Handles (the knob or the crook)

Ordinarily the handle is made of wood. But many prefer to have the handles of their umbrellas mounted with silver, gold or stones. The metal handles are often cast in curious shapes such as the head of *makara* or a fabulous water-animal or the head of a tiger.

Nowadays handles made of plastic and celluloid moulds are in much use. Wooden handles are often shaped like the ordinary curved walking sticks or hockey sticks. These handles often have various pleasing patterns on them done by means of poker work. Knobs of cherry wood are most frequently used for making handles. Handles are often lacquered or covered with a coat of paint and are sometimes highly polished.

UMBRELLA

Notch and Runner

The notch is the punched brass ring fixed on the rod, at a point about 6" distant from the bottom end of the rod. The runner is the hollow cylinder which is pushed up and down the rod to open or close the umbrella. One end of the ribs is fixed to the groove that runs round the notch and the other end to that round the runner. When the umbrella is closed the runner rests a few inches short of the handle; when opened it rests on the other end of the ratchet catch fixed on the rod a few inches below the notch.

Rib

An ordinary umbrella has eight ribs and a police umbrella twelve. The ribs are from 20 to 22 inches in length. Each rib has a round knob at the end and a little below the knob it is flattened and perforated. Midway down the rib are fixed two more thin iron rods which are joined to the rods from adjacent ribs on either side. When the umbrella is opened, these rods are unfolded like the petals of a lotus.

Mounting the Panel Cloths

After the ribs are fixed to the rod of the umbrella, the cloth is mounted on the ribs. The two ends of the base of the triangular panel cloth are sewn to the perforations just below the round knob of the ribs. The other end is sewn to the notch and finally it is properly fixed by inserting a leather washer and a cap made of thin B.S. G. 28/30 steel sheet.

Catch

The catch is fixed before the runner or the handle is inserted.

Ribs

For some years now, ribs are being manufactured in local smithies. They are stretched on ordinary turning machines, and the knobs are mounted, the perforation made and arms are joined with the help of simple machinery. The ribs have to be appropriately tempered. Manufacturers of umbrellas buy ribs in bulk from these establishments. Ordinary good quality ribs generally cost Rs. 8 a dozen.

Cap Ferrule

It is made from sheet metal and any smithy having pressing machines can manufacture it. Ferrules cost Rs. 4-8 and caps Re. 1 a dozen.

Among the manufacturers of umbrella ribs the Presidency Engineering Works and B. B. Divan Company have built up a sound reputation for their superior workmanship.

Runner and Notch

These are generally made of brass and the process of making them is very simple. Nafar Chandra Atta is the most well-known maker of these components. The prices of notch and runner are Rs. 5-12 per gross and Rs. 8-8 per dozen respectively.

Bamboo

It is generally sold by the thousand. Bamboos measuring 8 to 10 ft. generally cost between Rs. 75 and Rs. 78 per thousand.

Cane

It is also sold by the thousand and costs between Rs. 75 and Rs. 78 per thousand pieces.

Sundri

This is sold by the maund. The rates are Rs. 150 per 100 maunds and upwards.

Handles

Many different varieties are obtainable in the market. These are sold by the piece, dozen or by the hundred.

Cover

Umbrella covers are mostly made of paper.

Fastener

The fastener consists of a strip of cloth, a ring and a button. Usually the trade mark appears on the inner side of the fastener cloth.

In addition, ladies' umbrellas are decorated with straps on the handles, beads on the knobs of the ribs, *jhumkos* or tassels, and a cap at the bottom.

Establishments for making umbrellas employ both male and female workers and also children to assist the former. Female workers do the comparatively lighter and less skilled jobs. A skilled worker normally earns good money in wages and more during the season. They work on a piece-rate basis which is fairly high. The usual piece-rates are given below:—

- (a) A cutter earns Rs. 230 per week @ as. 12 to as. 14 per dozen cuttings.
- (b) A machineman earns Rs. 100 per week @ as. 12 to as. 14 per dozen machining.
- (c) A stickingman earns Rs. 80 to Rs. 90 per week @ Rs. 1-12 to Rs. 3-8 per dozen stickings.
- (d) A feeder assistant earns about half the money of a cutter. There are two feeder assistants to each cutter.
- (e) A marker earns Rs. 60 per week @ as. 10 per dozen markings.
- (f) A cap and ferrule fitter earns about Rs. 120 per week by fitting caps and ferrule @ as. 6 per dozen.

UMBRELLA

(g) A notch and runner fitter earns about Rs. 75 per week by fitting runners and notches with ribs @ Re. 1. per dozen.

These rates are for ordinary umbrellas. State umbrellas have different rates depending upon the nature of the work involved. These umbrellas are decorated in many fashions such as embroideries with gold and silk threads, floral designs, etc.

Mahendra Datta and Company were the first to introduce wooden handles to umbrellas in our country (1928). Hitherto only bamboo and cane handles were used. Mahendra Datta discovered the possibility of making handles from Sundri wood.

The price of umbrellas varies from Rs. 5 to Rs. 48 per piece.

Of late there has been a big demand for garden umbrellas, survey and trolley umbrellas from the richer classes, clubs, government and railway departments. Though apparently simple, the making of these umbrellas calls for much skill for ensuring a correct balance during use. Mahendra Datta lead in the manufacture of these umbrellas also.

It is said that at the Calcutta Congress Exhibition in 1928, Mahendra Datta put out a number of these umbrellas in their stall. At that time they attracted considerable notice and soon they were in much demand. Orders started pouring in from various firms. But the Company had to stop the manufacture of these umbrellas during the period from 1939 to 1945 owing to difficult wartime conditions. After the war the manufacture of State umbrellas was resumed. The State umbrellas manufactured by Mahendra Datta have important differences from their imported counterparts. The leg of the imported variety is mounted on a pointed cone-like piece of steel for planting it in the ground but Mahendra Datta's umbrellas are fitted with a screw at the bottom which helps it in getting not only a firmer grip on the soil but also ensure better balance.

Raw materials for State Umbrellas

The raw materials for State umbrellas consist, as in the case of ordinary umbrellas, of wood, cane, cloth, steel and brass. The cloth, generally drill, has to be subjected to a number of processes before it is ready to be cut into triangular panels. First, it is properly starched so that the weave gets close-set. Next, it has to be dyed in the colour desired which is made fast by the usual processes. Then the cloth is treated to make it waterproof. After waterproofing, the cloth is finally calendered. Calendering is a difficult and important job

because on it depends the strength of the texture and the resistance of the cloth to sun and rain. Powdered ivory is used to rub the cloth for calendering. Finally the calendered cloth is ready to be cut into panels.

The ribs and arms of garden umbrellas are made of cane and not of steel as in the case of ordinary umbrellas. The best canes for this purpose are those from Singapore and these are still used in preference to the local varieties. The cane is also subjected to a number of processes before it is ready for use. First comes seasoning which is followed by what is called tempering. After the cane is imported, it is kept in the open for about a year to allow it to mellow. Next it is kept immersed in kerosene oil till it is saturated to the requisite degree. After seasoning, it is placed under mud for which purpose Mahendra Datta send all their cane to Amta in Howrah. It is the mud-bath that gives the cane its ash or yellowish colour. Finally it is tempered.

Steel rods of $\frac{1}{4}$ " and $\frac{3}{8}$ " diameters are used for making umbrella arms. Slots are made on the arms and then the latter is forked. Then the end of the cane is entered into the fork of the arm and is properly rivetted, and a brass disc is mounted on it. The arms are then coated with anti-corrosive paints. The usual length of the arm is 16". In umbrellas of 42" X 16" and 60", the arms are 20" long.

The pole of the umbrella is made of Sundri wood which is turned on machines to round off and polish the edges as necessary.

The umbrellas are from 6' to 7' in height and have to be planted 1' deep in the ground when using.

In addition, these umbrellas have a few more small metal fittings such as detachable brass joints fixed on the pole; six inches brass screw spikes with pressure discs fixed at the end of the pole for planting the umbrellas firmly on the ground. The brass discs are fitted as a special precautions to prevent the pole from slanting either way and ensuring a perfectly upright position. The tilting joints are fitted to enable the umbrella to be tilted appropriately against the inclination of the sun. All that is necessary to do is to loosen the nuts and then tilt the umbrella to the requisite degree and screw it on again.

The prices of garden umbrellas are Rs. 107, Rs. 117 and upwards.

Rs.

• Tilting joints . . . 20 each extra
• Pressure disc . . . 13 each extra

The prices of State umbrellas are Rs. 1,000, Rs. 1,200 and Rs. 1,500.

The following extract on State umbrellas will be of considerable interest.

UMBRELLA

Trappings and Caparisons

All Indian collections are overloaded with gaudy trappings, state caparisons and housings, horse-cloths, elephant-cloths, howdahs, high umbrellas, standards, peacock tails, yak tails, and other ensigns of royalty. But they look very brave in procession through the narrow, picturesque streets, thronged with the gay crowd of an Indian town, advancing tumultuously between the high, overhanging houses, which are painted storey above storey in red and green and yellow like macaws; or when the Maratha princes and their whole court go forth in unprepared pomp, with trumpets, shawms, high shrilling pipes, and belaboured tom-toms, into the jungle to do homage at the dasera festival to the palas tree (*Butea frondosa*); returning every one with his hands full of its yellow flowers to offer as gold before the idols in the wayside village temples. They are also very interesting for the designs to be found on the metal work; and for the manner in which cut cloth work, *opus consutum*, or applique as it is termed by the French, is used in their ornamentation, particularly of the horse-cloths, saddles, and girths.

Chatris or umbrellas, and chauris or horse-whisks of sandalwood, ivory, and particularly yak tails, and murchals or fly-flappers of peacock feathers, are regarded as the most solemn symbols of state throughout the East. In the *Ayin Akbari*, or Institutes of the Emperor Akbar, written by Abul Fazl, Akbar's great minister (see Gladwin's translation, London, 1800), the following enumeration is given of the ensigns of state "which wise monarchs consider as marks of divine favour".

The auring or throne, the chuttur or umbrella, the sayiban or sun fan; and the kowkebah or stars in gold and other metals which are hung up in front of palaces: and these four ensigns are used only by kings.

The alum, the chuttertowk, and the temen-towk, all varieties of standards of the highest dignity, appropriated solely to the king and his military officers of the highest rank.

Then follow the kowrekx or demameh, the nekareh, and the dehl, three kinds of drums; the kerna of gold, silver, brass, or other metal, the serna, the nefeer, the sing, or horn of brass, made in the form of a cow's horn, all different kinds of trumpets and the sing, or conch shell.

Formerly, adds Abul Fazl, they used to blow the conch shell four hours before night, and the same time from daybreak; but now the first blast is at midnight and the other at sunrise;—"And one hour before sunrise

the lively blast of the serna awakens those who slumber; and the kowrekx is beat a little. These are presently joined by the kerna, the nefeer, and all the other musical instruments excepting the nekareh. Then after a short pause, the serna and the nefeer play the musical modes, after which the nekareh is beat, and the people with one voice pray blessings on his majesty." Thus was the reveille sounded in every camp and garrison of Hindustan and the Dakhan during the plenitude of the Mogol power in India, in the reign of the Emperor Akbar, 1556-1605; at the very moment when Queen Elizabeth was signing (31 December 1600) the charter of the East India Company, which was to prove its death warrant.

In Herklot's *Quanoon-i-Islam*, (Canons of Islam), London, 1832, the alums used in the Moharram procession in India are described in detail. They are analogous to the standards used by the Greeks and Romans, and those figured on the gates (torans) of the Sachi tope; consisting not only of flags, but of all sorts of devices in metal, raised on the top of long staves. They are generally kept wrapped up in bags of scarlet cloth, and displayed only on days of festivity and parade; and, of old time, before the British peace was established, in battle. The umbrella is the highest of all these insignia of regality. Chatrapati, "lord of the umbrella", is even now a prouder title in India than raja or maharaja. The king of Burma's title translated is "Lord of the Twentyfour Umbrellas"; and the Emperor of China always has that number of umbrellas borne before him, even in the hunting-field. A vermilion umbrella everywhere in the east signifies imperial authority. The Mahabharata makes frequent mention of umbrellas as a mark of royalty, and speaks of the gift of a white umbrella, having a hundred ribs, as calculated to insure the giver a place in Indra's heaven. Rajendralal Mitra, in his *Antiquities of Orissa*, Calcutta, 1875, says that the most detailed rules are given in the *Yukti kalapataru* for the making and proportion of the parts of both royal and common umbrellas. An umbrella with the stick of choice wood, and ribs of selected bamboo, and a cover of scarlet cloth, is a gift worthy of presentation to a king. It is called *prasada*. An umbrella with blue cloth and a gold fringe is meet for a prince. It is called a *pratapa*. An umbrella, the frame and stem of which are of sandal-wood, mounted in gold, with a gold kalasa or knop on the top, and covered with pure white, fringed with gold, is the right umbrella for a noble. It is called a *kanaka-dand*. But the most important umbrella of all is the *nava-danda*, which is

OIL CLOTH

used only on occasions of high state, such as coronations, the marriages of kings and princes, and other regal celebrations. The stem, the sliding frame and the ribs are all of pure gold. The handle is a pure ruby, and the knop at the end a diamond, and the cover of silk, of the choicest colours and fringed with thirtytwo looped strings or pearls, with thirtytwo pearls on each string. Umbrellas are also appropriately decorated with the feathers of the peacock, heron, parrot and goose.

The chamara or chauri is next in dignity to the umbrella, and may be made either of strips of sandal-wood, or of ivory; but the most esteemed are those made of the tail of the Himalayan yak. The prince has a pair of yak-tail chauris, and also of murchals, mounted on elaborately jewelled and enamelled handles. To put gems and enamel on peacock feathers would seem like adding another hue to the rainbow, but there is no "wasteful and ridiculous excess" in the

masterly way in which the Jaipur artist has used the feathers and gems, and his secret enamels, to mutually enhance each other's effect. Nothing can be richer than his materials, nothing more harmonious and effective than the manner in which he has combined them. The popes always have a peacock feathers borne before them at their enthronement, and no doubt the custom was derived at some distant date from the East. There is a sayiban in the arms room of the India Museum made of a talipot palm leaf, with a conventional tree pattern worked on it, which in form and detail is exactly like the fan-like ensign represented in the Nineveh marbles, as borne before the kings of ancient Assyria. The royal kowdahs and the painted open palanquin in the arms room are most picturesque-looking objects, and are valuable examples of strong and massive goldsmith's work, and Indian ivory and wood carving and turning.

XIV(b)

Oil Cloth

Oil cloth is one of the many industries, large as well as small, that came into existence in the wake of the Swadeshi movement.

From the available records it appears that experiments for making oil cloth were undertaken in Calcutta and the credit for the actual manufacture goes to Sri Bhupatimohan Basu Thakur of Malkhanagar, Dacca.* During its early stages, this infant industry could not make much progress because of Japanese and British competition. With the disappearance of foreign products from the market, the industry has been able to gain a foothold. Calcutta is now a leading centre for oil cloth manufacture in India.

In Bengal, oil cloth making is run as a cottage industry. Like all other cottage industries, it too has to face the competition of the mills. The fact that the oil cloth industry has been able to withstand mill competition is because of a certain speciality of Bengal oil cloths. This speciality lies in the fact that the oil cloths made in Bengal are coloured and waterproofed on both sides instead of on one side as is the universal practice. During World War II when big producers got all their supplies of raw materials for making oil cloths at controlled rates, the Bengal producers had to buy them at market rates, but they were still able to carry on because they were able to get the

services of skilled workers at so low a rate that it compensated amply for the higher costs of raw materials.

Oil cloth manufacturers used to make rexine also. But the quality of their rexine was plain while Bombay mills produced rexines with relief or embossed work on the surface. As a result it was not possible for Bengal producers to compete with mill-made rexine of Bombay and they were forced to discontinue its production.

At present the local oil cloth industry is in a fairly sound position. Generally the workers run their own establishments because the business does not require much outlay. An investment of Rs. 250 fetches a return of around 20 p.c. The number of comparatively large establishments, employing on an average 5 to 10 people, is between 25 and 30.

The oil cloth establishments generally have an area of from four to five *kathas* of open land adjoining them. A shaded area of about 14 cubits square is necessary for drying the oil cloths.

Raw materials

Markin; long cloth; linseed oil; whiting, zinc oxide; paints—green and other colours; blue—usually powdered; lamp black for black or grey colours.

* Sri Basu Thakur organised several exhibitions of his products. In 1943 the Editor, then Sub-divisional Officer of Munshiganj, had the privilege of attending one in Malkhanagar,—A. M.

OIL CLOTH

Market rates for raw materials

	Rs. A. P.
A bolt of markin (38 yds.)	30 0 0
Zinc oxide	5 0 0 per seer
Whiting	18 0 0 per cwt.
Blue	2 4 0 a box
Lampblack	0 8 0 per packet
Thread	0 8 0 per ball

Tools of trade

Pumice stone	.
Scissors	.
Iron trays (1' x 4" x 1/2")	0 12 0 as. to Re 1
Brush	0 12 0
Bamboo frame	.
Markin cloth	.

Mode of work

First, a little over 6 yards of cloth is cut out from the roll, and the borders are turned up and sewn. Then the cloth is mounted on a frame measuring about 3 ft. in height. Next the whiting is mixed with oil in the proportion of 1:3 and the mixture is plastered on both sides of the cloth. When the coating dries up, generally in about 3 days' time, it is rubbed and scrubbed with the pumice stone. The process is repeated three times. This is done to smooth out the grains that appear as a result of the application of whiting. Then the necessary colour is

applied on both sides of the cloth, one side at a time. Finally, the cloth is laid out to dry in a covered place constructed for the purpose.

Statement showing the raw materials required to make 12 pieces of oil cloth each 6 yards long

Zinc	4 seers
Oil	14 seers
Whiting	14 seers

Plus the necessary colours.

In case of green oil cloths 4 seers of green colour, for grey a packet of lampblack, and for blue one packet of blue powder are necessary.

The rate of wages for average worker is Rs. 2 per day. There is also the practice of paying workers on a piece-rate basis.

Each manufacturer has his special trade mark which is printed on the finished rolls of oil cloth. The price of a roll of oil cloth (6 yds.) varies from Rs. 15 to Rs 16, and Rs. 17 depending on the quality. They are used in homes and hospitals throughout India.

During the period of control oil cloth manufacturers had an association which tried to keep internal competition in check. Now, with the disbanding of the association, free competition prevails.

Oil cloths have a substitute in rubber cloth and consequently the latter is their principal rival.

The Narcotic Derivatives of Hemp

Hemp has a remote antiquity in India which is indicated by several very expressive synonyms. The earliest of these appears to be *bhanga*, which occurs in the *Atharva Veda*. It is derived from a root which means 'to break'. The *Veda*, however reckons it along with the *soma*, one of the five plants "which were liberators of sin", and the word implies that its narcotic property was also well known.

The Arabians, it is supposed, received the hemp plant from Persia or India in ancient times. They knew the use of its fibre, but they prized it also for its narcotic properties; in fact, they now esteem it only on this latter account.

In India the *Ganja* for smoking and the *siddhi* for a drink are favourite offerings for *Siva*.

The hemp belongs to the natural order of *Urticaceae* which includes several families of plants, such as the *Urtica*, *Boehmeria*, *Morus*, etc., noted for their fibres and other economic uses. The hemp is a representative of the family called *Cannabiceae* by *Bhume*. Its generic name is *Cannabis* (*Sprengali systema Vegetalium*, III, p. 903), and its specific name *Sativa* or *Indica*. The *Ganja* plant differs from the wild hemp in its woody, thick, straight stem, its bushy pyramidal habit, the crowded female flowers, the shape of the calyx and bracts of the female flowers, and the presence of the viscid, *Ganja*-bearing glandular hair on the calyx and bracts. The two are of different varieties if not of distinct species. The so-called "wild hemp" is not necessarily a wild plant, but in many places it is cultivated for its leaves.

In the wild state the plant is common all over India, and grows to a height of from five to six feet, a few vigorous specimens rising to nine or ten feet—a bright, handsome, pyramidal plant, with rich green leaves and greenish-white small flowers.

The cultivated variety is stunted, rarely rising above six feet, and more slender, delicate, and regularly pyramidal, assuming a look of a cypress. The root of the plant is white, fusiform or spindle-shaped, and covered with fibres. The stem is erect, six or eight inches in circumference, simple when crowded, but when growing apart branched even from the bottom, angular, and, like the whole plant, covered with fine, but rough, pubescence; it is hollow within or wholly filled with a soft pith. The pith is surrounded by a tender, brittle substance, consisting chiefly of cellular texture with some woody fibres, which are called the reed, boon, and shove of the hemp. Over this is the bark, which is composed of fibre extending in a

parallel direction all along the stalk. The fibres consist of delicate fibrils united together by cellular tissue, and all covered by a thin membrane or cuticle. The leaves are opposite or alternate, on long weak petioles or leaf-stalks, rough, digitate, that is, with several leaflets radiating from a common point, which are from five to seven in number, narrow lanceolate and sharply serrated; pale green on the inner side, the uppermost being three only, and the lower ones smallest, but all of them tapering at the apex into a long, smooth, entire point. (See *Royale*, *Drury*, *Elliot* and *Voigt*.)

The following is a summary of the botanical characters of the plant as given in *Lindley's Flora Indica*, p. 299:

The plant is dioecious, annual, about three feet high, covered with a fine pubescence; the stem is erect, branched, bright green, angular; leaves alternate or opposite, scale-rous, with linear lanceolate, sharply-serrated leaflets, tapering into a long, smooth, entire point; stipules subulate; cluster of flowers axillary with subulate bracts; males lax and drooping, branched and leafless at base; females erect, simple and leafy at the base; ♂ calyx, downy, five-parted, imbricated; stamens five; anthers large and pendulous; ♀ calyx covered with brown glands; ovary roundish with pendulous ovule, and two long filiform glandular stigmas; achenium ovate, one seeded.

The most remarkable peculiarity of this species of plant is that it is dioecious, i.e., some of its members are male and others female. It is the female plant which yields *Ganja*.

"The narcotic property of the plant is due to a resinous substance which is secreted in minute glands both in the leaf and in the flowers. The resin has been named *Cannabin*. According to *Dr. O'Shaughnessy* (*Bengal Dispensatory*, p. 581), it is very soluble in alcohol and ether; partially soluble in alkaline; insoluble in acid solutions; when pure, of a blackish-grey colour; hard at 90°; softens at higher temperatures and fuses readily; soluble in the fixed and in several volatile oils. Its odour is fragrant and narcotic; taste slightly warm, bitterish, and acid."

The quantity of resin present in *Ganja* differs greatly in different specimens. In 1872 *Dr. Macnamara* examined 61 samples collected from different parts of India, and the percentage of resinous extract obtained by him varied from 1.5 to 14.9, the Bengal specimens ranging from 3.9 to 5.8. (*Dr. Macnamara's Report No. 71*, dated 11th June 1872). A sample examined by *Rai Kanaj*

NARCOTIC DERIVATIVES OF HEMP

Lall Dey Bahadur in Calcutta yielded 10.63 per cent. of extract.

Among Ganja-smokers opinion varies very considerably as to the narcotic effects of the different varieties of Ganja sold in the markets. Those who are in the habit of using flat Ganja will not, if they can help it, touch round Ganja, while those who are accustomed to the round sort will not relish the flat drug.

According to Bucholz the seeds of European hemp contain fixed oil 19.1, resin 1.6, sugar with extractive 1.6, gummy extract 9.0, soluble albumen 24.7, woody fibre 5.0, and husk 38.3. We do not know if the seeds of Indian Ganja have ever been examined, but they certainly contain a much larger percentage of fixed oil. By the ordinary modes of extraction in a mill as much as 25 to 30 per cent. of it is easily obtained.

In Bengal the seeds are used for making a bland, fixed oil, which is tolerably well adapted for lamps; it is also employed for adulteration with mustard oil. In Rajshahye the seeds are baked and eaten as an article of food, but not very extensively. In Europe they are used to feed cage-birds. The hemp-seed oil is extensively employed for a variety of purposes: for lamps, soap-making, paints, and varnishes. It has an acrid odour, but mild taste. The wood is used for fuel only, and the bark in Bengal is thrown away.

Siddhi

The most important products of the hemp in India are its leaves, flowers, and resin—all used as intoxicating drugs. The leaves are known under the different names of bhang, siddhi, patti and sabji and form a most important article of trade. They are consumed in a variety of ways, the most common form being an emulsion. In Bengal this drink was very popular everywhere, the rich and the poor, men and women alike indulging in it. Even to day on the last day of Durga Puja in West Bengal it is religiously offered to every guest and member of the family. The rational use of this drink produces no perceptible ill effects on the human system; it is recommended to persons suffering from long-protracted chronic diarrhoea who find it very efficacious in checking their complaints.

Boiled with ghee over water, the leaves part with a portion of their peculiar resin to the ghee which floats on the water in the form of a green jelly. A portion of this jelly mixed with dried milk and syrup over a fire produces a paste which readily hardens when cooled, and it is then cut into small tablets; this is called m'ajun or m'ajum, which is a favourite form of taking the drug. The dried leaves in powder are also mixed with a variety of stimulating spices and made into

different kinds of conserves, which are reckoned to be highly aphrodisiacal.

Charas is the name of the resin which naturally exudes from the flowers and leaves of the Indian hemp plant. It occurs in brownish-black grains or masses, and has a strong, but not very disagreeable, resinous smell. It is collected on the Himalaya in Nepal and Tibet, and also in Kabul, Bokhara and Hirat. The Hirat charas is said to be the most potent; it comes in the form of a thick, treacle-like, deep brown fluid. It is only used for smoking, never for any medicinal purposes. The mode of smoking the drug is to put a few drops (10 to 15) of the fluid, or to mix about 10 grains of the resin in powder with prepared tobacco—a paste of tobacco and molasses—and to smoke the mixture through an ordinary hubble-bubble.

While the intoxication from the siddhi lasts for twelve to fourteen hours, that from the charas vanishes in an hour or two. Habitual Ganja-smokers take charas frequently to whip up the effect of Ganja. The first use of charas may produce injurious effects; but once the habit is formed, it does no permanent harm to the constitution.

As already described, the flowers of the female plant produce Ganja. Like charas it is used only for intoxication and that also in one form, i.e., smoking. From 25 to 30 grains of the flowers are carefully separated from the leaves, stalks and seeds, well mixed with dry tobacco leaves on the palm of the left hand, and then placed in a small bowl over a thin layer of prepared tobacco, and smoked through a small hookkah. Its effect, like that of the charas is instantaneous and the intoxication lasts for several hours although the quantity of the resin contained in Ganja is much smaller than that of the charas (which is pure resin) consumed at a time. All the evil effects of hemp-smoking which cause such widespread mischief, are due solely to Ganja. No narcotic is so injurious to the constitution as this baneful drug.

Jessore was celebrated for its Ganja. Large quantities of the drug were prepared there. The quality of the drug as prepared there was also held in high esteem by Ganja-smokers. Several popular songs in praise of Jessore Ganja are still current. The mode of curing Ganja there was peculiar. The floral spikes were rolled on a mat so as to make the florets adhere to each other and assume a long tapering cylindrical form. This form bears a popular name of "Jessori Ganja". In official records it is called "round ganja". The parganas noted for it are Ramchandrapur, Taragonia and Syedpur.

Westland (1874) gives the following information with regard to the Jessore Ganja in 1809.

NARCOTIC DERIVATIVES OF HEMP

"The exciseable drugs consumed in Jessore were maddat, ganja, sabji, bhang, majum, bakar, charas. Ganja is largely cultivated within the district, principally about Keshubpore, in purgunnas Ramchandrapore and Taragonia, but also to a small extent in the north-western corner The Collector writing in 1809, estimates that 50,000 or 60,000 maunds are prepared within the district, and are bought up from January to April by byaparis (or traders) at Keshubpore, Fakirhaut, Noapara, and Kooshtea, the price being then about Rs. 4 or Rs. 5 per maund (B. 21-11-92; C. 3-5-00, 17-4-06, 25-4-09)". (Quoted by Hem Chunder Kerr.)

The cultivation of this narcotic was flourishing in 1843 and it continued to do so till 1875 when it was stopped under orders of the Board.

From Jessore the Ganja was carried to Bogra and Rajshahye.

In about 1877 there was only one tract of land where it was cultivated, and parts of it lay in the three districts (Rajshahi, Dinajpur and Bogra). The headquarters of this tract was Nowgong. The whole of this tract was called Ganja Mahal. The tract was included within a radius of about sixteen miles, and included an area of a little over sixty thousand acres.

The selection of lands for the growth of the hemp crop is generally made in the months of Magh and Phalgun, but the dressing of the lands does not, as a rule, commence before the month of Chait. The sites selected are open fields on which the shadow of no large tree can fall, for shade of all kinds is held to be injurious. The first act of preparation is to plough up the land from four to ten times according to the state of the field. The object of this ploughing is to free the soil of all herbage and stubble. The ploughing takes place at intervals of three or four days. In the beginning of Baishak or even earlier fresh earth is put on the field. This proceeding is known as bhora kata. The earth is taken up with kodalis and carried in bhangis formed of two round flat baskets suspended from a piece of split bamboo. The quantity of earth deemed necessary is a basketful over an area of about three square feet.

The next process required is what is locally called chalikata. This is invariably done by the cultivators themselves. The process consists in taking up with kodalis from the sides of the field under cultivation patches of sod along with the grass and other weeds which grow in abundance on it, and to throw them on the field. The hollows caused by the digging is filled up with earth taken out of the side ditches and the sides are raised to about nine inches above the level of their

field. This last proceeding is called pagarbandha. The objects of these proceedings are twofold, namely, (1) to get the grass and other weeds which cannot necessarily be ploughed on the borders of the fields taken up and to act as manure by being left to rot on the centre of the field; and (2) to have fresh earth put on the sides, where also the cultivators grow hemp.

The next operation is to manure the field with cowdung. After about a week during which time the fresh earth becomes dry and friable the land is thoroughly ploughed up. The ploughing is repeated after an interval of three to eight days. In the four months which follow, when rains set in, the land is alternatively ploughed and a *moi* (ladder) drawn over it from four to ten times according to the nature of the soil. The latter is a substitute for the harrow, the object being in either case the same, namely, the breaking up of clods and levelling the field. A shallow channel is also excavated, locally called bhomor (bhomor for the drainage of the rain-water). Towards the end of Bhadra cowdung and refuse and house-sweepings are carried to the field in bhangis and thrown in little heaps of one basket-load three to four and a half feet apart.

In the last week of Bhadra or early in Aswin, that is about a week or ten days after the manuring a third course of ploughing has to be gone through, numbering from six to eight times, every two ploughings being followed by one harrowing with the ladder. Ridges are then made over the field at a regulated distance from each other, and well smoothed and beaten down with the hand.

When the fields are fully prepared by this course of dressing, the seedlings are transplanted.

The majority of hemp cultivators are Muhammadans. Among the Hindu cultivators Kaibartas, Napits, Bhumias, Malakars and Jugis may be mentioned.

In about 1877 it would cost a peasant Rs. 22 per bigha for the cultivation of hemp and preparing the Ganja. Similarly the cost of manufacturing the flat Ganja would be Rs. 22-8-0 per md. and that of the round sort about Rs. 27-12-0 per md.

For persons engaged in the cultivation of Ganja, the area under cultivation and the quantity of hemp produced in each year from 1854 to 1876 see Hem Chander Kerr's Report on the Cultivation of, and Trade in, Ganja in Bengal, Appendix A.

For districts which import both the flat and round Ganja from Nowgong; see Appendix C, *op. cit.*

For the quantity of Ganja exported from the Ganja Mahal to the several districts from the year 1854-55 to 1875-76, see Appendix E, *op. cit.*

This note is an abridgement of Hemchandra Kerr's Report on the cultivation of and Trade in, Ganja in Bengal.

XVI

The Bidi Industry

The Report on an enquiry into conditions of Labour in the Bidi, Cigar and Cigarette Trade says (page 3) "It was first brought into India by the Portuguese for their hookah about the year 1508. The only two species cultivated in India are *Nicotiana tabacum* and *Nicotiana rustica*. Nearly three-fourths of the area is under the former variety which is grown all over the country. The plant is pink flowered with large leaves and forms the most important source of Tobacco commerce. The latter is widely cultivated in Eastern Bengal, Assam, the United Provinces, the Punjab, Kashmir. This species differs from the other by being a smaller and hardier plant with yellowish flower and stalked smaller leaves."

The chief tobacco growing provinces are Madras, Bengal, Bombay and Bihar. More than half the Indian production is concentrated in five clearly defined zones. The North Bengal (including Cooch Behar State) and North Bihar areas are both important for the production of hookah and other types of tobacco. The charotar area in Gujerat and Nipani area in the South of the Bombay Presidency, have a special reputation for their Bidi tobacco where as the remaining area that of Guntur in Madras Presidency is outstanding for the production of Cigarette leaf

Tobacco is manufactured into many different forms for different purposes. The importance of the manufactured products can be gauged by the ex-factory value of the various products mentioned below. The figures in brackets show the value of the product in crores of rupees.

- (i) Hooka (9.60); (ii) Cheroots (9.20);
- (iii) Bidis (7.52); (iv) Cigarettes (5.86); (v) Chewing (3.02);
- (vi) Snuff (1.53); (vii) Cigars (0.15); Total (36.83).

In page 39 we find "The three principal Bidi making centres in Bengal in order of importance are Calcutta, Bankura and Raniganj. The survey was confined to the first two centres only. Bidis are made in factories, big and small, and in almost all pan bidi shops. In Calcutta the Bidi making areas are Kidderpore, Behalla, Tollygunge, Park Circus, Rajabazar and Sealdah. Three factories were selected from each of these areas, except Kidderpore and Rajabazar where five factories were taken as they have more factories than the other areas. Thus 22 factories of all sizes in Calcutta, 6 out of 11 factories in Bankura and several pan-bidi shops were covered in our survey."

Both tobacco and wrapper leaves are imported from outside. The tobacco which is

most commonly used is Nipani, Gujerati and Hindusthani and the wrapper leaves are imported from Central Provinces and Bihar.

The Bidi Workers' Union, Calcutta, estimates that there are about 20,000 bidi makers in Calcutta and about 2,000 at Bankura. It also considers that there has been a shrinkage in the volume of employment since 1939 in Calcutta, which in its opinion employed about 25,000 bidi workers, before the war. The shrinkage is mainly attributed to the abnormal rise in the price of tobacco which compelled many owners of small bidi factories to close down. A few of the able bodied workers who are displaced are said to be working as labourers under military contractors. At Bankura on the other hand the employment figures have gone up. This is due to the fact that many merchants from Calcutta and other big cities have started buying bidis from Bankura, where labour is cheap. In the six factories investigated, the number of people employed has gone up from 450 in 1939 to 825 in 1944. About 40 per cent. of the workers in Calcutta and 80 per cent. in Bankura work in factories while the rest work in pan-bidi shops. The factories act does not apply to bidi factories.

The majority of the workers in Calcutta are from Bihar. More than 90 per cent. in Calcutta are Muslims and the rest are Scheduled caste Hindus. At Bankura, majority of the workers are local people and over 90 per cent. are drawn from the Scheduled Castes. 560 people selected at random from 50 factories and pan-bidi shops in Calcutta were examined and showed the following distribution regarding communities and areas of recruitment.

Composition of sampled bidi workers in Calcutta, 1944.

Community	Bengal	Bihar	U.P.	Total	Per cent. of Total
Muslims	203	295	10	508	90.71
Scheduled Caste Hindus	52	..	..	52	9.29
Total	255	295	10	560	100.00

The same examination revealed the following age distribution among the 560 workers.

Age distribution of sampled bidi workers in Calcutta, 1944.

Age	No. of workers	Per cent. of Total
Below 16	51	9.11
16 to 20	100	17.86
21 to 25	100	17.86

BIDI INDUSTRY

Age	No. of workers	Per cent. of Total
26 to 30	136	24.28
31 to 35	89	15.89
36 to 40	45	8.04
41 to 45	34	6.07
46 to 50	5	0.89
51 and above . . . . .	..	..
TOTAL	560	100.00

The absence of workers above 50 is explained by the fact that as a man becomes old he loses dexterity of his fingers which is essential for high output.

In Calcutta the women workers do not work in the factories or shops probably because of the purdah system but quite a large number of them are engaged in this industry in their homes. These women are supplied by the factory owners with all the requisite materials such as wrapper leaves, tobacco, thread, etc., as in the case of the men working in factories and shops. They are paid about 4 annas less per 1,000 bidis than men on the plea of inferior quality of bidis made by them though these bidis are sold at the same rate as those made by men. Women workers do not seem to grudge this in view of the facility afforded to them for making bidis at home and as it helps them supplement the income of their menfolk. Usually these women are wives of bidi makers working in factories. In Bankura also there is home work but not to the same extent as in Calcutta. In every factory there are one or two women workers on daily rate who do the work of sieving tobacco. In one factory 35 women were engaged on bidi making. Here also women get about 2 annas less per 1,000 bidis, whether made at home or in factories, than men. Shopkeepers and bidi merchants employ very few children directly but workers employ them as helping hands. Bidi factories generally employ 5 to 10 boys, some even below the age of 12 for labelling and packing which is against the provision of the Employment of Children (Amendment) Act, 1939.

All workers are employed at piece rates and are considered temporary. There is no security of service and the workers can leave the service or can be discharged at any time without notice. Very few workers stay in one factory or pan-bidi shop for more than a month. As the conditions of employment are unattractive, there is no inducement of any kind to the workers to stick to one place. It is not possible to work out figures of labour turnover and absenteeism in this unorganised industry where no records are maintained.

Nearly all the beginners learn the trade at home, while helping their parents in cutting

wrapper leaves. Sometimes workers keep helping hands, commonly known as *Pottas* who may be considered a sort of apprentices. These helpers learn the work in two or three months after which they work on their own. During the period of training they are paid by the workers four to six annas a day. These *Pottas* are usually adolescents and in some cases related to workers whom they help. At first they learn to tie the thread on the rolled bidis, then to cut wrapper leaves and finally to roll bidis. The *Pottas* are employed for cutting leaves usually by workers who are bachelors or live away from their families. Married workers living with families get the work done through their womenfolk at home.

The only supervision over workers is to prevent theft of tobacco and wrapper leaves. In pan-bidi shops and small factories employers themselves do this work but in bigger factories this work is entrusted to old and reliable workers who are given an allowance varying from Rs. 12 to Rs. 15 per month for supervision and for taking account of the output of each worker at the end of the day. Occasionally they also make payment to other workers from the money deposited with them by the employers and render account to them at the end of the week. They are placed in charge of limited stocks of tobacco and leaves for supplying workers in case they run short of them. These old and reliable workers occupy a place analogous to that of *Sirdars* in other industries and also work as bidi makers in these factories.

WAGES AND EARNINGS

Before 1939, there were three different rates in Calcutta, viz., 11 annas, 12 annas and 14 annas per thousand bidis and at Bankura the rates were 6 annas, 7 annas and 7 annas 6 pies. Since the outbreak of war the rates have gone up and at present there are three prevailing rates, viz., Rs. 1-9-0, Rs. 1-11-6 and Rs. 1-14-0 in Calcutta and Rs. 1-1-0, Rs. 1-1-6 and Rs. 1-4-0 in Bankura. The rates do not depend on the size or quality of bidis but on the locality or more often, on the bargaining between the parties. Children who are mostly employed by the workers are on piece rate basis, except a few in large factories who do the labelling and packing. The number of such persons is, however, negligible and is less than 1 per cent. of the total number employed in this industry. They are usually boys and were getting 4 to 6 annas per day in 1939, and are now given 10 to 12 annas in both Calcutta and Bankura. No dearness allowance or any other allowance or bonus is given to workers. Piece rate workers are paid daily at the end of the work when their bidis are counted. There are also no deductions in wages on account of various *chats* or rejection of bad

BIDI INDUSTRY

bidis in Calcutta, but rejection has been a source of annoyance and discord particularly at Bankura where it is reported that quite an appreciable percentage of manufactured bidis is rejected and later on sold at the same price as others.

There is no closed day except in three big factories in Calcutta, where Friday is observed as a closed day. During festival days, however, practically no work is done in any factory or shop. In cases of accumulated stocks also factories are closed down for one or two days. It is perhaps needless to say that no payments of any kind are made in respect of such days and workers are obliged to seek employment in other shops.

The examination of 560 bidis workers referred to above showed that bachelors (125) earned Rs. 12-4-0 and married men (435) earned Rs. 15-8-0 per week. The weighted average of weekly earnings was Rs. 14-12-0. Married people were found more regular in attendance than bachelors and generally worked for all the seven days of the week, while others worked, on an average, for six days in a week. The bidi workers are whole-time workers and have no connections with agriculture.

WORKING CONDITIONS

Even in big and medium size factories working conditions are not satisfactory. Workers have to sit on the floor. (Sometimes on mats) with bamboo trays on their laps. The space allotted to each worker is generally six square feet. Ventilation is deplorable. Ordinary amenities like supply of drinking water and latrines are absent in some of these factories. In every pan-bidi shop there is section for bidi making. These shops are usually 5 ft. x 4 ft. x 8 ft. This space is partitioned into two decks by means of planks the upper portion being occupied by the pan-bidi shop and the lower portion which is on the road level by the workers. The workers have to crawl into the space allotted to them for work.

PRICES AND WAGES

	Rs.	A.	P.
Bundle (25 Bidis)	0	2	6
During war 1942	0	0	9
Worker per 1,000 Bidis used to get daily in 1942	0	12	0
Worker per 1,000 Bidis used to get daily in 1944	1	8	0
Worker per 1,000 Bidis used to get daily in 1948	2	0	0

XVII

List of Common Edible Fishes in West Bengal

(By courtesy of the Director of Fisheries, West Bengal)

Local Name	Latin Name	District where found
Air (1)	<i>Mystus aor</i>	Howrah, Hooghly, 24-Parganas, Burdwan, Nadia, Midnapore, West Dinajpur.
Air (2)	<i>Mystus Seonghala</i>	Malda, Jalpaiguri, Cooch Behar, Bankura, Murshidabad.
Ayechari bata	<i>Cirrhina reba</i>	Hooghly.
Bagha air	<i>Bagarius bagarius</i>	Howrah, 24-Parganas, Malda, Midnapur, Cooch Behar, Murshidabad.
Bacha	<i>Eutropiichthys vacha</i>	Howrah, Hooghly, 24-Parganas, Burdwan, Malda, Nadia, Jalpaiguri, Cooch Behar, Murshidabad.
Bam	<i>Mastacembelus armatus</i>	Howrah, Hooghly, 24-Parganas, Midnapur, Jalpaiguri, Bankura, Murshidabad, Malda.
Bara Hangor or Muri	<i>Pristis sp.</i>	Midnapur.
Baul	<i>Stromateus cinereus</i>	Midnapur.
Bagda Chingri(1)	<i>Penaeus carinatus</i>	Midnapur, West Dinajpur.
Bagda (2)	<i>Palaemon sp.</i>	Bankura.
Badangi	<i>Semiplotus</i>	Jalpaiguri.
Baim	<i>Semiplotus (Mc. Cl1).</i>	
Banspata (1)	<i>Murasnesox talaborides</i>	Cooch Behar.
Banspata (2)	<i>Danio devario</i>	Malda, Jalpaiguri.
Bele	<i>Cynoglossus sp.</i>	Midnapur.
Bhangan	<i>Glossogobius giurus</i>	24-Parganas, Malda, Nadia, Midnapur, West Dinajpur, Murshidabad.
Bhangan bata	<i>Mugil tade</i>	24-Parganas, Midnapur.
Bhangore	<i>Labeo bata</i>	Howrah, Hooghly, 24-Parganas, Malda, Nadia, Birbhum, Burdwan.
Bheda	<i>M. tade</i>	Howrah, 24-Parganas, Midnapur.
Bhola (1)	<i>Badis badis</i>	Darjeeling, Jalpaiguri and Cooch Behar.
Bhola (2)	<i>Sciaena coitor</i>	24-Parganas.
Bhola (3)	<i>Barilius barna</i>	Malda, Jalpaiguri.
Bhetki	<i>Umberina sp.</i>	Midnapur.
Bhetki Sol	<i>Lates calcarifer</i>	24-Parganas, Midnapur.
Bhangna	<i>Serranus Sonnerata</i>	Midnapur.
Bhangna	<i>Labeo bega</i>	Jalpaiguri.
Boal	<i>Mugil speigleri</i>	Cooch Behar.
Bot Singhi	<i>Wallagonia attu</i>	Howrah, Hooghly, 24-Parganas, Burdwan, Malda, Nadia, Midnapur, Jalpaiguri, Birbhum, Cooch Behar, Bankura, Murshidabad.
Bot tengra	<i>Olyra Kempf Chaudhuri</i>	Jalpaiguri.
Chanda (1)	<i>Erethistes elongatus</i>	Malda, Jalpaiguri.
Chanda (2)	<i>Ambassis nama</i>	Howrah, Hooghly, 24-Parganas, Burdwan, Malda, Nadia, Jalpaiguri, Bankura, Murshidabad.
Chato Kamot	<i>S. Sineusis</i>	24-Parganas.
Chapra	<i>Rhynchobatus sp.</i>	Midnapur.
Chabli	<i>Penaous Indicus</i>	West Dinajpur.
Chedra	<i>Danio acquipinnatus (Mc Clell)</i>	Jalpaiguri.
Chang	<i>Bariluis sp.</i>	Darjeeling, Jalpaiguri, Cooch Behar.
Chela (1)	<i>Ophicephalus gachua</i>	Howrah, Hooghly, 24-Parganas, Malda, Nadia, Midnapur, Jalpaiguri, Birbhum, Murshidabad.
Chela (2)	<i>Chela baccala</i>	Hooghly, 24-Parganas, Burdwan, Malda, Nadia, Midnapur, West Dinajpur, Birbhum, Cooch Behar, Murshidabad, Jalpaiguri.
Chega	<i>Chela gora</i>	Murshidabad.
Chital	<i>Chaca chaca</i>	Malda, Jalpaiguri, Murshidabad.
Chuno Khalse	<i>Notopterus Chitala</i>	Howrah, Hooghly, 24-Parganas, Burdwan, Malda, Nadia, Midnapur, West Dinajpur, Jalpaiguri, Birbhum, Cooch Behar, Bankura, Murshidabad.
Chuchhe bata	<i>Trichogaster chuna</i>	Howrah, 24-Parganas, Malda, Murshidabad.
Dani Kona	<i>Cirrhina sp.</i>	Hooghly.
Danrke	<i>Rasbora daniconus</i>	Terai and Darjeeling.
	<i>Esomus danricus</i>	Hooghly, 24-Parganas, Malda, Jalpaiguri.

EDIBLE FISHES

XVII—contd.

Local Name	Latin Name	District where found
Darangi	<i>Esomus danricus</i>	Throughout Bengal.
Darkina	<i>Rasbora daniconius</i>	24-Parganas, Malda, Jalpaiguri, Murshidabad.
Dalina	<i>Chrysophrys datnia</i>	Midnapur.
Dento Punti or Tit Punti	<i>B. Ticto</i>	Hooghly, 24-Parganas, Burdwan, Malda, Cooch Behar, Murshidabad.
Dera	<i>Aplocheilus</i> sp.	Midnapur.
Dumaho bata	<i>Cirrhina</i> sp.	Hooghly.
Dud chang	<i>Ophiocephalus stewartii</i>	Malda, Jalpaiguri.
Elega	<i>Rasbora elenga</i>	Malda.
Galda Chingri (1)	<i>Palaemon</i> Sp.	Hooghly, Midnapur, Bankura.
Galda Chingri (2)	Lobster	Nadia.
Gang khoira	<i>Gonialosa manmina</i>	24-Parganas, Nadia, Midnapur.
Gajal	<i>Ophiocephalus marulius</i>	Burdwan, Malda, Nadia.
Gachai	<i>Rhynochobdella aculeata</i>	Malda, Murshidabad.
Gente Bele	<i>Glossogobius giurus</i>	Hooghly, Birbhum.
Ghora mach or Sankhachur	<i>Carnex</i> sp.	Midnapur.
Ghora Chingri	<i>Leander styliurus</i>	Midnapur.
Ghusa Chingri	<i>Caridina gracilipes</i> and <i>C. Propinqua</i>	Midnapur, West Dinajpur.
Ghol	<i>Barilius barna</i>	Jalpaiguri.
Gharua	<i>Pseudotropius</i>	24-Parganas.
Goda Chingri	<i>P. rudis</i>	Midnapur.
Gula	<i>Mystus gulio</i>	Midnapur, 24-Parganas.
Gula-tangra	<i>Macrones gulio</i>	Howrah.
Gurjaoli	<i>P. tetradaotylus</i>	Howrah, 24-Parganas, Midnapur.
Guley or Baria	<i>Apocryptes lanceolatus</i>	Midnapur.
Harina Chingri	<i>Metapenaeus monoceros</i> and <i>M. brevicornis</i>	Midnapur.
Ilish	<i>Hilsa ilisha</i>	Howrah, Hooghly, 24-Parganas, Burdwan, Malda, Nadia, Midnapur, West Dinajpur, Cooch Behar, Murshidabad, Bankura.
Joia	<i>Barilius bendelisis</i> van <i>chedra</i>	Jalpaiguri.
Katla	<i>Catla Catla</i>	Howrah, Hooghly, 24-Parganas, Burdwan, Malda, Nadia, Midnapur, West Dinajpur, Jalpaiguri, Birbhum, Cooch Behar, Bankura, Murshidabad.
Kankle	<i>Xenentodon cancila</i>	Howrah, 24-Parganas, Malda, Midnapur, Jalpaiguri, Murshidabad.
Katkate, Patka	<i>Tetraodon cutentia</i>	24-Parganas, Malda, Jalpaiguri, Murshidabad.
Kanchan Punti	<i>B. Conchonus</i>	Hooghly, 24-Parganas, Malda, Jalpaiguri.
Kamot or Hangor	<i>Carcharias</i> sp.	Midnapur.
Kanmagur	<i>Plotosus canius</i>	Midnapur.
Kaibal	<i>Cromileptes alliveles</i>	Midnapur.
Kalbasu	<i>L. Calbasu</i>	Howrah, Hooghly, 24-Parganas, Burdwan, Malda, Nadia, Midnapur, West Dinajpur, Jalpaiguri, Birbhum, Cooch Behar, Bankura, Murshidabad.
Katli or Bhorkol	<i>Barbus (Lissocheilus) Dukai Day</i>	Jalpaiguri.
Katal Kushi	<i>Lebeo dero</i>	Jalpaiguri.
Kero	<i>Palaemon</i> sp.	Hooghly.
Kharko bata	<i>C. reba</i>	Howrah, Hooghly, 24-Parganas, Malda, Jalpaiguri, Birbhum, Murshidabad.
Khalse (1)	<i>Colisa fasciata</i>	Howrah, Hooghly, 24-Parganas, Burdwan, Nadia, Midnapur, Cooch Behar.
Khalisa chuna	<i>Trichogaster chuna</i>	All Districts.
Khalisa (2) (Lal)	<i>Trichogaster fasciata</i>	Malda, Jalpaiguri, Murshidabad, Practically all districts.
Kharika	<i>Nemachilus corica</i>	Malda.
Kharua	<i>Pseudotropices garua</i>	Malda.
Khoira (1) (Khayra Gang)	<i>Gadusia chapra</i>	Howrah, Hooghly, 24-Parganas, Malda, Nadia, Midnapur, Jalpaiguri, Murshidabad, Bankura, Practically all districts except Darjeeling.
Khaira (2)	<i>Clupea fimbriata</i>	Cooch Behar.
Khorsula	<i>M. Corsula</i>	Howrah, 24-Parganas, Nadia, Midnapur, Cooch Behar, Murshidabad.

EDIBLE FISHES

XVII—contd.

Local Name	Latin Name	District where found
Koi	<i>Anabas testudineus</i>	Hooghly, 24-Parganas, Burdwan, Malda, Nadia, Midnapur, West Dinajpur, Jalpaiguri, Birbhum, Cooch Behar, Bankura, Murshidabad.
Koksa (1)	<i>Barilius Shaora</i>	Jalpaiguri.
Koksa (2)	<i>Barilius vagra</i>	Jalpaiguri.
Kunehe	<i>Amphipnous cuchia</i>	24-Parganas, Malda, Jalpaiguri, Murshidabad.
Kukurjiv	<i>Cynoglossus indicus and Dudios</i>	Midnapur.
Kuju Bhetki	<i>Soiaena albida</i>	Midnapur.
Kunkati	<i>Erethistes hara</i>	Jalpaiguri.
Kurchi bata (Kurebha)	<i>Labeo gonius</i>	24-Parganas, Jalpaiguri, Murshidabad.
Kursa	<i>Labeo deno</i>	Malda.
Kucho chingri (1)	Shrimp	Nadia.
Kucho chingri (2)	<i>Palemon lamarri</i>	Midnapur.
Lata	<i>O. Punctatus</i>	Howrah, 24-Parganas, Burdwan, Malda, Nadia, Midnapur, Jalpaiguri, Birbhum, Cooch Behar, Bankura, Murshidabad.
Lakwa or Pansha	<i>Polynemus sp.</i>	Midnapur.
Lal Khalisa	<i>Colisa lalius</i>	24-Parganas.
Lal mach	<i>Carassius auratus</i>	Murshidabad.
Letua or Nara	<i>Harpodon Nehereus</i>	Midnapur.
Magur	<i>Clarias batrachus</i>	Howrah, Hooghly, 24-Parganas, Burdwan, Malda, Nadia, Midnapur, West Dinajpur, Jalpaiguri, Birbhum, Cooch Behar, Bankura, Murshidabad.
Mahasol	<i>Barbus putitoora</i>	Jalpaiguri.
Manwa	<i>Rohtee cotio</i>	Jalpaiguri.
Mourala	<i>Amblypharyngodon mola</i>	Hooghly, 24-Parganas, Burdwan, Malda, Nadia, Midnapur, Jalpaiguri, Birbhum, Bankura, Murshidabad.
Mrigel	<i>Cirrhina mrigala</i>	Howrah, Hooghly, 24-Parganas, Burdwan, Malda, Nadia, Midnapur, West Dinajpur, Jalpaiguri, Birbhum, Cooch Behar, Bankura, Murshidabad.
Muri bacha	<i>Pseudotropius murius</i>	Malda, Jalpaiguri.
Nadash	<i>Nandus nandus</i>	Hooghly, 24-Parganas, Malda, Midnapur, Jalpaiguri, Birbhum.
Naby or Chohara	<i>Gobiodes rubicandus</i>	Midnapur.
Nandina	<i>Labeo nandina</i>	Malda, Murshidabad.
Nehare	<i>Harpodon nehereus</i>	Howrah, 24-Parganas, Midnapur.
Nedas	<i>Badis badis</i>	Jalpaiguri, 24-Parganas, Malda, Nadia.
Nipati	<i>Danio dangila</i>	Jalpaiguri.
Nona tangra	<i>Mystus gulio</i>	Midnapur, West Dinajpur, Birbhum.
Non Koi (Datney)	<i>Sciaena cuja</i>	Midnapur.
Pabda	<i>Callichrous pabda</i>	Howrah, Hooghly, 24-Parganas, Burdwan, Malda, Nadia, Midnapur, West Dinajpur, Jalpaiguri, Birbhum, Cooch Behar, Murshidabad.
Panga	<i>Acanthopthalmus Dangia</i>	Jalpaiguri, Darjeeling, Cooch Behar.
Pangas	<i>Pangasius pangasius</i>	Howrah, Hooghly, 24-Parganas, Malda, Nadia, Midnapur, Cooch Behar, Murshidabad.
Parse	<i>Mugil parsia</i>	Howrah, 24-Parganas, Midnapur.
Pankal	<i>M. Pankalus</i>	Howrah, Hooghly, 24-Parganas, Burdwan, Malda, Midnapur, Jalpaiguri, Birbhum, Bankura, Murshidabad.
Pat tangra	<i>Mystus cavasius</i>	Hooghly, Malda, Jalpaiguri.
Peni Tangra	<i>Mystus sp.</i>	Hooghly.
Phensa	<i>Engraulis telara</i>	Howrah, Hooghly, 24-Parganas, Malda, Nadia, Murshidabad.
Pholui	<i>Notopterus Notopterus</i>	Howrah, Hooghly, 24-Parganas, Burdwan, Malda, Nadia, Midnapur, West Dinajpur, Jalpaiguri, Birbhum, Cooch Behar, Bankura, Murshidabad.
Phutuni punti	<i>B. phutunio</i>	24-Parganas, Malda, Cooch Behar.
Poia	<i>Lepidocephalichthys guntea</i>	Jalpaiguri.
Poma	<i>Pama</i>	24-Parganas.

EDIBLE FISHES

XVII—concl'd.

Local Name	Latin Name	District where found
Punti (1)	<i>Barbus stigma</i>	Hooghly, 24-Parganas, Burdwan, Malda, West Dinajpur, Jalpaiguri, Bankura, Murshidabad.
Punti (2)	<i>Barbus titius</i>	Malda, Jalpaiguri, Murshidabad.
Punti (3)	<i>Barbus sophore</i>	Midnapur, Cooch Behar.
Puti tor	<i>Barbus tor</i>	Cooch Behar.
Pyra Chanda	<i>Stromateus niger</i>	Howrah, 24-Parganas, Midnapur.
Raja or Shankhi	<i>Caranx</i> sp.	Midnapur, 24-Parganas,
Raj Bham	<i>Anguilla bengalensis</i>	All districts.
Ranga Chanda	<i>Ambassis ranga</i>	24-Parganas, Malda, Midnapur, Jalpaiguri, Cooch Behar.
Rita	<i>Rita rita</i>	Howrah, 24-Parganas, Burdwan, Malda, Nadia, West Dinajpur, Murshidabad.
Roopa patia	<i>Trichiurus Savala</i>	24-Parganas, Midnapur,
Roop Chanda (1)	<i>Scatophagus argus</i>	24-Parganas, Midnapur.
Rup Chanda (2)	<i>Stromateus Sinausis</i>	Midnapur,
Rui	<i>Labeo rohita</i>	Howrah, Hooghly, 24-Parganas, Burdwan, Malda, Nadia, Midnapur, West Dinajpur, Jalpaiguri, Birbhum, Cooch Behar, Bankura, Murshidabad.
Sal	<i>O. Marulius</i>	Howrah, Hooghly, 24-Parganas, Midnapur, Jalpaiguri, Birbhum, Cooch Behar, Bankura, Murshidabad.
Saral or Swarna Punti	<i>Barbus sarrana</i>	Hooghly, 24-Parganas, Burdwan, Malda, Nadia, Midnapur, Jalpaiguri, Birbhum, Murshidabad.
Sankar	<i>Trygon uarnak</i>	Murshidabad.
Sele	<i>Polynemus indicus</i>	Howrah, 24-Parganas, Midnapur.
Singi	<i>Heteropneustes fossilis</i>	Howrah, Hooghly, 24-Parganas, Burdwan, Malda, Nadia, Midnapur, West Dinajpur, Jalpaiguri, Birbhum, Cooch Behar, Bankura, 24-Parganas, Hooghly, Howrah, Midnapur, Murshidabad, Malda.
Silandia bata	<i>Silonia Silondia</i>	24-Parganas, Hooghly, Howrah, Midnapur, Murshidabad, Malda.
Silone	<i>Silonia Silondia</i>	Howrah, 24-Parganas, Malda, Midnapur, Murshidabad.
Silun	<i>Silundia gangetica</i>	Cooch Behar.
Slong or Kankan	<i>Cybium</i> sp.	Midnapur.
Sole	<i>O. Striatus</i>	Howrah, Hooghly, 24-Parganas, Burdwan, Malda, Nadia, Midnapur, Jalpaiguri, Birbhum, Cooch Behar, Bankura.
Tangra (1)	<i>Mystus vittatus</i>	Howrah, Burdwan, Malda, Midnapur, Jalpaiguri, Murshidabad.
Tangra (2)	<i>Mystus tengra</i>	Cooch Behar, 24-Parganas, Nadia, Bankura, Murshidabad.
Talar dati	<i>Sillago domina</i> S. Panijus	Midnapur.
Techokha	<i>Panchax Panchax</i>	Midnapur, Murshidabad.
Telohita	<i>Ghyptothorax telohitta</i>	Jalpaiguri, Darjeeling, Cooch Behar.
Tempa	<i>Tetrodon outoutia</i>	Midnapur, Howrah, Hooghly, 24-Parganas, Malda.
Thuris	<i>Hemiramphus</i> sp.	Midnapur.
Titari	<i>Psilorhynchus balitora</i>	Jalpaiguri.
Topsey	<i>P. paradisicus</i>	Howrah, Hooghly, 24-Parganas, Nadia, Midnapur.
Utta	<i>Barbus Chagunio</i>	Jalpaiguri.
Utti	<i>Labeo pangusia</i>	Jalpaiguri.

XVIII

Fishing in Bengal

THE FISHING CLASSES

Kaibarta is a hybrid caste. The word Kaibarta is derived from Sanskrit Ka (water) and vrit (to engage) and hence denotes those who are engaged in occupation in or on water. Keot, Kebat, Kyaot are the other names of the caste. In Bengal the Kaibartas are divided into two main classes—Halik Kaibarta and Jalik Kaibarta. The Halik Kaibartas claim that they have nothing to do with the Jalik Kaibartas and that they are socially superior to the latter and the other Sudra castes. In support of their claim, the Halik Kaibartas quote the verses relating to the Kaibartas that occur in Brahmaibarta Purana and Brihatvyas Sanhita.

Gotra or Clan

The following are the principal gotras or clans of the Halik Kaibartas: Sandilya, Kashyap, Batsya, Sabarna, Bharadwaj, Moudgallya, Palashar (Parashar), Nageswarbilas, Vashistha, Vyas and Alaswan. The Kaibartas of Bengal and Orissa are divided into three families of Adi (highest), Madhya (middle) and Anta (lowest). Marriages, etc., are determined on the basis of this classification. The Kaibartas have not adopted any of the social and religious innovations made by Ballalsen. They stick to the Shastras in matters of ritual. Given below are the different titles of the Kaibartas belonging to the three classes mentioned above:

ADIGRIHA or *Highest Family*—Samanta, Shantra, Bhuyna, Bhupalya, Jana, Mana and Adak.

MADHYAGRIHA or *Middle Family*—Sinha, Byaghra, Mahapatra, Hathi, Das, Kar, Maiti, Mahata, Ray, Hazra, Mondal, Bar, Dinda, Pal, Delai, Giri, Gayen, Bishayi, Karan and Tunga.

ANTAGRIHA or *Lowest Family*—Kapat, Kajlee, Kuita, Kap, Kanchi, Katsa, Kotal, Kuiti, Kat, Khatna, Khoskee, Khaura, Khamrai, Patat, Garu, Ganja, Gol, Gomta, Ghairee, Ghara, Ghati, Ghata, Chingree, Chiad, Charan, Chanlya, Jhulki, Jhap, Dandowa, Dagra, Tool, Joshu, Dandapattya, Deoa, Dua, Dolpati, Doari, Dhara, Dhabak, Nijka, Nayak, Paddy, Padai, Pattanaik, Pakhora, Paloyee, Patra, Mahapatra, Panjash, Patola, Patha, Pramanik, Phadikar, Baitalik, Bera, Badal, Bulya, Balda, Bakra, Bayan, Betal, Byaddi, Bej, Biswas, Bashuli, Benya, Bunan, Barik, Bhakta, Midda, Mullick, Moyee, Mool, Maishal, Mayees, Mal, Metta, Mate, Makud, Maman, Moonyan, Raj, Rahut, Samayee, Singhatal, Sahooya, Senapati, Sena, Saran, Sayee, Sinhali, Sashyamal, Shanka, Senee, Sannakee, Hootaye, Hayeet, Hand, Habar, Haik, Achrai, Agoan, Ojh, etc.

Halik Kaibarta Samaj.—The principal Kaibarta Samajs or centres of Bengal are Chandpratap in East Bengal, Bhusna in Jessore, Nadia, Rajsahi, Paschim Pabna or West Pabna, Purba Pabna or East Pabna and Paschim Mymensing or West Mymensing. There is no social intercourse between the different samajs and if a member of a particular samaj mixes with the members of a different samaj, he is socially degraded. There are eight families in the Chandpratap samaj in addition to whom there are two or three other families who also are on the same social status as the former and are considered kulins. In Bhusna there are three families in the Samaj and there are also two or three other families who are considered Kulins. Similarly in Rajsahi and Purba Pabna there are important families in the respective Samajs. In case of Kaibartas it is not possible to tell a Kulin or a Maulik by their titles because the titles are common amongst the various groups. A man's status is judged by the family he belongs to, and not by his title. In the past the various Kulin families had their particular distinctive symbols. Nowadays, however, this system has fallen into disuse and persons are introduced as somebody's son or a member of the Roy family of a particular village and similar other fashions. In certain areas of Midnapur, however, the old order still exists. The most important families are the Uttar Rahdi or North Rahdi and Dakshin Rahdi or South Rahdi. Intra-gotra marriage is not allowed among the higher groups like Kulins and Mauliks but this injunction is not always respected by the lower groups of the Kaibartas.

Jalik Kaibartas.—The Jalik Kaibartas are found in various parts of India. There are various speculations about the origin of this caste. According to some, there was in the past a powerful caste-group known as Keot who by a fiat of king Ballalsen were raised to the status of Sudras whose offered water could be taken by the higher castes, and came to be known as Kaibartas. These people gave up fishing for livelihood after they became known as Kaibartas (Ref. Ballalcharita manuscript by Gopalabhata).

In the district of Murshidabad there are five hundred and seventyfour families of Kaibartas such as Chanddapara, Rahdi Bindu, Rahdi, Bagdi, Barendra and Dakshini and other families. In the district of Hooghly are to be found Kaibartas who are known Tootia and Jalya or Malakaibartas. In Jessore there are Rajbanshi and Mala Kaibartas; in Malda Halik and Jalik Kaibartas; in Midnapur Halik or Hele Kaibartas who

FISHING

are divided into Lalchatai, Eksidhe, Dosidhe and Makunda sub-castes; in 24-Parganas Das Kaibartas. Bhuluai in Noakhali district, Kalarai in Dantrai, Patua Phirti in Sandwip, Haliadas, or Parashardas and Chandradwipi in Bakhergunj are the other important Kaibartas.

Kalarai, Halia, Balai, Jadavrai, Bhubankuri, Manjhi, Sunaddar, Charmanairai, Majumdar, Bangaj and among the Chandradwipis Kabai, Mondal, Majhi, Pathar, Sikdar and Bangaj are the different *Bhats* and *Mels* among the Kaivartas of Bakhergunj.

XIX

The Fishing Nets of Bengal

Given below are names of some of the principal varieties of fishing nets all of which were on display at the Great International Fisheries Exhibition in London in 1883:—

1 Beotā or a bag-like net

Beoti is also known as bel jal. It is made of either jute or silk cotton twists. Two heavy weights or sinkers are attached to the bottom end of this type of net. Sticks are not used. This is the most widely used variety of net in Bengal for fishing in rivers.

2 Kheplā Jāl or casting shore net

This net is to be found practically in every village home having a pond attached to it. It is made either of jute or silk or cotton twists and is extremely suitable for fishing in tanks and ponds.

3 Darā Jāl

There are three types of *Darā Jāl*—*kal darā*, *khāl darā* and *kalghute darā*. These nets are used for fishing in tanks and ponds and are made of jute twists.

4 Chitké Jāl

It is suitable for catching chingri, ghusha and other small varieties of fish. It is made of either jute or silk cotton twists.

5 Patlā Jāl

This net is used for catching *parse* fish. It is used in khals and bils at depths of 3 to 4 ft. It is made of either jute or silk cotton twists.

6 Jagat bédé Jāl

It is used in the river Padma for catching hilsa and certain other varieties of fish. It is a huge net, covering practically the half of the river when cast and takes no less than a dozen or more people to haul.

7 Beshāl Jāl

First two poles are fixed in the water and then the net is cast from a boat. It is used for catching *bhangan*, *bhakut* and other kinds of fish. This net is much used and is cheap.

8 Chhāl Jāl

It is used for catching hilsa fish. It is about 250/300 cubits in length and 9/10 cubits in width and is cast crosswise in the river. From the lower end of the net hang a series of baked mud sinkers to keep it straight and firm. These discs are made by village potters. Fish driven by strong current strike against the net and get entangled in the meshes. When they try to wriggle out the net is disturbed and the shola floats on the surface of

the river begin to move to and fro. Their movements indicate the presence of fish in the net and the fishermen immediately arrange to drag the net up.

9 Chachari Jāl

The Chachari Jāl resembles the *kheplā jāl* but unlike the latter it can be cast only from a boat. Before casting the net is neatly arranged on the *Dinghi* and has to be used with considerable skill. It is let down slowly and is dragged up in the same way. It is suitable for catching practically all sorts of fish, from *bhakut*, *rekha rucho* to *chingris*. At least three men are required to handle this net which is generally made of jute twists and sometimes of cotton twists also. The net is fitted with iron prongs along its bottom.

10 Shangra Jāl

This type of net is usually 15/16 cubits long and is used for catching hilsa.

11 Bans Jāl

It resembles the *Beshal Jāl* except for its size which is much smaller.

12 Khara Jāl

It is used for catching small fish.

13 Gopa Jāl

This type of net is spread around the small plants and weeds growing in the shallow water next the river bank to catch smaller variety of fish that abound there.

14 Antal Jāl or Fanshan Jāl

The net is spread along the entire width of small creeks or inlets just before the ebb tide. The fish, driven by the flow of water, get stuck in the net.

15 Chaka Jāl

This is a circular type of net and resembles somewhat the sieve known as *chāluni*. It is placed into the water and then dragged up straight so that the fish get caught in it while the water trickles through.

16 Chabi Jāl or conical net

This type of net is used in small creeks and canals. It is conical in shape—narrow at one end and gradually widening, somewhat like the *kheplā jāl* already mentioned. It is first thrown and later the fish is killed by means of *konch*, spears, etc. It is used for catching *sole*, *lata*, *magur* and other non-scaly fish.

17 Khut Jāl

It is very long in size and is used for catching hilsa.

FISHING NETS

18 Panj Jal

This net is floated on the river by means of a few huge earthen jars.

19 Dholi or Dhoni Jal

This type of net is used for catching fish in canals and creeks. It measures 61' x 13' and is made of cotton twists and the mesh is 2"-50. It is supported by shola floats and is used in still and in running water. It is never steeped in cutch or gal. Hence the name *Dholi* or *Dhoni*.

20 Kona Jal

It is not fitted with small pieces of sticks in the bottom as is usually the case with nets but floats on the surface of the river. It is very long and used for catching hilsa.

21 Patta Jal

This net is used for catching fish in small inlets and canals.

22 Pash (Nadiya)

This is a small net of the same principle as the *tear*, measuring 15' 6" long and 2' deep, and with a mesh of 1"-75. It is made of cotton cord soaked in gab, and has sixteen reed flats 2"-50 long, at intervals of 9". It is used for catching small *labeo rohita*, *catla buehanani*, *orrhina mrigala*, etc.

23 Dakon Jal

A net corresponding to the *tear* of Champaran, threaded on cord 86' 9"; the length of the net, stretched along its free lower border, being 171', with a depth of 12' and with a triangular mesh of 8" to 9". Each net must have three floats either of shola or bamboo, one at each end, and another float at the middle attached to the end of a long cord.

This net is used only at nights, and from October to the middle of June, when the current is not strong, large fish, such as *labeo rohita* and *catla buehanani* are caught in it. (Great International Exhibition, London 1883, p. 16. By Francis Day.)

24 Kabal Jal

A net 35' long, 1' 4" deep, and with a mesh of 1". It is made of cotton twist and can be used in still water and for small fish. It has fortyfour fine bamboo floats. (*Ibid.* p. 17.)

25 Sarki or Pakhi Jal (Murshidabad)

Measuring 328' long by 4' 8" deep, mesh 5" (*Ibid.* p. 15.)

26 Shooli Jal or Vasha Jal (Chittagong)

It is a floating net. (*Ibid.* p. 17.)

27 Do Khanda Jal

A floating net. It is generally used in lengths of 200 yards and 10 yards deep.

28 Kai Jal (Jessore)

A net with six sinkers of broken earthenware formed into discs, and with twenty floats made of cane and doubled, each net measuring 3"-50. The net is 34' long and 2' 6" deep, and with a mesh of 1"-25. It is made of cotton prepared with the juice of *Diospyros embryopteris*, and is chiefly used for netting the koee fish, *anabas scandens*, and young specimens of *labeo rohita*.

29 Dowra (Nadiya)

A drag net with a mesh of 1", and measuring 50' by 24'. A strong rope of jute is run through the upper and lower borders of the net, shola floats being attached to the upper, and weights, usually stones or bricks, to the lower border. A rope is fixed to each and above and below and the fishermen on either side of the tank, in which these nets are used, drag it from one end to the other. The fish caught are those generally found in tanks.

30 Kachal (Nadiya)

A hempen net with a mesh of 1"-50, and measuring 49' deep by 92' in length. It has twentyeight floats made of the wood of *Excaecaria agallocha*, wild, measuring 17" long and 1"-50 in thickness, and tied at both ends to the rope that runs along the upper border of the net. The lower border is generally weighted with stones or bricks, and it is the first part that is let into the water. (*Ibid.* p. 19. Dr. King.)

This net is chiefly used in deep rivers for the capture of hilsa, *clupea ilisha*, one of the *clupeidae* (herrings), and famous for the rich flavour of its flesh.

31 Buchur Jal (Nadiya)

A wedge-shaped net with a convex border for its base, the apex ending in a point to which a rope is attached. The total length of the net, in a straight line from the apex to the centre of the base, is 50'. and the breadth across the latter is 37'. The broad part is paid out first, from side, the boat being propelled outwards as this part of the net is let into the water. After this, the remainder of the net is then let out as far as the rope attached to the apex, which is secured in the boat. At the broad end or base the net is turned round on itself for 2' 6", and tied at regular intervals to its under-surface; the intervening portion being weighted with sinkers, a series of pockets is produced when the net is drawn into the boat, and it is in these pockets that the fish are netted. The mesh is 3"-56.

This is a net used for catching large fish, such as *labeo rohita* and *catla buehanani*.

32 Chella Jal (Jessore)

A net with a mesh of 0"-40 and resembling a large hammock in form, the two sides being

FISHING NETS

of unequal length, one measuring 65' and the other 68', the latter having fifty-nine floats of pure wood attached to it, each float being 9" x 50 in length. The two sides of the net are connected at each end by a cross piece of bamboo 21" in length. A man stands on the bank holding one end whilst a boat manned by three fishermen pull out from the shore describing nearly a semicircle, paying out the net as they go, returning with their end of the net, and when the shore is neared the fisherman paying out the net jumps into the water and makes over his end to the shoreman, and thus a loop is formed. As the man on the shore receives the second cross stick he reverses the position of both of the cross sticks, so that the floated side of the net is brought downwards to the other and lower side. The other man, who is standing within the loop, at once grasps the floated and non-floated borders of the net, bringing the inner sides of the loop together, and as he does so the man on the land draws the net towards him in a heap, and, when it is nearly all pulled in, it is lifted on to the boat and the fish in the net are then shaken out into it.

All kinds of fish may be taken in the net.

33 *Boā Jāl (Nadiya)*

A net made of a coarse but thin hempen cloth with an open weave, and woven specially for the purpose. It is in the form of a long bag with a wide deeply concave mouth 12' in breadth when closed, the total length of the bag from the centre of the mouth being 15'. It rapidly tapers from the mouth backwards to a diameter of 1' 13". The cloth bag is tied at its mouth to a strong cord, with an intervening network 4" broad to relieve the pressure of the stream against the bag; but at the corners the network is increased to 20". Each of the two arms or corners of the mouth is fastened to a bamboo post, and tied to it about 2' above the bed of the stream, whilst two other erect bamboos serve to keep the mouth open. The far end of the bag is kept open by a bamboo hoop, and the bag is prevented fouling by means of a bamboo driven into the bed of the stream on either side of the hoop. A long piece of cloth, generally a portion of the clothing of the fisherman, and known as *gamchha*, is tied under the hoop and extended backwards, as a kind of channel into which the small fish that find their way into the net are carried; the fishermen, of course, are standing in the water, one on either side of the far end of the *gamchha*, as it is only used in shallow water. By means of the free end of the *gamchha* the fish are transferred into a handi or basket.

Fry of all kinds are caught in this ingenious net.

34 *Bura Jāl*

This net is of the same shape as the *boā jāl*, but is made of strong net with a mesh that varies in diameter and strength, the net being especially strong in the long tabular end, which is extremely narrow at its free extremity. From the centre of the mouth to the end of the tabular portion is 25' 3", and each arm from the first mentioned part measures 11' and has a depth at the middle of 6' 2". The mouth when stretched is 17' x 10', behind its middle, and the net is 8' 7" broad. There is a split bamboo 1' 6" long tied across each arm near its free end, the latter being conical and attached along the bamboo, to the lower end of which a strong cord is tied for the attachment of a long rope by which the net is pulled in from the shore. The lower free margin of the arms and mouth is leaded. The mouth is kept open by a bamboo tied to its middle, but when the net is used in deep water the bamboo is not sufficient to float, but only to keep the mouth stretched.

The net is taken out into deep water and sunk, the long ropes being retained in the boat which makes for the shore from which the net is pulled in.

The name of *jāl* is derived from the circumstance that the man engaged in working it becomes so fatigued that he resembles an old man, *bura*.

Crocodiles, turtles, and large fish are caught in the net.

35 *Bans Jāl*

A net triangular in form, measuring 70' along the base of the triangle, which corresponds to the mouth of the net, and 35' from the apex of the triangle to the middle of the base. The mesh is only half an inch in breadth generally, but there is a considerable area at the apex forming a kind of pocket, and here the mesh is only a quarter of an inch in breadth.

36 *Kona Jāl or screen-like net*

From the position which this net occupies in the stream, it is only adopted for the capture of fish passing upwards.

37 *Kharki Jāl or purse-like net*

The fish caught in this net is chiefly *hilsa*. *Sangree Jāl*: It is made of hemp and is used in catching large fish as *catla*, *ruce* and *hilsa*. *Fesha Jāl*: *Kharki*, 25' long, 9' deep, and with a gap of 6'; mesh 1"; used from a boat in netting *feshā* or *fhaisa* fish, a species of *engranlis*. *Shangra*: Like *Kharki*; 24' long, 5' 8" deep and with a gap of 6' 8", mesh 2". Used for catching *hilsa*.

NETS ON TRIANGULAR FRAMES

38. A triangular conical net fixed by its margin between two divergent bamboos

FISHING NETS

which are kept apart and in position by a short cross bamboo below their point of junction. The mouth of the net when fixed forms a triangular aperture of 4' every way. The margin of the net for about 6" is made of cord and with a wide mesh, while its remainder is made of fine cotton twine with a mesh of $\frac{1}{4}$ ". The base of the triangle is applied to the muddy bottom, and pushed forward by the fisherman holding the cross piece of bamboo by his left and the end of one of the lateral bamboos in the other hand. Only small fish and shrimps are caught in the net.

39. (1) *Sitki Jāl*: Base 3' 6", sides 4".
(2) *Chitki Jāl*: Base 10', the sides between 6' and 7', and mesh 0"-25. It has a small pocket at the apex, which is open when not in use.

(3) *Besali Jāl* (referred before).

(4) *Thella Jāl*: This resembles the *lisri jāl* of the Champaran district, but the net is not so loose, and the lower border is defined by a cross bamboo, so that the frame forms a triangle. Used for catching prawns. It measures at the base 3' 9" and at the sides 4' 3". Its mesh is 0"-25.

SPECIAL NETS

40 Khara Jāl

For the marking of this net a complicated arrangement of long bamboos and a boat are required. First a tripod, called 'peet gauz', i.e., back post, is fastened into the bank, or it may be a short way into the water. About 15' further onwards from the tripod an erect bamboo called 'māj gauz', i.e., middle post, is fixed to the bottom of the stream, and 5 ft. further out another, called 'mool gauz', i.e., principal post, is similarly secured, and the boat lies between them. These erect bamboos are kept in position by two other bamboos placed about 10' up the stream, and called 'pagla gauz' and these are slightly bent downwards and tied to the upper ends of the māj and mool gauz respectively, about 11' above the surface of the water. From one of the posts of the tripod, at a distance of 3' from one another, the end of the lower bamboo resting on the ground, two bamboos are diverted outwards and upwards, one above the other, the lower, the pāot, or step, rising to 24', and the upper, the hāt bans, or handrail, to 26', both being tied to the māj and mool gauz. The māj and mool gauz are connected by two cross bamboos 5' long, the lower placed transversely and the other obliquely upwards, but they have no particular names.

This framework is quite independent of the net, and is only the means by which the net is worked.

The apparatus in connection with the net itself consists first of a long strong bamboo

tied loosely by its lower end which rests on the ground to the mool gauz, and is known as the 'oopāot', and which forms a very acute angle with the mool gauz, and is closed to the side of the boat. Two long slender bamboos, about 13' each, are tied to the upper end of the 'oopāot' one above the other, one pointing upstream and called *pagla bans*, i.e., foolish bamboo, and the other down the stream, and known as *bhaskor bans*, i.e., that which floats in the air, the inner ends of these bamboos overlapping each other at the 'oopāot' and tied together but somewhat apart. The outer end of the *bhaskor bans* is loosely secured by a long cord to the upper end of one of the 'pagla gauz', while the 'pagla bans' is held in position by a cord attached to its middle and fixed to a bamboo placed upstream and also called *pagla bans*. One corner of the net is tied to the outer end of the *pagla* and another corner of the *bhaskor* bamboos, and to the inner end of the *pagla bans* a bamboo 30' in length is tied projecting outwards over the stream, and is called *mool dahri bans*, chief bamboo, and to it another corner of the net is tied. Its inner end projects backwards for about 4' or 5' beyond the 'oopāot', and a small bamboo tied on to its extremity passes downwards and is fixed to the 'oopāot'. This small bamboo is called 'goodomch bans'. The portion of the net between the *pagla corner* and the 'oopāot' is tied to the latter near its middle, the fourth corner itself being secured to the middle of the boat.

The net is lifted and let down by a rope attached to the upper end of the 'oopāot', and is worked by a man, who walks up and down the 'pāot' bamboo, holding on by the *hāt bans*. In letting down the net he holds the rope in his hand, but in dragging it up he puts a loop around his waist walking down backwards along the bamboo. When the net is raised the rope is fastened to one of the bamboo posts of the tripod.

After the net has been let down, the fish in the process of raising it fall down towards the boat, and the loose portion of the net at the boat's side is pulled in and the fish shaken out of it into a basket or handi (pot).

All kinds of fish are caught in it.

41 Komār Jāl

Between the months of September and November branches of trees are piled in the centre of a jheel, or very deep still water, where the net is to be used, and by the beginning of March the spot has become the resort of numerous fish. The net is then set, and its size depends on the extent of the mass of branches in the jheel. (P. 42, Francis Day.)

The name is apparently derived from the circumstance that a potter, Komār, is required to manufacture the sinkers, which are

FISHING NETS

made of earthenware and are elongated and perforated lengthwise, and are strung on to the lower border of the net.

42 Tatree Jāl

This is a hexagonal frame enclosure depended above by nets and with a deep bag-shaped net suspended to it internally. The sides of the hexagon are 9' broad, and the posts forming the corners are 20' long, of which about 3' are fixed in the bed of the stream, with 7' above water. About 1' 6" above the level of the water they are connected by cross bamboos, over each of which a net is threaded about 7' deep, each being suspended as a screen from the erect bamboos about 4' above the cross bars, and permitted to hang down below as a kind of ample pocket along the outer side of the cross bars. There are only five of these nets, as one side of the hexagon is left open. The interior of the enclosure is fitted with a long bag-shaped net, tied also to the cross bars, except at the open side, where it is pulled in and secured to the corner opposite to it, and as there is a slit down this side of the bag for a short way, the fish find their way in through it, and directed towards the opening by a screen-like net that runs outwards to the bank, where it is secured to a bamboo post being attached internally to the upper slit portion of the bag net, the long end of which hangs down almost in the centre of the enclosure. The fish pass in from up and down stream, and, not being able to find their way out, try to clear the lateral screen, and in doing so, fall into the saccular or pocketed portion outside the cross bars. As the net is in deep water it is worked by a boat. The mesh of the bag net is 1"·50, and of the screen nets 2". The fish caught in the net are catla buchanani and labeo rohita.

43 Chānd Jāl

This apparatus consists of two parts. First a piece of jute cloth, 28' long by 13' 2" broad, doubled upon itself, and closed at one end; the second part consists of a string 73' long, to which portions of the carapaces and plastrous of *trionyx gangeticus* are tied at intervals of 6". This net is only used in shallow water and at night, and, as it is frequently used in moonlit nights, it is called *chānd jāl*.

When in use the cloth portion is opened, the closed end being towards the bank and held by one man, while each corner of the open end is held by a fisherman, who also has one end of the rope with broken turtles shells tied to it. They all wade into the stream, and the middle of the turtle-ropes is first let down, and then they walk backwards in the direction of the bank paying it out as they go, so that, when fully paid out, it forms a triangle, of which the cloth, when extended, forms the

base. Each of the two men then pulls in his own end of the turtle-ropes, the bones of which turning over shine in the water and frighten the fish towards the cloth, which, when it has had the rope completely drawn in front of it, the fish pass into it, and the two corners are rapidly raised and shaken towards the men who hold the opposite closed end.

Ground swimming fish are caught in it.

44 Fānsi Jāl

A small net made of the fibre of the stem of the leaf of the tar palm, *Borassus flabelliformis*. The net has the form of an elongated cone measuring 1' 9" in length with a diameter of 10" at the mouth. The mesh measures 3"·50×2"·50. A cord of 9" long, and also of palm fibre, is attached to either side of the aperture, and by means of it the net is fixed by two wooden pins to the bed of the shallow stream.

Only two kinds of fish are caught in it, viz., *Ophio cephalus marulins* and *Ophiocephalus Striatus*.

MATS FOR CATCHING FISH

45 Ghanti Jāl

A reed mat used for catching mugil corsula, a surface swimmer, found in shoals, although it dives rapidly when disturbed. The mat measures 28' 3"×8' 3". Along one side a small net 4" in height, is attached from one end of the mat to the other. It can be placed in an erect position by small pieces of bamboo, which are tied on by cords ready for use. A long rope or cord covered with shola floats at intervals is tied on to a corner of the mat next the bank or boat, and there are two such. A long cord is attached to each of these float ropes, and when the mullet appear between them, the floats are drawn together, so that the fish are frightened, and leap on to the mat, which is kept stretched by bamboos tied along its length. The marginal net prevents the fish wriggling off, and the mat may either be drawn to the bank or on to the boat, and the fish are removed by a landing net, having been first knocked on the head by a small bamboo.

TRAPS

46 Polo

A conical trap 2' 1" in diameter at the base, and 5"·50 at the upper aperture, and having a height of 1' 10". The workmanship of this is superior to any of the other traps of this kind, and the shape is rather elegant.

47 Poloi

A bell-shaped trap. It is 23" high, and with a diameter of 26" at the lower and 5"·50 at the upper opening.

FISHING NETS

48 Honcha (*Nadiya*)

24-Parganas, etc. Hoinchee in Calcutta.

49 Bhanta

A flat framework made of split bamboo, the pieces being tied together longitudinally, with interspaces of $\frac{1}{4}$ ", with the fibre of the peduncle of the leaf of *Borassus flabelliforus*. The sides are turned upwards for 1"·50, and at one end there is a vertical screen 8" high of the same character and breadth as the flat portion, which measures 1' 7"×1' 2".

It is used in small watercourses that are rapidly falling, as after a shower of rain. It is placed at an angle, with the screen downwards, and as the water falls the fry are left stranded on the frame.

50 Doari (*Nadiya*)

This trap is oval in front and triangular behind, the oval measuring 3'×2' 1", and the base of the triangle, which rests on the ground, 1'×2", and the sides of the trap 3'. Its length is 2' 8".

A vertical partition or screen made of fine bamboo splints, with their inner extremities pointed, divides the wet space into two. The bamboo splints increase in length from above downwards, so that the lowermost ones reach back nearly to the triangular end of the trap. Another screen partition, but with the splints of equal length, is prolonged inwards from either side of the oval mouth, and the pointed ends of the splints of the two sides interlock, except below, where they are divergent, the middle screen hanging loosely between them. Within these there are two other lateral partitions also fixed to the sides of the trap, but they are firmly tied to each other in the middle line, but a small aperture is left between them below, and through it the long splints of the mesial screen project backwards at an acute angle to them. The fish pass through these low openings into the back part of the trap, but cannot return by reason of the long splints that lie in the back opening.

A variety of small fish are caught in it.

51 Ghonee

A nearly tubular trap, measuring 1' 10"×8" in diameter at the mouth. (24-Parganas.)

QUADRANGULAR TRAPS

(Entrances protected internally by sharp bamboo points.)

52 Aineh

A trap made of split bamboos tied together with the fibre of the peduncle of the leaf of *Borassus flabelliformis*, but 0"·40 apart from each other. It measures 2'×1' 1"×11". The opening is in the end of the trap and measures 3" in breadth, its height corresponding to that of the trap 1' 1". Internal to the opening on each of its sides is a screen of long pointed

bamboos placed longitudinally. At 9"·50 from the opening the trap is divided by a partition with a similar door. The opening to remove the fish is at the upper right hand corner at the far end of the trap.

It is set in a stream frequented by small fish.

53 Dhoochna

A trap on the same principles as the *aineh*, but with the bamboo slips finer and the interspace very narrow. It measures 1' 7"×10"·50×9".

Only very small fish are caught in this trap.

54 Khora

Differs from the *aineh* in having an opening at either end and not being divided in the middle. It measures 1' 1"×10"·50×5"·50. This form of trap is used after rain, when the channels dividing paddy and other fields are filled with water in which there is no current. The trap is simply placed vertically in the channel, and small fish enter it at either door.

55 Baney

A trap measuring 16"×15"×9" with an opening at either end of the same character as the aperture of the *ghana* of Motihari, which this trap resembles.

All kinds of fish are caught in it. (Francis Day, p. 53.)

56 Hoochna

A trap resembling the *arsi* of Champaran measuring 1' 3"×7"×6"·50, an aperture on each side in the height of the trap 1' 3". (Francis Day, p. 54.)

57 Ghonee

Resembling *hoochna* and *arsi*, but with a very narrow aperture on each side. It measures 11"·50 high, 9" broad, and 6"·50 in depth.

58 Bilte

22"×15"×8". Manufactured by Bagdis and Chandals of the *Nadiya* district.

59 Rabani

22"×15"·25×5"·50 (Jessore).

60 Ghuni

31"×20"×6" (Jessore).

TRAPS OF OTHER FORMS

61 Dhair

A V-shaped trap, the sides measuring 2' 4", and the arms below separately 1' 1" in length, the aperture to the trap being 2" broad and 1" high. It has the usual loose screen of pointed bamboos internally.

FISHING NETS

62 Bar

A fishing screen made of split bamboos tied together, but with spaces between measuring 3' 6" x 2' 7". It is used along with such traps as *bilte*, *doari*, etc. A few of them are stretched across a narrow stream to prevent the fish passing, and, between two, a *bilte* or *doari* is placed with their mouths against the current.

BASKETS

63 Khalul

A truncatedly oval basket 12" high, with a diameter of 8"-50 at the mouth. It is used by fishermen in hand net fishing, and is either tied round the waist and fixed at the back, or slung over the arm. The fish are placed in it as the nets are emptied.

64 Khalul

A small basket measuring 6" deep and with a diameter at the middle of 8"-50, but tapering upwards to the mouth, which is 4" broad. The narrow mouth is to prevent the small fish, such as *singi* and *koi*, jumping out.

65 Panjah

A round basket made of bamboo, measuring 11" high x 1' 9" in diameter.

66 Pete

A small basket resembling a *panjah*, measuring 6" high by 1' in diameter. It has no cover, and in Nadiya it is called *pete*.

67 Chhip

An ordinary fishing rod without a reel.

FISHING BOATS

68 Othar or Bachari

69 Saranga

70 Kosh

71 Chhandi

It is a great, wide, shallow boat, often up to 60 ft. in length and 10 ft. in breadth, used in the larger rivers for the casting of the *Chhandi* net for catching *Hilsa*. (See Hornell.)

72 Dingi or Pansi

73 Chhip

74 Konda, Donga or Gach Nao

75 Sampan

76 Balam

77 Bhela, Bhera or Bhowra

FISHING NETS IN DINAJPUR

XX(a)

Fishing Nets in District Dinajpur

[From The History, Antiquity, Topography and Statistics of Eastern India, 1838]

The illustrations mentioned in this extract have not been reproduced

By

DR. FRANCIS BUCHANAN-HAMILTON (1808)

Fish, forming by far the greater part of the animal food that is consumed in the country, the fisheries deserve particular notice. The demand being very considerable, and the supply being rather scanty, there is none exported, and salt is too expensive to admit of its being used in curing fish. The whole fish caught are therefore consumed in the country, and none are imported. During four months of the year, when the rivers are much swollen, fish is very scarce, for the animals have then such an extensive range, that they are not easily caught; but as the inundations subside, and when the fish are confined within narrow bounds, they are easily secured by various simple means, which the natives employ; and a very large portion of those taken are secured, when they may be said to be almost left sticking in the mud; or by means that in most countries would be quite ineffectual.

The most simple method, when a pond, ditch, or marsh has become nearly dry, and the fish of a large space have been collected into a small pool, is to divide it by dams of mud, and then, having thrown the water from each successively, to catch the fish as they are left dry. This is usually practised by all the poor labourers, especially in the ditches and pools near the rice fields, which are not let to fishermen by the landholders.

It must be observed, that in about six weeks after the rainy season commences, every rice-field, although quite dry and hard in spring, abounds with small fishes. They are certainly most numerous near rivers and marshes, from which they in general come; but I am inclined to think, as I observed in Mysore, that the eggs often continue dry in the field, and are hatched after they have been moistened by the rain. The natives account for their appearance in such places by supposing, that they fall from heaven with the rain. The clerk (Muhurer) of the division of Rajarampore assured me, that he had often seen them leaping among the grass, as the shower fell. In fact a person, who is well disposed, can see anything; like a very good Danish naturalist, who imagined, that he saw a fish gravely walking up a tree; for he had been assured by the natives, that such was its common practice.

Where the water is deeper, and communicates with a large extent of low land, this method is improved by enclosing a square

piece of shallow water, perhaps 15 feet in diameter, with a mound of earth, and leaving an opening of about 3 feet wide in the side next the deepest water. The space within the dam is then filled with branches of trees, which attract the fish. After the branches have remained for some days, the opening is shut with a dam, the branches and water are thrown out, and the fish are secured. This also is chiefly practised by those who are not regular fishermen; but when this plan is farther improved, it becomes one of the most effectual means of procuring fish, that are employed in this district.

In the old courses of rivers called Bil, or in the courses of such as have little current, a large quantity of branches and twigs of trees are tied together, and thrown into the water, so as to occupy a space of 20 or 30 feet square, from the bottom to the surface. After they have remained for from 10 to 30 days, and the fish have entered into all parts, the branches are surrounded by a kind of screen called Byana, which is made of reeds (Ikiri) tied parallel to each other by means of twisted grass (Kese), and placed so close, that the smallest fish cannot escape. The screens are about 4 feet wide, and of length sufficient to surround the whole heap of bushes. When this has been done, the bushes are thrown out, and the fish are secured by small bag-nets (Chakoni), the mouths of which are fastened to hoops.

The Byana or screen is sometimes used without having previously thrown in branches of trees. This is done in shallow water, where there are many weeds. A space is surrounded by the Byana, and all the fishermen go in with bag-nets, and secure the fish. This kind of fishing requires about seven men, who usually have two heaps of branches in the water, for nine months in the year, or from about the middle of October until the middle of July, when the country becomes too much inundated. They draw one of these Byanas once a week, and in the intervals of this labour surround small spaces, as above-mentioned, where no branches have been placed. These same fishermen employ a kind of traps called Onta, which are made in form of a truncated cone, 4 feet high, and from 18 to 24 inches wide at the bottom. These traps are made of reeds in the same manner with the

FISHING NETS IN DINAJPUR

screen, and the two edges are not fastened together, but are bent in towards the cavity, so as gradually to approach each other. The fish can readily force its way into the cavity, but his efforts to come out are vain. The fish are directed to the opening by a screen placed on each of its sides, and according to the situation of the fishery, these are disposed in two manners.

The one is used during the dry season in shallow water courses that are stagnant, or contain but little stream; and in such situations the screen extends the whole way across, and has traps at the distance of every 20 or 30 feet. In the one at Akhanogor, from which the drawing (Plate 6, No. 1) was made, and which was about 300 feet wide, a net was suspended over the screen, in order to prevent the fish from leaping over, for some of the carp kind leap with an agility equal almost to that of the salmon. This apparatus, called a band, procures a great many small fish, and is usually rented for a certain sum.

The other situation chosen for this manner of fishing is much more common, as during the rainy season it is the only way in which these fishermen can procure employment. The screen is placed on the shelving side of a river with one end to the shore, and the other as far into the water as possible; but it cannot be placed where there is a greater depth of water than four feet. Such a screen admits of one or two traps, according as the water deepens more or less suddenly; and one man manages two screens. The fish caught in this manner are much smaller than by the other method; but the quantity makes up for this defect. These fishings with the Byana and Onta are very productive, especially in the southern and western parts of the district, and require no boats.

Still more simple traps are used. One called the Polo and Tarpa (Plate 6, No. 2) is a basket with a hole in the bottom. In shallow water the fisher puts the mouth on the mud, and then, passing his arm through the hole in the bottom, gropes for the fish, which he may have secured. Another called Jakoyi, is a basket of an irregular three-sided form, open at one end, and has a bamboo shaft (Plate 6, No. 3). The fisher places the bottom flat on the mud, treads among the weeds before the opening, thus drives the fish into the trap, and then suddenly raising the handle brings the opening above the surface. These two methods can only be practised in very muddy places covered with aquatic plants and are commonly employed by labourers of the lowest rank to catch fish for their own use.

The most simple net in this country is the Besal (Plate 6, No. 4) which is stretched between two bamboos, that meet behind at

an acute angle (about 75°), by which the fisherman holds. The net is of a triangular form so as to apply to the bamboos, but is much bagged behind. The fisherman, walking up to the middle in the water, pushes the points of the bamboos along the bottom for a little way, and then raises them up to secure whatever fish may have come into his net. The bamboos are from 12 to 15 feet in length.

The same form of net is enlarged so as to have bamboos 19 cubits long, and is then used in a boat. A rower at each end manages the canoe, which is kept broadside on to the stream, and allowed to descend with it, and a third man lowers the points of the bamboos, which are fixed at right angles to the gunwale, and then occasionally raises them to secure the fish. This is one of the most common nets used by fishermen. Its mesh is small. The boat is 16 or 17 cubits long by 2½ wide, sharp at each end, and broadest abaft the middle. At the widest part of the boat two forked sticks project between 3 and 4 feet, outwards and upwards from the gunwale, and a stick lashed between the forks serves as a lever, over which the bamboos of the net are raised and lowered. On the gunwale opposite to the net is a small out-rigger, which serves as a balance. This kind of fishing may be carried on at all times, but the rainy season is the most favourable. Most of the fish caught in this manner are of the crustaceous kind. On the Mohanonda a boat built of *sal* will cost Rs. 20, and will last 15 years; but it requires considerable repairs. The net is usually made of *son*, but sometimes of cotton, and were it sold, is worth Rs. 10; but the fishermen usually make it themselves, and it costs only the materials.

The same kind of net is still more enlarged, and is raised by a complicated machinery of bamboos, see Plate 7, No. 1. It is called a Chauri or Khora, and is fixed on the steep side of some river. A frame of four strong bamboos (a, b, c, d, e, f, g, h) supports the net (i, k, l, m,) placed with its descending edge (l, m) towards the mouth of the river; and also supports two sloping bamboos (n, o, p, q,) on which a man walks, who has one end of a long rope (r s) round his middle. The other end passes over a bamboo, for they have no pulley, and raises the net, when the man walks down, and lowers it into the water, when he walks up the sloping bamboos. The moving power is increased by a lever of bamboo (t u) the heel of which (t) rests on the bank, while the rope from the man's waist is fastened to the other end, and that again is connected with the bamboos of the net. This is the most complicated machine that I have seen the natives employ, and seems to me very

FISHING NETS IN DINAJPUR

ill contrived. I regret that my draftsman's want of skill in perspective will render the drawing scarcely intelligible. The net is quadrangular. Two corners (beyond l m) are stretched to the bamboos; one of the other two corners (i) is fixed to the bamboo lever; while the other (k) is fixed to the end of a bamboo, that projects over the river, which is fastened to where the lever and the two lateral bamboos (r, m, r, l) join, and which is suspended by a rope (w x) from the frame, so that this corner should always be high. Ropes (y z) also pass from the bank to the lateral bamboos, which prevents them from yielding to the stream; while a small bamboo (1, 2) from one of the lateral ones stretches out the lower edge of the net. Two men are employed at this net; one below, who is generally the proprietor, and who takes out the fish; the other walks backward and forward on the inclined bamboos; and is usually hired, getting six-sixteenths of the fish. These are generally small, and most are caught from about the middle of September until the middle of November, when the rivers are falling.

Another kind of net, somewhat of a similar nature would appear to be better fitted for such a large machine. It is called Chak or Jhati, and is of a square form, a good deal bagged in the centre; see Plate 7, No 2. Its angles are fastened to the ends of two bamboo bows that cross each other at right angles in the centre, which is suspended from the end of a bamboo lever, the other end of which rests against the bank, where the fisher sits. He lowers and raises his net by means of a rope, that is fastened to the far end of the lever. A large net of this kind, raised and lowered by a man on an inclined plain with the assistance of a pulley, might be a good contrivance in muddy water. The Chak is used chiefly by poor farmers and labourers.

The casting net is very much used. One from 9 to 11 cubits in diameter, and called Bhomori, and Khyepla and Khyeyuyal is commonly thrown from the shoulder, either from the shore or from a boat. The mesh is small, and the sinkers are often merely earthen rings baked by the potters, but iron rings are also used for the purpose. If made of cotton, the net will last seven years; if made of son, it will last only four, and will cost from 8 to 10 rupees. If the net is thrown from a boat, two men are required to this fishery; one to throw the net, and another to manage the boat. This latter and the boat are usually hired by the man who fishes with the net, and who allows the boatman six-sixteenths of the fish that are caught. The boat is only 13 or 14 cubits long and 2½ broad, and costs on the Mohanonda about 14 rupees. Small fish, especi-

ally of the crustaceous kind, and chiefly caught in this manner, which is only used in the dry season.

A much larger kind, 38 cubits in diameter, and called Othar, is frequently employed, and is thrown by means of a long narrow boat, which must be rather longer than the diameter of the net. This is gathered carefully into the boat, one edge being taken in first, and then one fold is placed above another. The boat is rowed into the stream, and by a rower at each end is placed broadside on. Two other men then throw over first one edge of the net, and, as the boat drives, they throw gradually the remainder. The whole sinks to the bottom, and the boat is allowed to drive, until the edges of the net have been dragged close to each other, when the net is drawn to the shore. Very large fish are caught in this manner. The natives use the sein, of several sizes, and different names.

The Pahiljal of Ghoraghat is a sein composed of several pieces, about 11 cubits wide by 12 cubits long, which belong to different fishermen, six or seven of whom unite their stocks, and join their different pieces into one net. The centre pieces are the widest, the mesh is small, the floats are gourds, and the weights are rings of potters' ware. It is thrown out in the usual manner from the stern of a boat, and requires six or eight men to draw it. The fish are divided equally, the owner of the boat taking half share more than the others.

At Potnitola on the Atreyi the larger sein is called Bed, and is made in one piece 60 fathoms long, and 10 or 11 cubits wide in the centre. It is floated by the spongy stems of the sola (*Aschynomene diffusa* W.), and sunk partly by iron rings, and partly by those made of baked clay. The twine made of son would cost 10 rupees; but the plant is usually reared by the men, and spun by the women in intervals of labour, so that no estimate can be formed of its value. The boat is made of Mangowood, costs about three rupees, but lasts only two years. Six men are required; the proprietor of the net and boat takes six-sixteenths of the fish, the remainder is divided equally among the other five men; so that a capital of less than 16 rupees is reckoned adequate to the labour of two men for the rainy season, at which time only this net is used in the river. At all seasons it is used in tanks. The largest fish are caught by it, such as Rohit, Katol, Chitol.

The Tana is a smaller sein of fine twine, about 90 cubits long and three cubits wide. It is floated by cutting of a spongy reed called ulu Khagra, and sunk by rings of potters' ware. One man goes with the boat, and another holds the end that is left on shore. I should have supposed that the man

FISHING CONTRACTIONS IN RANGPUR

in the boat had most trouble, but his situation is considered as preferable. This net seems well fitted for clear water, a shallow river, and sandy bottom. Two or three nets of this kind are sometimes joined into one. The Tune is a small drag net, that is well fitted for fishing in shallow water among weeds. It is about 20 cubits long and five and a half cubits wide, and has neither floats or sinkers. A row of sticks, about two feet long and two feet from each other, unite the two side-ropes, so that the net bags behind. A man at each end goes into the

water, until both are about three feet deep; they then immerse the net, and drag it towards the shore with one end of the sticks touching the ground.

In the Mohanonda, which is frequented in the rainy season by the fish called Ilish, four other kinds of nets are used. They are called Khurki, Sanggula, Konayu and Ber; but as I was there at another season I had no opportunity of seeing them, and cannot describe them from the accounts of the native.

XX(b)

Fishing Contraptions in Rangpur

[Extract from page 584 of History of Antiquities, Topography and Statistics of Eastern India]

By

DR. FRANCIS BUCHANAN-HAMILTON

Notwithstanding the great number of large rivers and lakes or marshes in this district, the people are but indifferently supplied with fish. This seems to be owing to the small skill of the fishermen, who have few means adequate to fishing in great rivers, and chiefly catch those that are almost left dry by the diminution of the water, in which they live during the floods. This, being the situation of the art in both districts the people of Ronggopoor are comparatively less successful than the people of Dinajpoor, because the waters being much deeper do not so readily become dry; and for four months in the year the inundation is so general that the methods employed by the fishermen are of little use. At that season, however, the fields being in general more deeply covered than in Dinajpoor, swarm with small fish, which the farmers can secure; and I have mentioned the manner in which they preserve them for use. I observed that these fish abound in the fields so early as the end of June, which confirms the opinion that I entertained, of their often proceeding from eggs which are left dry and have been hatched by the first rain.

Salt is by far too expensive to be employed in preserving fish; but besides the method of preserving these animals by beating them with vegetable substances, which is practised in the rainy season, a great quantity is preserved by merely drying them in the sun, which is practised in the dry season alone, and chiefly in the two eastern divisions, as the principal demand is from Bhotan and the Garos. All along the great Tista, however, some fish is dried in spring for the supply of the rainy season. The Vijn, Raja, who holds lands of Bhotan as well as of the Company, pays his tribute to the former power in dried fish, which he chiefly procures from his estates that are subject to

the Company; but this supply is not sufficient for the demand of the Bhotan market, and the Dev' Raja, who seems to have a monopoly of all foreign commerce, sends agents, especially into the northern half of the division of Dhubri, and makes large purchases. The fish dried on the left of the Brohmoputro are sent chiefly to the markets where the Garos deal, and next to salt is perhaps the most important article that is sold to these people. A small quantity of fish is also dried on the banks of the Brohmoputro on the lower part of its course. Some of this is distributed through the western parts of the district; but the greater part goes to the Garos, which border on the district of Moymonsing. Fish prepared in this manner is called Sukt, which signifies merely dry, as if this kind of fish were the only dry thing of any importance. To European taste and smell it is altogether insupportable, but the two nations that chiefly purchase are far from being select in their eating, and all the people of the two eastern divisions like this fetid aliment.

Most of fish that is cured in this manner, as I have before said, is caught in lakes, marshes, and old channels of rivers, but is sent to the sands of the Brohmoputro to be dried. The heads and guts of the fish are thrown away, but the fins and scales are allowed to remain. The fish, if small, is split in two; if large, it is divided into four slices. These are spread out to a sun that is intensely hot, on the extensive sands of the river, where there are no insects, and where in the day every thing is parched and withered by a dry heat. At night the fish are secured in a shed from the dews, which are abundant at all seasons. At the beautiful lakes called Toborong, north from Yoghopa, where this fishery is most extensive, and where from 1,200 to 1,400 mans may be

FISHING CONTRAPTIONS IN RANGPUR

annually dried, the fish are divided into four sorts.

The farmers here use all the simple means of catching fish that I observed in Dinajpoor, and also one which I did not notice; but which, notwithstanding, is probably employed. In any ditch where there is a considerable drain from rice fields or in any small rivulet where there is a drain from a marsh; they construct a dam, or fence, of bamboos, sticks, and reeds, or sometimes of earth, which not only prevents the passage of the fish, but also impedes in some degree that of the water until it rises to the level of the adjacent fields.

In order to give vent to this they dig three or four narrow semi-circular trenches, which convey the water from the higher to the lower part of the channel. Through these narrow channels the fish must pass in going from the higher part to the lower, as the floods subside; and are caught in traps called Thoraka placed at the lower ends of the semi-circular canals.

The Thoraka called also Dhoska and Dhorka, is a conical basket, lengthened far out, so that the fish in getting to its far end cannot turn to escape. In place of the Thoraka a smaller kind of cylindrical basket called Dengru is often used, and the fish are prevented from coming out by a row of flexible split bamboos converging to a point within the mouth, as in a mouse trap.

In rivulets that have a considerable and rapid current, Thorakas 14 or 15 feet in length are often used. A dam is made across the stream with a breach in it just sufficient to receive the mouth of the Thoraka, and the fish follow the stream, until they are no longer able to turn, nor can they swim backwards against the current.

The impure class of Rajbongsis called Dauyi, catch fish by a somewhat similar contrivance in shallow ditches connected with marshes or rice-fields. In these they lay a long trap called Dhanggi made of split bamboos. The mouth may be six or eight feet in length, and one and a half to two feet wide. It slopes to an edge behind, being about two and a half or three feet broad. The fish that enter are prevented from returning by a row of bamboo splits placed as in a mouse trap, and they are shaken out by a hole at one corner, which is plugged when the trap is set. Where there is any stream the fish enter of their own accord; but they are often collected from a whole marsh and driven to the trap, by dragging through the water a rope of twisted ribs of the plantain tree leaves, the sides of which hang down like a fringe, and alarm the fish as the rope approaches.

The most improved method on a plan analogous to these is practised by the fisher-

men in the smaller rivers of the eastern part of the district. A dam is constructed, obliquely across the river, of bamboos, sticks, and mats, not so as to contain all the water, but so as to raise it about a foot higher than the level below the dam. Near the lower end of the dam is left an opening about two feet wide and below this is a channel about 20 feet long. The sides are secured by posts and mats; and the floor, which consists of bamboos laid close to each other, is raised a little higher than the level of the river below; and a little lower than its level above the dam. All fish attempting to go down the river follow the current through the opening in the dam; but the channel is so full of crevices, that the fish immediately after entering it are left dry, and by their own exertions are always carried to the lower end where they are caught by the fishermen, who watch in a hut. This kind of weir, it must be observed, is not fitted for a variable climate; a sudden shower that raised the water a foot would destroy it.

The manner of catching fish by collecting them among the branches of trees, thrown into stagnant water, is still more practised here than in Dinajpoor, both by farmers and professed fishermen; and by far the greater part of the fish taken in Chilmari, and other parts near the Brohmoputro is caught in this manner. The fishing, in old channels that contain much water, continues from the middle of October until the middle of March. Large quantities of branches are thrown in until they reach the surface, and are held down by weights. After they have remained from five to seven days, stakes of bamboo are driven all round, and to these is fastened a net deep enough to go from the surface to the bottom, and long enough to surround the branches. The branches are then thrown out and the fish are drawn on shore. At one water course I found 11 men at work in this manner. They seemed to draw one heap almost every day, and did no other work, the fish being bought from them on the spot by those who retail in the market.

In this district I nowhere saw the kind of trap called Onta, which I have described in my account of Dinajpoor; but I understood that in some parts it is used to form the kind of weir called Band, which it would be superfluous to describe again. I also understood that these traps are used by farmers planted near the edges of rivers. In this district this implement is called Ghoni.

The Polo and Jakoyi, also formerly described, are in constant use among the farmers. The fishermen of Goyalpara have improved the Polo, so much as to render it useful for their purpose; and it is then called Chak. The frame consists of a loop, to which four bamboos are fixed in form of

FISHING CONTRAPTIONS IN RANGPUR

a cone. A conical net is fastened to the hoop, and its corner to the angle where the bamboos unite. When this net has been placed on the mud over a fish, the fisher drops the corner; and instead of groping about until he can catch the fish, he secures it at once by the net, which prevents the animal from moving. By this means they catch large fish.

Nearly allied to the Jakoyi, but somewhat more perfect, is a trap made of split bamboos, and called Jholongga. Two boys generally drag the corners by two ropes, and the splashing which they make towards each side, contributes to drive the fish into the trap, which is held like a plough by the fisherman, and raised occasionally to take out the fish. This is one of the methods much in use among the farmers.

Nearly of the same form is the most simple net used by the fishermen, consisting of a net stretched between two bamboos, which meet at an acute angle behind. This I have already described in my account of Dinajpoor, and there are many kinds. At Goyalpara there are four.

1. When a man wades and pushes this net before him, it is called Phutki, and the bamboos are from four to seven cubits in length. Such are used in all places, and at all seasons, for catching small fish, and cost from two annas to two and a half.
2. The Paha has bamboos of 11 or 12 cubits in length with a large mesh, and is used for catching large fish. The fishermen of Goyalpara have not the art of fixing this net to the gunwale of a boat, as I described in Dinajpoor; but the man who sits at the head of the canoe, lowers and raises it entirely by his hands. The rower sits at the stern. The fish are divided equally between them.
3. The Angtha is of the same size, and is used in the same manner; but the mesh is small. Both nets can be used at all seasons, and in every part of the great river. Each may cost a rupee.
4. The Janta is an implement with a frame of bamboos, which raises a large net of this kind. One man can fish with it, and the whole costs from five to five and a half rupees. The net lasts two years, but the apparatus must be renewed each season, which lasts from the middle of August to the middle of December, that is from the time when the inundation begins to subside until the country is dry. The mouth of the net is placed so as to receive the water, which drains from the fields into a marsh, creek, or river.

The still more complicated machine, which I described in my account of Dinajpoor, is also used here. At Goyalpara it is called Khora, and on the Mahanonda it is named Chak. The Chak described in my account of Dinajpoor is used here, both by the

farmers and fishermen, and at Goyalpara is called Phoronggi; while the improved Polo used there, as I have above described, is called Chak. The Phoronggi is employed from the middle of August until the middle of November.

Of the casting nets there are three descriptions. First.—A small net six or seven feet radius with a small mesh and iron sinkers. In the Brohmoputro and in large places of water it is always used from a canoe, one man paddling and the other throwing the net. The two men divide the fish equally. In marshes and old water-courses it is thrown from the bank. It usually costs 5 rupees of which the iron amounts to one-half. The fish taken by this means are small; and the net may be used at all seasons. At Goyalpara it is called Khyeyuyal. Second.—A net with a wide mesh and 15 or 16 feet in radius. It is used only in the river from a boat, which is managed in the same manner as with the first kind. Its sinkers are not heavier, and its cost is nearly the same. At Goyalpara, this net is called Rek. Both kinds at Toborong are called Naojal, or nets used with a boat. Third.—The large net which is cast by means of a boat, and which I have described in Dinajpoor by the name of Othar, is used also here, but not so commonly as in that district.

Seins or drag nets of various kinds are also in use. At Goyalpara the fishermen use a sein, usually composed of nine pieces, each 30 feet long and about 4 feet wide. The floats are made of the reed called Khagra, and the sinkers of baked clay. These pieces are separately called Tonalanggi; but when joined into one sein that is called Ber. Three men are usually employed, and each brings three portions. They unite in paying the hire of the canoe, which carries them from one part to another, and contains the fish that have been caught. One man manages the canoe, a second holds one end of the net, while the third takes a sweep with the other end, and then the net is drawn on shore. Of course the net is only employed on the shallow sides of the river, or in shallow marshes or lakes, and is used between the middle of September and middle of December while the waters are fast decreasing.

In some parts as Olipoor, a still smaller sein is used, and is called Gondhla. It is about 30 cubits long and 4 broad, and is used by one man. He fastens one end to a stake, and takes the sweep with the other. It is never used where there is a greater depth of water than two or three feet. The Raulagi is a net which is much used, especially in Toborong lakes, in the smaller rivers of the eastern divisions such as the Jijiram, and in many large water courses. The net

FISHING CONTRACTIONS IN RANGPUR

is like a large deep sein from 45 to 80 yards long and four or five deep, with floats and sinkers, and a wide mesh. It is used sometimes merely as a setting net, being stretched from side to side of a river or water-course. The fishers then go to a distance on both sides, and while they paddle towards the net in their canoes, make all the noise that they can by splashing in the water. The fish stick in the meshes.

At other times, where the water is too wide for the net to reach from bank to bank, two nets are used with five canoes. One at each end of each net, and one that remains unconnected between the two. One-half of each net is stowed on the stern of the canoe by which it is held, and the two sets go about 40 or 50 yards from each other. They then throw out their nets, the canoes belonging to each rowing straight from each other, so as to leave the nets in two parallel straight lines, with the fifth canoe in the centre. The canoes then begin to paddle, so as to form their nets into semi-circles, while not only the one in the centre, but those that hold the nets make all the splashing in their power. The two boats belonging to each net then row towards each other, splashing all the while until they meet. They then lash themselves together, and draw the nets into their sterns, bringing up the head and foot ropes of the net joined together. After the whole is drawn the nets are overhauled, and the fish which are sticking in the meshes are taken out. In rivers it is the upper net that takes by far the greatest quantity of fish, and the middle canoe attends to that alone, and splashes opposite to the opening as the two canoes at its ends paddle towards each other. It would therefore appear, that the fish naturally fly up the stream. This seems to be a good plan of fishing in rivers or lakes, where the banks are too steep for drawing the sein. The fish, that I saw taken in this manner, were of about four pounds weight.

In the Brohmoputro, during the beginning of the rainy season, from the middle of April until the middle of August, a floating net called Ohal is used. It consists of three pieces each 36 yards long and $3\frac{1}{2}$ broad, which are joined so as to be 108 yards long. The mesh is wide. It is paid out from the stern of a canoe, and one side is floated by gourds, while the other sinks by its own weight. It is drawn every hour into the boat,

and the fish that are found sticking in the meshes are secured. Two men and one canoe can manage this net, which may cost 9 rs. The nets used in this district are chiefly made of *son* (*Crotolaria juncea*); but in the eastern divisions many are made of *Kankhura* (*Urtica nivea*). These are dear, but are reckoned much better than those made of *son*, and last double the time. Some particular classes of fishermen use neither traps nor nets.

The Gangrar, already mentioned as killers of crocodiles, turtle and otters, catch also many fish with the harpoon. With the same kind of harpoon which is used for killing the otter, these men strike the large fishes. In the rainy season they attract these fish to their boats by means of torches. In the dry season they watch near shallow places, where there are many fry; and when a large fish comes to prey, he is struck. The three first kinds are supposed to eat floating or swimming plants (*Dol* and *Pana*), and are frequently observed raising their heads among these. The fishermen watch for this, and strike them as they rise. It is probable, that these fish often rise to catch insects or worms, that may be among the weeds. I have never, in India, seen a fish rising to catch flies. The same fishermen use a small harpoon with four slender prongs, which floats, and is darted along the surface of the water to kill a small mullett, which swims with its eyes above the water. This is done at all seasons.

All classes of natives fish occasionally with the rod, partly for amusement, and partly for a savoury meal; but there is a low tribe of fishermen, who use the rod for procuring a subsistence, and sell the fish. It is uncertain whether they are Hindus or Moslems, and their profession of fishing does not entirely afford them support. They therefore play on some noisy instruments of music, to which they sing, and go about to beg; and they only have occasional recourse to the rod. The rod used in India for fishing is a bamboo, which has very little flexibility. The line is silk or *Kankhura*, and is tied to the extremity of the rod without any reel to lengthen or shorten it; and the hook is suspended by a float, and baited with a worm for the cyprini, and with a frog for the larger *Siluri* or *Pimelodes*, which are the two most common classes of fish. The use of artificial flies is totally unknown.

The Conch-Shell Industry

*At the present day the general use of bangles made from sections sawn from the shell of the sacred Indian chank or conch is confined to the people of Bengal and of certain of the adjacent provinces. In India proper the custom does not appear to range farther west than Behar, nor farther south than Orissa. It is the women of the Bengali race who provide a steady market for richly carved and highly polished chank bangles; their humble sisters among the Santals, Kochs, Tibetans and Maghs are satisfied with plain or rudely carved bangles without polish—they prefer strength and quantity to ornamental designs and fine finish.

Six distinct chank fisheries are carried on at the present day in India; ranked in their order of importance they are:

- (a) Tinnevely (or Tutitorin).
- (b) Ramnad (with Sivaganga).
- (c) The Carnatic coast (south Arcot and Tanjore).
- (d) Travancore.
- (e) Kathiawar (Chula or Gutki or Bombay and Kathiawari) to which is to be added.
- (f) A large one in the north of Ceylon (Salamat Haji variety).

The industry of bangle cutting is located at the present day almost entirely in Bengal (see "The sacred chank of India by James Hornell, pp. 91-101, cf. Garcia da Orta's statement—Ibid., p. 67—Ibid., p. 156. proverb No. 4416 "If you take 1,000 chanks to Bengal your venture may turn to gold or just as likely to dirt". The reference to taking chanks to Bengal would seem to refer to the ancient character of the traffic in chank shells between the Tamil country and Bengal). Dacca is the chief centre of the manufacturing trade, Calcutta the emporium where the raw material is gathered from the different chank fisheries in the south of India and in Ceylon and whence the shells are distributed to Dacca and numerous local centres scattered throughout the length and breadth of Bengal. (The sacred chank of India by James Hornell, p. 41.) For the antiquity of the industry, see Hornell, pp. 42-67.

The first mention of the use of discs cut from chank-shells to ornament caps and head-dresses occurs in Tavernier's Indian Travels. In 1666 he was in Dacca and records the fact that Bhutan merchants took home quantities of "round and square pieces (of shell) of the size of our 15 sol coins."

At the present day, chank cutting, save for some insignificant work done in Kilakarai on the Ramnad coast near Pamban,

has long been a forgotten art in the south of India, in Kathiawar and in Gujarat. It flourishes solely in Bengal and Assam, with its headquarters at Dacca. No fishery for chank shells exists off the Bengal coast; the industry depends entirely for an adequate supply of the raw material upon imports obtained by way of the wholesale market at Calcutta.

Tavernier in his travels through India in the seventeenth century noted the existence of an extensive trade in cutting bracelets and charms from "sea-shells as large as an egg". According to G. V. Ball's translation of this work (London, 1899), Dacca and Patna were then the centres of this industry, Tavernier stating that it gave employment to more than 2,000 persons in these towns. Dacca to-day remains the chief working centre but the mention of Patna was a mystery to me (Hornell states) till I found that another busy and long-established working centre exists near the district town of Pabna. No industry of this nature exists at Patna and I have no hesitation in concluding that the Patna of Tavernier's "Travels" is an editor's misrendering of the name of the less well-known town of Pabna.

Finally, according to Risley (II, p. 223) the shell-workers of Dacca are accustomed to extract the dried remnant of the visceral coil (called pitta) from the shells they receive and to sell this to native physicians as a medicine for spleen enlargement. He also states that the dust produced in sawing the shells is employed to prevent the pitting of small-pox and as an ingredient of a valuable white paint, Ibid., p. 171. cf. *Calikata namer utpatti* by Suniti Chatterji. 'Sahitya Parishad Patrika', 1345 B.S.

At the present day all the shells of the common chank or conch used in the bracelet-making industry are imported into Calcutta in the first instance. A few go occasionally to Chittagong, where bracelet-cutting is carried on by Muhammadan workmen for supply to the neighbouring hill tribes. With this exception Calcutta is the sole emporium for chank shells.

The importers and wholesale merchants in Calcutta are chiefly men closely identified with the Dacca shell-cutters; and are either Dacca born or belong to Dacca families who have settled in Calcutta for trade reasons.

Under ordinary conditions the chief Calcutta importers have a business agreement among themselves, a form of co-partnership or syndicate by which the purchases are pooled and divided on a definite

CONCH-SHELL INDUSTRY

agreed basis. Under the Dutch the chank fishery had considerable value; it was leased out regularly to renters, the shells being forwarded by sea to Bengal as in the days of the Portuguese. By this means they are usually able to maintain a monopoly of the trade and to a large extent to dictate their own terms both to the owners of the various chank fisheries and to the trade buyers in the Bengal manufacturing towns.

All the Bengal chank-cutters originally were Hindus and their descendants claim that they belonged exclusively to a professional subdivision of the Vaisya caste; at the present time the Dacca workers all claim to be Vaisyas and are known throughout the State either as Sankhari Vaisyas or simply as Sankharis, or, as the word is corrupted in Eastern Bengal, Shakharis. According to Risley (II. p. 221) they say that, up to the time of Adisur they wore the Brahminical thread, but were degraded by him at the same time as the Subarnabaniks, because the latter had cut to pieces a golden cow which the king had given to certain Brahmans at the celebration of a special sacrifice. The better class of men and especially those in the Pabna and Dinajpur districts are now beginning to re-assume the thread, as may be seen in plates IX and X of Hornell's book. Sankharis have the Brahminical gotras and observed the same table of prohibited degrees as the higher castes. In Dacca they are divided into two sub-castes—Bara Bhagiya or Bikrampur Sankhari and Chota Bhagiya or Sonargaon Sankhari. The latter are a comparatively small group, who work at carving and polishing bangles, which they purchase ready cut—a departure from traditional usage which may account for their separation from the main body of the caste. In other districts, owing possibly to the smallness of the caste, no similar divisions seemed to have been formed.

Besides the Vaisya Sankharis who are occupational chank-cutters by caste, a large number of Muhammadans follow the same trade. In several centres they even outnumber the Hindu workers (in Dinajpur, for example). In point of social standing the Sankharis rank with the Navasakha and Brahmins will take water and certain kinds of sweetmeats from their hands.

Nearly all Sankharis belong to some Vaishnava sect or other.

Dacca became the manufacturing centre of the chank-bangle trade in modern times chiefly owing to its geographical situation at the present-day centre of bangle-wearing. To-day the wearing of chank-bangles is virtually confined to Lower Bengal and to the Hill tribes to the north and east of Eastern Bengal.

As a consequence of the centralizing influence which for reasons of economy tends to create factories at or near the port of import, Calcutta now ranks next to Dacca as a manufacturing centre; large numbers of bangles have been produced there of late years.

Nadia is a third centre where chank-shells are largely cut up both for conversion locally into bangles and for distribution to bangle-workers in other centres. Other bangle-factories are situated in the districts of Sylhet in Assam, Mymensingh, Chittagong, Pabna, Rungpur, Dinajpur, Murshidabad, Jessore, Khulna, Burdwan, Bankura and Balasore showing a widespread distribution throughout Bengal.

The Rajbangsi, Koch and Paliya castes of Hindus, inhabiting Rungpur, Dinajpur and Jalpaiguri districts and the Terai of Darjeeling, are the chief buyers of Haragash bangles, which consist largely of compound armlets of from ten to twelve rings in each set. The best centres of sale are Dhubri, Goyalpara, Jalpaiguri and Cooch Behar.

Dinajpur is another typical local centre. In the town itself the quarter where the chank-workers live is known as Shakhari Patti, and this, in view of the small number engaged in the industry, suggests its greater importance in former days.

Commercially important as the trade in chank-shells and bangles still is, it appears to have been considerably greater in former times.

In Hornell's time imports of chank-shells into Bengal were estimated to average 20 lakhs per annum divided as according to origin, thus:

Ceylon	1,650,000 shells
Tuticorin	250,000 "
Rameswaram	250,000 "
Other sources	50,000 "

The following are the nine commercial grades of chank-shells:

- 1 Above 4" in diameter
- 2 Between 3½" and 4" diameter
- 3 Between 3½" and 3¼" diameter
- 4 Between 3¼" and 3½" diameter
- 5 Between 3" and 3¼" diameter
- 6 Between 2¾" and 3" diameter
- 7 Between 2 ⅞" and 2¾" diameter
- 8 Between 2¾" and 2" diameter
- 9 Between 2¼" and 2⅝" diameter

• The Trade varieties of shells employed

1. Tutikkuddi.—Shells obtained from the Madras Government fishery off the coast of Tinnevely. These form the finest and the most valued quality from which the choicest bracelets are manufactured. They are marked by a well-balanced and elegant form, neither squat (as in the Negapatam or Tanjore type) nor greatly elongate (sub-fusiform) as in shells from the Andamans.

CONCH-SHELL INDUSTRY

The regular and gradual increase in the size of the whorls enables this form of shell to be cut to the greatest advantage, and gives a maximum number of sections. The shell is of a perfect opalescent whiteness and of great hardness and evenness of texture, which render it susceptible of a high polish.

2. **Ramessari.**—These are the shells fished off Kilakarai and the island of Rameswaram. The quality approaches that of Tuticorin very closely but is esteemed slightly inferior.

3. **Jammaipatti.**—An inferior quality of Ramnad shell fished off the mainland to the north of Mandapam—thence to Tondi.

4. **Patti.**—This is the generic name for "live" shells fished off the north and north-western coasts off Ceylon. There are several recognised grades of Patti.

A. **Noyakhad Patti.**—or standard patti is the best grade.

B. **Small Patti.**—same as grade A, but of inferior size and sometimes inferior colour.

C. **Thin Patti.**—Shells of inferior thickness obtained from certain Jaffna waters.

D. **Mixed Patti.**—Said by the dealers to consist of mixed shells of inferior quality and colour imported from Singapore via Jaffna.

5. **Gharbaki.**—A class of squat shells badly adapted for economical cutting coming from the Carnatic coast, from Point Calimere in the south to Madras in the north. To the defect of shape, they add that of colour, these shells being frequently distinguished by a marked redness of the inner surface.

6. **Dhola.**—Dead, sub-fossil chanks from the shallow muddy lagoons in the neighbourhood of Jaffna, Ceylon. These are found by probing with an iron rod in the soft mud. They are chalky and lustreless and are used for the cheapest and most inferior grades of bracelets. A considerable portion of the large sizes are found.

This quality is one principally employed in making the compound bracelets or gauntlets of 10 to 12 rings affected by low-caste Hindu women in Northern Bengal—Paliya caste very largely.

7. **Duani.**—These shells are fished off the Travancore coast. They are large and of excellent quality.

8. **Surti.**—The name is a corruption of Surat as these shells were exported from that port prior to the rise of Bombay. The shells are fished off the Kathiawar coast; they are often very large and of fine quality.

The sawn rings supplied from the wholesale cutting factories at Dacca and some few other centres to local bangle workshops widely scattered throughout lower Bengal are distinguished and sold under a different series of trade names.

The grades of shell section recognised by bangle-workers in outlying districts are usually five in number and are as follows:

A. **Titkutti.**—As is indicated by the name, these sections should be cut from Tuticorin shells of perfect quality. In actual practice the highest quality of Rameswaram and a quantity of the best selected Ceylon shells from Nedumtiva and Mannar are usually utilised for the production of Titkutti rings.

This particular quality is required almost exclusively for the manufacture of highly ornamented bangles of churi and bala descriptions as both these require to be highly polished and for this purpose the Tuticorin grade is the one best adapted on account of its great hardness, fine grain and perfectly white colour.

B. **Jadki.**—Also hails from the Tuticorin and Rameswaram fisheries but is slightly inferior to the Titkutti grade which forms a "selected" one.

C. **Patti.**—The third grade. They are cut from good quality Jaffna shells. The large compound bangles so freely used by Santal women are made generally from this quality.

D. **Dhola.**—Is cut from dead shells imported from Ceylon.

E. **Alabila.**—The fifth and most inferior grade, cut from the smaller sizes of Jaffna dead shells.

Byaparis or Dealers

The Byaparis or the dealers are mostly Muslims of Southern India. It is said that they buy shells by bidding. The Sankharis refer to them as Sahibs. The dealers, however, send their merchandise to Mahajans in Bengal who sell them to the Sankharis. The Mahajans are also Sankharis by caste and include big as well as small wholesalers. The trade was from the beginning controlled by the big dealers and of late it has become a virtual monopoly of a few important wholesalers because, except Tuticorin, all other sources of supply have been exhausted. The following table gives comparative prices of the various types of shell, now and before:

	Past wholesale prices per sack	Present wholesale prices per sack	
	Rs.		Rs.
Titkoor	} 40	} 200—300
Salamat Haji		
Pati		
Choola		
Rameswar		
Dhata		} 150—200

CONCH-SHELL INDUSTRY

Each bag contains from 200 to 350 pieces of conch-shell. The sizes of the shells are indicated by numbers from 1 to 8; No. 1 indicates the maximum size and No. 8, the minimum. The contents of a typical bag are assorted and the proportion of the various sizes of shells may be as follows:

No. 1 to No. 4 . . . 40 p.c. to 50 p.c.

No. 4 to No. 8 . . . 50 p.c. to 60 p.c.

Normally the sales from the Calcutta go-downs vary between 1,000 and 4,000 bags a month. On receipt of the despatches the dealers sort out the conch-shells according to their quality and sizes and reject the ones that are damaged or wormed. The average wastage is around 15 to 20 shells per bag.

DETAILS OF BANGLE MANUFACTURE

Being an industry widely scattered over a large area, the two Bengals and Assam, it is to be expected that considerable variations in the conduct of manufacture should prevail. In large centres such as Dacca and Calcutta a great part of the work is carried on by capitalists employing work-people on piece-work; elsewhere it is largely a home or family industry carried on by the head of a household with the aid of his sons and relatives.

In Dacca the industry falls into two chief divisions, one engaged upon the preparation of working sections of the shell which may either be wrought into the finished product by other craftsmen in the town or else imported to other places where the trade is limited to the ornamentation of working sections sawn from the shells elsewhere.

The preparation of working sections is carried out usually in shady sheds in the backyards of the employers. In a typical shop six sawyers are employed. The shells first pass through a preparatory treatment for the purpose of extracting the columella and thereby reducing the amount of labour necessary in sawing the shell into sections. To admit of this a slice of the lip is first sawn off; it is then comparatively easy to break through and shatter, by way of the mouth opening, the majority of the various septa connecting the columella with the outer wall of the shell. The open end of the shell is next smashed in and the apical septa destroyed, so releasing the columella already set free in its oral portion. The shell is now open from end to end. The tool employed for breaking away the columella is a hammer fashioned on the principle of the well-known geologist's hammer, sharp-edged on the one side and square on the other.

The shell is now ready for the sawyer, who sits on the earthen floor tightly wedged between two short stakes of unequal length driven into the ground. Against the longer, measuring some 15" above the ground, the

worker's back is supported, while against the shorter, only 4 to 5 inches high, his toes are pressed. The space between the two stakes measures no more than 18 inches, hence the workman although he sits with his knees widely separate is very tightly jammed between the rests. This is found essential and it is necessary that his limbs should be rigid during his work, as his feet have to function as a vice during the sawing of the sections, the shell to be cut being placed between the right heel and the toes of the left foot.

After the columella and lip of the shell are removed, a disc of hard wood is placed over the mouth aperture of the shell to provide a firm purchase for the foot pressed against the side of the shell. The worker is now ready to begin sawing the shell into sections. For this purpose he is provided with a heavy hand-saw of great apparent clumsiness. The iron blade is of a deep crescent form ending in an alternated horn at each end. A little way from each of these tapered extremities the end of a long iron tong is rivetted to the back of the saw; the farther ends of the two tongs are connected by a thin cane cross bar or handle lashed by twine to the tongs which are covered with a serving of the same twine. It is noteworthy that the tongs are not straight but have a hook-like bend the attachment to the blade. The latter is a stout forged iron plate, 2 mm. thick except for a distance of one inch from the cutting edge where it is worked down to a thickness of 0.6 mm. Between the tongs the back of the saw is protected by a piping of iron.

In beginning work, the shell is placed somewhat obliquely between the feet, the apex directed to the right and away from the worker, who places his left hand on one twine-covered tong of the saw and the other on the horn of the blade at the opposite extremity. Balancing the saw carefully in his hands, and at right angles to his body, he applies the edge to the shell and begins a vigorous to and fro movement of the saw from side to side, the course of the hands being through a short arc of a circle at each swing. On an average it takes 4½ minutes to saw once through a shell. The number of working sections given by a single shell is determined according to the shape and size of the shell and thickness of the sections desired. For the narrow *churi* bangles as many as ten sections may be obtained from a good sized shell, but for a broad *bala* bangle three are a good average. If 5 sections are cut from a shell the shell has to be sawn through six times, so we must count five minutes as the minimum time required to cut off a working section. To this must be added the time occupied in re-sharpening

CONCH-SHELL INDUSTRY

the saw, a frequent requirement, owing to the great hardness of the shell. Fortunately the method employed is an expeditious one. It consists merely in going over the whole length of the cutting edge in a series of taps with a light chisel set hammerwise in a wooden handle. One hundred working sections per day is the limit of production per man working upon shells previously prepared ready for sawing.

Hitherto the Dacca and other shell cutters have employed no machine saws.

The further stages in the manufacture of chank-bangles vary within wide limits, dependent upon the market to be served.

The rubbing down of the inner surface of the working cirlet is accomplished in an ingenious manner by means of a wooden spindle 18 to 20 inches long, covered with an abrasive coating of fine river sand embedded in a rough lac basis. Several sections are threaded on the spindle which is wedged tightly between the low stool whereon the grinder sits and some rigid second support-- a tree trunk outside the house or a post of the verandah workshop. Smoothing is effected by rubbing the rings up and down the spindle till the required effect is attained.

More highly finished bangles necessitate decoration by means of carving, small *tenon* saws, and files are used; preference is given to the former whenever possible as they are more flexible, expeditious and durable than files. The greater part of patterns composed of straight lines and grooves are graved by a small saw. The edge is of the same minutely dentate form as in the two-handled shell-saws, and is sharpened in similar manner by means of a chisel-edged hammer. An ornamentation frequent on common bangles for country women is where a U-shaped groove passes circumferentially around it. This is produced by two cuts made by this saw, finished off by filing.

The rest used by bangle carvers to support the working sections exhibits some variation in style according to locality.

In Bengal, owing to the custom prevailing here among Hindus which requires a bride to put on for the marriage ceremony two red coloured chank bangles, a considerable trade exists in lacquering and decorating bangles in this colour in the manner prevalent in each particular district. For the vermilion that is required, a quantity of the purplish red crystals of hingol (cinnabar) is obtained. This is ground down to a fine powder upon a disc-shaped stone of fine-grained granite or gneiss by means of a pestle consisting of a short stumpy pebble, roughly conical in shape. One tola weight of cinnabar to three tolas weight of shellac is the proportion employed. When the pigment has been suffi-

ciently reduced, two-thirds of the total amount of the shellac requisite is first fashioned by heat into the form of a small cup within which the powdered cinnabar is placed, the remaining third of shellac being warmed to pliability and then used to close the aperture of the cup. The next stage is thoroughly to amalgamate the contained powder with the lac walls of the cup, a process calling forth a great amount of dexterity. The whole mass is deftly rotated over a charcoal fire till soft and pliable and then kneaded thoroughly for a considerable time by the help of two short sticks of the size and length of lead pencils. The softened mass is twisted about over the fire and repeatedly 'wound' from the end of one stick to that of the other and back again, the operation being repeated till the incorporation be complete. The mass is then formed into a pencil-shaped stick and is ready for use.

In the lacquering of a bangle, a short segment of the circle is heated over a small charcoal fire made in the cavity of a wide shallow chatty, a portion of the bangle being laid directly upon the glowing lumps of charcoal. As soon as hot enough the workman removes the bangle and rubs a portion with the end of a thin stick of lac. A short length only is curved at each application as the bangle soon becomes too cool to melt the lac sufficiently; it is replaced upon the coals and then a fresh segment is covered and so on till the whole circumference has been worked over. In incised patterns required to stand out red upon a white ground, this effect is obtained by scraping over the surface with a small tool shaped like a bradawl.

Each bag contains from 200 to 350 pieces of conch-shell. The sizes of the shells are indicated by numbers from 1 to 8; No. 1 indicates the maximum size and No. 8, the minimum. The contents of a typical bag are assorted and the proportion of the various sizes of shells may be as follows:

No. 1 to No. 4 . . . 40 p.c. to 50 p.c.

No. 4 to No. 8 . . . 50 p.c. to 60 p.c.

Normally the sales from the Calcutta godowns vary between 1,000 and 4,000 bags a month. On receipt of the despatches, the dealers sort out the conch-shells according to their quality and sizes and reject the ones that are damaged or wormed. The average wastage is around 15 to 20 shells per bag.

Tools of Trade

Of the tools of trade, mention must first be made of the saw. The length of the saw is usually 3 feet, and is made of crescent-shaped or semi-circular piece of flat iron 10" to 12" wide, the weight being 5 to 6 seers. From both sides of the saw, handles jut out like horns. On the groove on the reverse

CONCH-SHELL INDUSTRY

side of the handle a tape saw is fitted to it. The teeth of the saw are so fine that they are hardly visible from a distance. The teeth are cut by the Sankharis themselves. Dinanathpur village in Mauza Ramchandrapur J.L. No. 38 in P. S. Ausgram of Burdwan district is the most celebrated place for the manufacture of these saws. Sankharis from all parts of Bengal order their saws from the smiths of this village and often come and wait upon the smiths for six weeks at a time to be able to take back a saw the making of which they watch from start to finish.

Adan

This is the tool used to cut the teeth of the tape saw used for shell-work. It consists of a blade made of sheet iron, 3 to 4 inches long, $1\frac{1}{2}$ " in width and $\frac{3}{16}$ " or $\frac{1}{4}$ " in thickness, fitted to a long handle by means of a ring, as in an axe.

Ek Dhara

This instrument is shaped like a hay-cutter. Its blade, 10" long and $\frac{3}{4}$ " wide, is fitted to a handle which is slightly curved. It is used for engraving the design on the surface of the conch-shell.

Kuda or Hammer

It is a kind of punch. The head of the hammer measures 2 to 3 inches and one of its ends is pointed.

Sata or Booli

It is like a fine drill and is used for engraving purposes.

Toorpoon

Hand drill also used for engraving.

Sil

Sil, made from bite stone, used for smoothing out the rough edges of the shell.

Solai

A wooden roller, about two feet long, used for bangles polishing the inside of the shell by pasting its surface with the necessary polishing chemicals

The composition of a seer of the polishing chemical is as follows:

Dhuna or a kind of incense made from the extract of sal tree	1(?)
Ground stone	3(?)
Oil	1 chhatak

Khoonti

Two pieces of bamboo, one thick and about 6" in height and the other measuring 3" are planted side by side for keeping shell-bangles on them.

Malsa and Foil

Malsa or an earthen pot is used to hold a slow charcoal fire on which the shells are heated to remove the stain, resembling that of sandal paste, found on their surfaces.

Nitric acid and a vulcanite basin are also among the essential tools of shell-work.

A team of at least three people are required in shell-work. One person has to clean the shells. He cleans by tapping the body of the shell gently with Kuda and breaks the superfluous covering on the horizontal central slit of the shell. Then he taps the mouth of the shell to take out the core.

Measurements.

The circle formed by the thumb and the second finger—the break—is the accepted unit of measurement in the trade.

The second person is the sawyer. The shell is bisected near the middle at an angle of 50°—the lower portion is scrapped. Sankha or shell bangles are cut from the top half of the bisected shell. From a No. 1 sized conch-shell, 6 rekis or pieces of bangle are cut; the number of bangles from shells of 2 to 4 and 4 to 8 sizes are on an average, 4 and 2 to 3 pieces respectively. A sawyer can normally cut anything between 100 and 150 pieces of bangles a day.

After the bangles are sawed, patterns are carved on them by a third worker. Ekdhara, Reti and Toorpoon or hand drill are used for making the patterns which are mostly geometric. The geometric designs found in Mr. Foot(e)'s book are still in vogue to-day. Mr. Foot(e) thinks that these designs and patterns are of a very ancient origin and have been used by generations of craftsmen.

In the past Dacca was famous for another conch-shell product. This was made from a piece of egg-shaped shell $2\frac{1}{2}$ " to 3" in length and $1\frac{1}{2}$ " to 2" in breadth, cut from the side of the bigger sized conch. Beautiful patterns were chased on its surface with the help of the Booli or the fine hand drill. A typical specimen is preserved in the Indian Museum, Calcutta. These shell-products, often used as a medallion, were mostly used for religious purposes as the designs on them generally represented Radha and Krishna. Nowadays, very few Sankharis do this type of fine work. Abesh Chandra Sur, formerly of Dacca and now a resident of Calcutta, Prem Chandra Sur and Bharat Chandra Sur are the well-known practitioners of this craft.

The insides of the bangles are polished by mounting them on the Solui or the roller and the sides are rubbed on the Sil or the bill stone to make them even.

The sandal-like stains on the shells are removed by heating them over a slow fire and the bangles are finally given a bath in

CONCH-SHELL INDUSTRY

a weak solution of nitric acid. In rural areas the craftsmen do not use nitric acid.

Rings are made from the end portion of the conch-shells. The mode of making rings is almost identical to that of bangles.

Wages

The cleaner is paid a fixed daily wage. The sawyer and the Naksi or the designer are paid by the hundred. The rates for different types of work are as under:

(1) Sawyer—

(a) Bangles—Rs. 4-8 to Rs. 5-8 for 100 (coarse work).

" Rs. 5-8 to Rs. 6-8 for 100 (fine work).

(b) Rings—Rs. 10 to Rs. 20 for 100 (coarse and fine works respectively).

(2) Naksi or the Designer—

Bangles—Rs. 8 to Rs. 9 for 100 (coarse work).

" Rs. 9 to Rs. 10 for 100 (fine work).

Blowing Conches

These do not call for much labour. Only careful cleaning can make them fit for blowing. The usual design on the body of the conch is of a lotus.

By-products from Waste Shell

All shells which are wormed are scrapped. Other wastes include the sawed-off portions and breakages, which are usually around 5 per cent. These are used by Sankharis to make lime, and are also sold to people at the rate of Rs. 1-8 a maund who buy them for the same purpose.

The *Sish* or end is used for making buttons. It is sold at Rs. 10 a maund.

The shell-dust, produced by sawing, are used in toilet and also in the preparation of

medicines. It is sold for one anna a *chhatak* or 2 ounces.

Sankha or Bangles

Shell bangles are bought by goldsmiths, shopkeepers and proprietors of *Dashakarma Vandars* (shops which specialise in supplying all requisites for religious ceremonies, marriages, *sradhs*, etc.). They are sold by the pair and are graded according to quality by members. A pair of No. 1 variety costs Rs. 2-2; No. 2 Rs. 1-12; No. 3 Rs. 1-8; No. 4 Rs. 1-4. Each of these grades again are available in six to eight different varieties but their prices do not vary. These are wholesale prices—the retail prices are about 8 annas extra per pair. The blowing conches are sold at Rs. 2 or Rs. 3 each.

Goldsmiths cover the shell bangle with a strip of gold. These are generally made to order.

The name of the bangles vary according to the patterns carved on them. Nowadays, however, most shell-bangles are named after films and film stars. Often the shell-bangles are made in imitation of some types of gold bangles, and are accordingly known by names of the originals. Similarly gold bangles are sometimes patterned on shell-bangles.

The conch-shell industry employs a fairly large number of people—anything between 3 and 4 thousand. The shell shops are always small establishments and a strictly hereditary profession of the Sankhari caste. There are no fixed hours of work. The average Sankhari earns good money; as a matter of fact this caste can boast of many rich people. The percentage of literacy is low among the community.

BOATS AND SHIPS

XXII(a)

Boats and Ships

The importance of boat traffic in undivided Bengal is well brought out in the following passage from the Imperial Gazetteer of India, Vol. II, p. 310:

The position of the classes engaged in trade and commerce in Bengal is very prosperous. The boat trade on the rivers is, for magnitude and variety, quite unique in India. Some of these country craft, with their strong gear and equipment and their skilled navigators, face the wind, storms, and waves of the estuaries of the great rivers, and will, under sail, carry a heavy cargo against the current; others, again, can only ply in the sheltered creeks and channels which spread their net-work over the country. In Eastern Bengal every husbandman keeps his boat, just as in other countries he keeps his cart. The import trade into Calcutta from the interior (exclusive of opium and railway materials) in 1881-82 was valued at £39,071,119, goods to the value of 11 millions sterling came by country boats.

The landward export trade from Calcutta into the interior of the country in the same year (i.e., 1881-82) amounted to an estimated value of £27,841,540. Goods to the value of 4½ millions were exported by country boats.

As for ancient times, it would seem from the *Periplus*, that the trade between Malabar and Coromandal was carried on in the coasting vessels of the country, but that voyages from the latter coast to the Ganges were made in ships, that sailed across the Bay of Bengal. These were native or country built vessels, and like the ships described by Fa Hian about the end of the 4th century, as sailing from the Ganges to Ceylon and thence to China, they appear to have been manned by Hindoos.

.....that the Egyptian traders seldom extended their navigation beyond Cape Comorin, and that the commercial intercourse that existed between them and the natives of Bengal centred in the ports of southern India (Journal of the Asiatic Society of Bengal, Vol. 16, p. 3).

The SANGARA vessels, named Monoxyla by the Greeks, are met with in various parts of India, and are used both in coasting and inland navigation. In some of the eastern districts of Bengal as Dacca, Sylhet and Mymensing, this kind of Boat is called SARANGA; it consists, as the Greek term implies, of one tree or timber, which is scooped out to form the hull of the vessel, two or more tiers of planks being generally placed on each side to enlarge its dimensions.....

(JASOB., Vol. 16, Jan. 1847, p. 7.)

Method, speaking of the trade between Bengal and Masulipatam early in the 17th Century, remarks: "Once a year there arriveth at Masulipatam from thence a fleet of small vessels of burden about 20 tons, the planks only sewed together with coirs (a kind of cord made of the rinds of coconuts and no iron in or about them) (*vide Purchas's Pilgrims*). The voyage, however, from the Coromandal coast to the Ganges, was performed, not only in Monoxyla, but also in vessels called Colandiophouta, which appear to have been ships of considerable burthen. Many interesting details are contained in Grant's Analysis of the Finances of Bengal (5th Report) regarding the organisation and progress of the Imperial Nowwara or shipping yards stationed at Dacca, the sources of revenue for its maintenance, the materials for ship-building, and the like. Some details regarding Hindu maritime activity, commerce, and shipping in Bengal are also derived from *Takmilla-i-Akbarnama* in Elliot, Vol. VI, from the Sanskrit work *Ghataka-Karika*, from the Portuguese accounts of De Barros and Souza, from the records of foreign travellers like Varthema and Ralph Fitch, from *Relation des Voyages dans L'Inde et a la chine* by Rejnaud (Paris, 1945), and lastly from some old Bengali poems and songs preserving local tradition. Cf. also (1) *Faithiyah-i-ibriyyah* translated by Blochmann.

(2) Account of Shihab-uddin Talish in MS. Bodleian 589.

(3) Sachu & Ethe's Catalogues translated by Jadunath Sarkar.

Among foreign travellers who supply us with information for this period we may mention Thomas Bowrey, in whose account of the countries round the Bay of Bengal we have many interesting details regarding shipping and commerce: Radhakumud Mookerji: *A History of Indian shipping and Maritime activity from the earliest times*, p. 15.

In Kalidasa's Raghuvansa (Canto 4, sloka 36) we find the defeat by Raghu of a strong naval force with which the Kings of Bengal attacked him, and his planting the pillars of victory on the isles formed in the midst of the River Ganges.

Having by his prowess uprooted the enemy arrayed for battle with a naval force, that excellent leader (Raghu) posted pillars of victory on the isles formed in the midst of Ganga".

The scriptures of the Japanese priests preserved in the Horiuzi temple of Japan bear testimony to the extraordinary vitality

BOATS AND SHIPS

of Bengali religious activity. (The priests of the temple worship the manuscript of a Buddhistic work called "Usuisa Vijaya Dharmi", written in a character considered by experts to be identical with that prevalent in Bengal in the 6th Century). Cf. *History of Bengali Literature*—D. C. Sen.

The "Mahawansa" and other Buddhistic works tell us how as early as about 550 B.C. Prince Vijaya of Bengal with his 700 followers achieved the conquest and colonization of Ceylon, and gave to the island the name of Sinhala after that of his dynasty—an event which is the starting point of Sinhalese history. (Cf. Rhys. David's *Buddhist India*, p. 35). It is also said that in a still earlier period the Bengalis of Champa, near Bhagalpur, founded a settlement in Cochin China, and named it after their famous native town. (*Indian Antiquary*: Vol. IV, p. 101.)

.....and Theophrastus, who died B.C. 287, says that the ships of Tylos, or Tyros, in the Persian gulf, mentioned in some traditions as the original seat of the Phoenicians, were made of a wood that lasted 200 years; and this could only have been teak, of which the Arabian ships on the Indian Ocean are still all built.....

First Letter Book of the East India Co. (1600-1619): (p. XXIX, foot note). From thence they went to Ceylon and between point de Galle and Colombo they took a small ship of Bengala.....

Letters received by the East India Company, Vol. I (1602-13), p. 9.

This tradition of the Bengalis being once famous for their maritime enterprises and commercial activities has also been, as may be naturally expected, well preserved in their literature. No folklore is so popular in Bengal as those volumes of poetry evoked by devotion to the goddesses of Chandi and Manasa, and in them are contained accounts of the maritime adventures of merchants like Dhanapati, Srimanta and Chand Saodagara, which, in spite of the miraculous details invented and imported into them by a pious imagination and warm religious feeling, contain a nucleus of truth, and unmistakably point to one of the ways through which the national genius of the country chose to express itself. In the same manner that Shakespeare's Antonio had "an argosy bound for Tripoly, another for the Indies, a third for Mexico, and a fourth for England," is our Indian Srimanta represented to possess merchantmen trading to the Coromandal coast, to Ceylon, to Malacca, Java, and China. The vast collection of poems known as the Padma Purana or Manasamangala is formed by the contributions of

more than fifty authors who have all described sea voyages. About eight or nine poems form the group of poems celebrating the glories of the goddess Chandi, and in nearly all of them are also contained accounts of sea voyages. These works belong to so late a period as the 16th Century, and their value lies in the fact that they thus carry down to comparatively late times the tradition of the Bengalis being once known for their commercial and maritime pursuits. The oldest record in Bengali literature is that of Narayanadeva, a poet who lived about the latter part of the 13th Century, and who has given a graphic account of the sea voyage of Chand Saodagara. Another account, free from exaggerations and fabulous details, and hence more reliable is that given by Bansi Dasa, who of course profusely borrows from Narayanadeva.

These poems together throw a great light on the then condition of commerce in Bengal. Sailors for sea-going vessels were then, as now recruited from the people of East Bengal, who have been the object of genial banter in the writings of Kavikankana, Ketakadasa, Kshemananda and others. Ships had more poetical names in those days than now. In Manasamangala poems we come across such names as Gangaprasad, Sagara-fena, Hansarava, Rajavallava and the like. There is a very detailed account of the fleet of Dhanapati sailing towards Ceylon in Kavikankana Chandi, which is well worth a notice. It is made up of seven vessels. The head ship is called Madhukara, generally meant for princes and big merchants: its cabin is made all of gold. The second ship is named Durgavara, the third Goorakhi, the fourth Sankhachura, the fifth Sinhamukhi, shinning like the sun, the sixth Chandrapana, which is used for goods, and the seventh Chotamukhi, meant to carry provisions. The whole fleet sailed merrily, propelled by the lustily singing oarsmen. There were also trading fleets carrying merchandise and provisions for long voyages; and worthless things were often exchanged in distant countries for very valuable ones.

The great trading centres of Bengal in those days were Satgaon,* called Tcharitrapoura in the time of the Chinese pilgrim's visit, and described by Ptolemy as a royal city of immense size, as well as Sonargaon, the great harbour of Eastern Bengal. Champa or Bhagalpur was also one of the commercial centres from which merchants could sail for Subarnabhumi or the Burmese coast. But by far the most important emporium of ancient Bengal was Tamralipta, the great Buddhist harbour of the

* See Kavikankana: Chandimangala: Bangabasi Edition: p. 229.

. BOATS AND SHIPS

Bengal sea-board. It is referred to in the Mahawanso (ch. xix) as Tamalitta, and was probably meant by the author of Periplus¹ when he spoke of "a great commercial city near the mouth of the Ganges, the trade of which consisted chiefly in cloths of the most delicate texture and extreme beauty." The place is of very great antiquity, and existed prior to the days of Asoka, for it figures even in the sacred writings of the Hindus. The Chinese pilgrim, Fa-Hien² when he visited India in A.D. 399-414, found it a maritime settlement of the Buddhists. "There are twenty-four Sangharamas in this country", he says, "all of them have resident priests". After his residence there for two years he shipped on board a great merchant vessel which he found in the harbour of Tamluk, and putting to sea, they proceeded in a south-westerly direction, and catching the first fair wind of the winter season (i.e., of the N.E. monsoon), they sailed for fourteen days and nights, and arrived at Ceylon. Two hundred and fifty years later, a yet more celebrated pilgrim from China speaks of Tamluk as still containing a thousand monks, and a pillar by Asoka 200 feet high. It was "situated on a bay, could be approached both by land and water, and contained stores of rare and precious merchandise and a wealthy population". And another Chinese traveller, I-Tsing, who followed Hiuen Tsang, thus wrote of the Bengal port: "Tamalipti is forty yojans south from the eastern limit of India. There are five or six monasteries; the people are rich.....This is the place where we embarked when returning to China". *Indian shipping*: R. K. Mookerjee.

It was during Man Singh's viceroyalty that we find a remarkable outburst of naval activity in Eastern Bengal, and proofs of a naval organisation that was being slowly and silently built up by the efforts of some of the Hindu landlords of Bengal, while the Mogul Government was busy establishing the Nowwara at Dacca. The chief centres of this Hindu naval activity were Sripur, Bakla or Chandradwipa, in the south-east of the modern district Backergunj and Chandikan,

which is identified with the Saugor Island. Cf. Kedar Ray, Lord of Sripur: *Indian Shipping*—R. K. Mookerjee.

Coming to more recent times the following is an account from Lord Wellesley's testimony (p. 249).

The port of Calcutta contains about 10,000 tons of shipping, built in India, of a description calculated for the conveyance of cargoes. From the quantity of private tonnage now at command in the port of Calcutta, from the state of perfection which the art of ship building has already attained in Bengal (promising a still more rapid progress and supported by abundant and increasing supply of timbers), it is certain that this port will always be able to furnish tonnage to whatever extent may be required for conveying to the port of London the trade of the private British merchants of Bengal.

The following extracts are quoted from John Phipps' *Ship Building in Bengal in his A Guide to the Commerce of Bengal*.

Previous to the year 1780, Bengal was almost entirely dependent on Surat, Bombay, Damaun and Pegu, for shipping. The first vessels built on the river Hooghly, were the Amazon and Minerva, cruisers, for the Bengal Government Service; the former, 138 tons, was launched in 1769, and the latter, 180 tons, in 1770.

The earliest specimen of a regular Calcutta built ship, was produced in the year 1781, by the late celebrated Colonel Watson, and named the "Nonsuch"; measuring 483 tons, and so constructed as to answer as a Vessel of War, or a Merchant Ship; after much service in those capacities respectively, she was unfortunately so much injured by an accident which occurred while hauling her into Dock at Sulkea (opposite Calcutta) in December 1802, that it was deemed expedient to condemn her, and she was accordingly broken up.*

Of the many specimens of Naval Architecture, which the Port of Calcutta has exhibited; the Hastings, 74 gun ship, built by Messrs. Kyd and Company, and launched in January 1818, has been considered the finest in every quality.

¹ Periplus of the Erythraean sea: an account of the 1st Cent. Greek writer: Tr. by Schoff.

² Foe-Konc-Ki, see also V. Smith (History of India—4th Edn.: p. 25).

* William Hickey, who usually had a good memory, gave a different order to the names of the first ships. The following is from pp. 151-2 of Vol. 2 (ninth Edition, 1950) of his *Memoirs*:

"The situation of the Chief Engineer, which Colonel Watson held, being at that time one of prodigious emolument, the Colonel did not choose to relinquish it, which must have been the case had he left India. He therefore resolved to remain in Bengal and endeavour to dispose of at least a part of the immense quantity of marine stores he possessed, or to turn the same to advantage by employing the ingenious artificers he had brought from England with him in building ships. He accordingly set them to work upon a part of the ground about which there was no contest, and within two years launched three as beautiful vessels as ever were constructed in any dockyard in Great Britain. The first was named *Surprise*, the second *Nonsuch*, and the third the *Laurel*. The *Surprise* of three hundred tons, was, previous to leaving the stocks, taken up by Government and sent to Europe as a packet, making a very excellent passage and proving a first-rate sailor. The *Nonsuch* and *Laurel* were both engaged in the China trade, but were afterwards also employed as packets to England, and were much admired for their strength and beauty by the London Shipwrights."—A. M.

SHIPS BUILT IN CALCUTTA

The Hastings is built on Sir Robert Seppings's New Principle of Ship Building; which is, that of a regular system of trussing from the keel to the gunwale, with the beams secured to the sides, by thick rabbited waterways, shelf pieces, chocks, and forked iron knees, so as to give the Vessel one continued support, both in a transverse and a longitudinal direction.* She measures 1,732 Tons and cost, fitted for Sea, Sicca Rupees 8,71,406 or £1,08,938,† which was paid by the principal Merchants of Calcutta, and other public spirited and patriotic individuals, who subscribed most liberally to this laudable undertaking.

The cost of the Hastings forms no criterion by which we are to judge of the expense of building large Ships at Calcutta; as several of from 900 to 1200 Tons have been built here at rates, not exceeding what those of equal burthen have cost in England.

The price of ships, however, has very much increased since the art was first introduced into Bengal, which has been occasioned by the great rise in materials and workmanship; but notwithstanding this, the Ship-builders on the Hooghly can supply Merchant Ships, of the best description, at lower rates even, than similar Ships have recently cost building of the river Thames; as distinctly shewn in the following sheets.

The timber now used in building Ships at Calcutta, is principally Saul and Teak; the former for the Frame timbers, Breast-hooks, &c.; and the latter for the inside and

outside plank; Sissoo timber is sometimes introduced into their Hulls, but the supplies of it, have become so limited, and the quality so inferior, that it is almost entirely dispensed with in the construction of Ships built on the Hooghly.

With respect to the durability of Calcutta built Ships;—the Aurora of 573 Tons, built at Calcutta in 1789, was sailing out of London, as a Free Trader in 1820. The Peggy of 517 Tons, built in 1793, also similarly employed, under the name of the Juliana of London, was at Calcutta in the early part of 1821, and remained aground eight rays, in a very critical situation. It was the decided opinion of all on board, that, "had she not been a country built ship, she would have gone to pieces the first night."

The superiority of Ships built in Bengal, of Teak and Saul, is now too well established to need further comment here.

During the last thirty years, Ship-building made most rapid progress, but has recently declined, owing to the great depression in trade, as fully appears in the annexed pages.

An Account of Ships, with their Tonnage, Built in the Port of Calcutta, in the following years; specifying how they have been disposed of, or are at present employed, is given below.

Those with an Asterisk were Sailing out of Calcutta, in 1821.

SHIPS BUILT IN CALCUTTA BETWEEN 1781 AND 1819

When launched	Names	Tons	Remarks
1781	Nonsuch	483	Lost hauling into dock at Sulkea, December 1802.
1788	Indostan	800	Burnt off Cape Ramos, about 1790.
	Surprize	370	Taken by the French, in Masulipatam Roads, 1798.
1789	Fairlie	500	Burnt in Madras Roads, 1798.
	Aurora	573	Free Trader of London, 1820.
	Speke	500	Sold to the Portuguese.
1793	Rose, (Snow)	380	
	Peggy	517	Afterwards called the Juliana of London, and was at Calcutta in 1821.
1794	Lutchmy	500	Sold in England, and called the Ceres.
	Gabriel	815	Lost in the Red Sea, on the expedition 1801.
1795	Calcutta	760	Ditto, Ditto.
	Varuna	548	Sold in England.

* For a further description of this New Principle, the reader is referred to the Transactions of the Royal Society, wherein Sir Robert Seppings has given a very comprehensive account of it; which is also to be found in the Repertory of Arts., Vol. 28, page 127.

† Hull,	7,18,963
Masts and Yards	65,387
Fitting for Sea	87,056
Sicca Rupees	† 8,71,406 or £ 1,08,938
Total cost to the Proprietors, on the Ship's reaching England	11,63,754 or £ 1,45,409
† Including workmanship	1,10,989 or £ 13,873

SHIPS BUILT IN CALCUTTA

When launched	Names	Tons	Remarks
1796	Cuvera	935	Sold in England.
1797	Betsy	800	Sold in England.
	Bhavani	650	Wrecked on the Coast of France.
1798	Auspicious, (rebuilt)	462	Sold at Calcutta, to the Malabara, 1821.
	Admiral Rainier	500	Sold in England for a Store Ship, and called the Hindostan.
<i>Ships Built in the Port of Calcutta</i>			
	Anna	684	Lost on the Coast of Chittagong.
	Arran	350	Lost on the Island of Karak, June 1809.
	Indian Chief	402	Captured and sold to the Americans.
	Earl of Mornington	375	Afterwards called the Tay, Captured in 1802, and sold to the Arabs.
1799	Porcher	772	Sold in England, and called the Cambridge.
1800	Mornington	770	Burnt off Nursapore, October, 1815.
	Ruby	248	Lost at the Sand Heads, 1820.
	Henry	210	Lost in the Persian Gulf.
	Jennet	310	Afterwards called the Union.
	Experiment	500	Lost, 1807.
1801	Countess of Sutherland	1445	Captured; employed as a hulk at the Mauritius, and broke up there, 1821.
	Shah Byramgore	521	Sold at Bombay, of Calcutta again 1819; broke up 1821.
	Lucy Maria	770	Broke up at Calcutta, 1821.
	Union	748	Lost at Engano, 1815.
	Gilwell	390	Taken 1807, sold to the Arabs, and named the Fyzel Curreeem of Juddah.
	Lord Teignmouth	280	Sold to the Arabs; since lost.
	Shaw Allum	300	Sold to the Arabs.
	Medway	192	Sold in England.
	Daniel	750	Lost on the Mizan Sand.
	Stirling Castle	703	Taken by the French, October 1804, sold to the Arabs, and lost.
	Betsy	630	Afterwards the Marquis Wellington of London.
	Peggy	620	Sold to the Arabs; captured by the French and lost.
	Duchess of York, (Schooner)	198	Lost at Madagascar, 1811.
	Althea	807	Lost upon Fultah Point, July 1812.
	Hope	562	Lost on the Malabar Coast, May, 1820.
	Queen Charlotte	335	Lost in the Bay of Bengal, about 1802.
	Margaret	178	Lost on the Coast of Mozambique, 2nd April, 1819.
1802	Nancy	250	Lost.
	Clyde	600	Lost on a voyage to China, 1804.
	Olive	420	Captured.
	Alert	500	Afterwards the Eliza, Free Trader, of London.
	Susan	300	Lost in the Bay of Bengal.
	King George	400	Afterwards called the Perseverance; Broke up at Calcutta, 1808.
	Nautilus	260	Lost on a voyage to China, September, 1802.
	Sir Andrew Snape Hammond	452	Afterwards called the Udney, Captured 1807; of Calcutta again.
	Transit	360	Sold to the Portuguese, and called the Caroline of Lisbon.
	Melville	680	Afterwards H. C. E. S. Lady Campbell.
	Thomas Henchman	500	Burnt at Malacca, 1811.
	Sir William Pulteney	509	Sold in England.
	Vigilant	276	Sold to the Arabs, and lost.
	Belle, (brig)	281	Captured on the Coast of France, January 1806.
	Henry, (brig)	200	
1803	Daniel Robertson	275	Afterwards called the Marlbro, and lost.
	Mangles	274	Captured off Coringa, 26th September, 1807; afterwards H. C. E. Ship; since a Free Trader, of London.

SHIPS BUILT IN CALCUTTA

When launched	Names	Tons	Remarks
1803	Wormeaten	500	Lost upon the Eastern Reef, 27th July, 1807.
	Frederick	450	Sold to the Arabs.
	Barlow	375	Sold to the Arabs.
	Suffolk	430	Afterwards called the General Wellesley; Captured, and subsequently lost on the Coast of America.
	Fortune	275	Captured, 30th September, 1807; sold to the Arabs.
1804	Euphrates	285	Broke up at Calcutta, 1820.
	Eagle, (Brig)	125	Sold at Batavia, 1819.
	Maria	450	Captured, 27th September, 1807 now the Derreah Beggie, Arab Ship.
	Resource	385	Captured 1807; of Calcutta again.
	Letitia	300	Lost on a voyage to China.
	Hope	301	Afterwards called the Madras Merchant, Captured at Bencoolen by the French; 1808; sold at Manilla, 1816.
	Sir George Barlow	350	Sold to the Portuguese, and called the Ulysses, of Macao.
	General Lake	500	Sold to the Arabs, and lost on point Gorda ware.
	Ann	330	
	Fortitude	480	Seized at Trinidad, and sold in England.
	Henry Wellesley	290	Captured by the Americans; since lost.
	Margaret, (brig)	275	Taken by the French, 1803.
	Marchioness Wellesley	538	Broke up at Fort Gloster (River Houghly), 1820.
	Emma, (Hoy)	130	Lost.
	Lovely Hannah	317	Lost on the Basses.
	Clyde	340	Cut off at the Feejee Islands.
1805	Sir Edward Pelley	490	Lost on the Eastern Reef (Bengal), July 1810.
	Forbes	340	Lost in the Java Seas.
	Caroline	456	Lost in the Straits of Malacca.
	Princess Charlotte	140	Afterwards called the Gessina; sold at Java, 1821.
	Eliza	399	
	Albion	800	Burnt at China.
	Alexander Brodie	650	Sold to the Portuguese, Called the Asia Felix; afterwards the Baring, of London.
	Harriett	488	Lost 1807.
	Charlotte	250	Founded at Madras, October 1818.
1806	Betsey, (brig)	162	Stranded on the Coromandal Coast, 1808.
	Reliance	500	Burnt at Bombay, 1807.
	Fort William	1,236	
	Trafalgar	512	Captured off Coringa, 26th September 1807, and lost.
	Endeavour, (brig)	150	Burnt at Penang.
	Ganges	412	Captured; afterwards lost at Sea.
	Mercury	270	
1807	Abouqir	388	Now called the Good Hope.
	Providence	630	Sold in England.
	Lord Minto	210	Sold to the Malabars, January, 1821.
	Portsea	425	Lengthened; Formerly only 315 Tons.
	Two Friends, (brig)	110	
	Boyne	790	Afterwards the Moffat, of London.
1808	St. Andrew	525	Sold to the Portuguese and called the Luz.
	Bheemoolah	496	Afterwards called the Woodbridge; stranded in Table Bay, 4th November, 1816; afterwards recovered.
	Hibernia	156	Lost on the Malabar Coast, 1820.
1809	Louisa	655	Afterwards the Larkins, H. C. Extra Ship.
	Emma	550	Sold in England.
	Russell	990	Sold to the Spaniards, 1811.
1810	Fox, (Schooner)	86	Sold at the Isle of France.
	Fairlie	692	Afterwards a Regular Indiaman; since a Free Trader.

SHIPS BUILT IN CALCUTTA

When launched	Names	Tons	Remarks
1811	John Palmer	895	Lost on the Coast of Portugal, 1814.
	Lady Rollo, (brig)	125	Lost to the Eastward.
	Cornwall	795	Now a China Ship.
	Margaret and Frances	303	H. C. Surveying Ship at China ; of Bombay March, 1820.
	Java	1,118	Sold in England.
	General Hewitt	894	Sold to the H. C. in England, for a China Ship.
	Ramoncita	650	Sold to the Spaniards, and lost.
	Friendship	311	Burnt at the Isle of France, 1820.
	Barrossa	698	Sold in London.
	Claudine	436	Sold in London.
1812	Eliza	197	Lost in Torres Straits, 1815.
	Minto	180	H. C. Agent Vessel, afterwards Surveying Vessel ; since in the Country Trade.
	Volunteer	361	
	Maitland	630	
	Alexander	495	
	Bengal Merchant	464	Sold to the Spaniards, 1816 ; of Calcutta again, 1818.
	Castle Huntley	1,279	Built for a China Ship.
	Creole	232	Lost on Java, 1816.
	Delhi	687	Lost on the Coast of Cornwall, 1815.
	Flinders	326	Lost on the Maldivas, 1816.
1813	Gloucester (brig)	198	Now of Penang.
	Investigator	174	H. C. Surveying ship ; sold at Calcutta December, 1820.
	Java Packet, (Schooner)	85	Sold at the Isle of France.
	Nearohus	263	H. C. Surveying Ship ; sold at Calcutta, 1821.
	Severn	550	Sold in England, to the Navy Board.
	Hindustan	670	Sold in England, to the Navy Board.
	Regent	911	Sold in England.
	Cornwallis	696	
	General Brown	327	Lost at Vizagapatam.
	Vansittart	1,272	Built for a China Ship.
1814	General Kyd	1,200	Built for a China Ship.
	Lady Flora	705	
	Moir	630	Sold in 1816, for a Free Trader.
	Radnor	455	Burnt at Saugur, 3rd. September, 1815.
	Ganges	606	
	Phillippa	574	
	Susan	523	
	Snoocess	475	Lost in the hurricane at Madras, 24th October, 1818.
	June	461	Sold in London.
	Emma	450	Wrecked at the Cape of Good Hope, 4th January, 1821.
1815	Swallow	330	Sold at Java.
	Lady Sophia	319	Sold at Java, 1820.
	Helen, (brig)	160	
	Morning Star, (brig)	135	Lost in Torres Straits, June, 1814.
	Aurora, (brig)	135	
	Salamanca, (brig)	120	
	Penang, (brig)	90	
	Albion	790	Lost at Trincomalie, December, 1816.
	New Carmo	401	Sold at Manilla.
	Heroules	400	
1816	Duchess of Wellington	532	Burnt at Diamond Harbour, 7th January, 1816.
	Lady Nugent	492	
	Lord Hungerford	679	
	Lord Lyndock	586	
	Orient	580	Sold in England ; Now a Free Trader.
1817	Juliana	505	Sold to the Portuguese ; of Calcutta again, 1813.
	East Indian	518	
	Exmouth	669	
	Harriett	557	

SHIPS BUILT IN CALCUTTA

When launched	Names	Tons	Remarks
	John Bull	180	
	Kandyan, (brig)	190	
	Liverpool	515	
	Neptune	515	
	Roberts	685	
	Thereza	531	Sold to the Portuguese; Mary of Calcutta, 1817.
	Trito	560	Sold to the Spaniards, 1815.
	Zenobia	537	
	Actaeon	305	Sold at Mauritius.
	Nautilus, (brig)	70	Lost at Port Jackson.
	Admiral Tyler	242	Afterwards called the Isabella; lost at Sea 1820.
1816	Fame	637	
	Lady East	593	Sold to the Portuguese; and called the Carmo.
	Mary Ann	532	
	Alert, (brig)	210	Sold at Java.
	Earl Kellie	525	
	Pascoa	733	
	General Palmer	538	
	Seaflower	395	Sold at Manilla.
	Anna Robertson	420	
	Asia	550	Sold at Bombay, 1821.
	David Clark	576	
	Commodore Hayes	673	
	Lady Kennaway	550	
	Lady Pole	486	Sold to the Spaniards, and called the Gertudes, 1817.
	Two Sisters, (Schooner)	60	
	Mermaid, (cutter)	85	Lost.
	Palmer	380	Lost.
1817	Elizabeth	520	
	Heroine	561	
	Boyne	560	
	Hashmy	495	
	Ceneus	124	Sold at Penang, 10th June, 1820, Now called the Sincal.
	Marquis of Hastings	220	
	Eliza	639	Sold to the French and called the Gorretty; Eliza of Calcutta again, 1821.
	Mermaid	447	
	Marchioness of Hastings	590	
	Emma (Schooner)	107	Sold at Java, 1819.
	Waterloo, (cutter)	60	River Vessel.
1818			
Jan. 8th	Hastings, (74)	1,732	Sent to England and purchased for His Majesty's Service, 1819.
	James Scott	648	
11th	Frolick, (cutter)	108	
March, 3rd	Edward Strettell	210	Sailing out of Madras, 1821.
April, 24th	Merope	320	
	Shah Byramgore	795	Now of Bombay.
May, 23rd	Golconda	802	
June, 23rd	Barretto, Junior	490	Sold to the Portuguese.
August	Indiana	375	
	Louisa	475	Sold.
Sept. 1st	Crown	400	Sold to the Arabs and called the Taje.
Dec. 28th	Stanmore	381	
1819			
March	Nerbuddah	592	
April	Naudree	365	
	Chichley Plowden	423	Afterwards the Mellish, sold for the Europe Trade, 1819.
1819			
July, 19th	Indian Trader	294	
Sept. 6th	Triton, (brig)	186	

SHIPS BUILT IN CALCUTTA

When launched	Names	Tons	Remarks
Oct. 25th	Lotus	522	
	Janet Hutton	260	
Dec. 30th 1820	Sophia	520	
Jan. 15th	Pallas, (brig)	150	
	Seaflower	280	
Feb. 17th	Hero of Maloun	458	
May, 29th	Colonel Young, (brig)	175	
30th	Snipe, (brig)	223	
July, 8th	Palmyra	560	
Sept. 11th	Duke of Bedford	685	
Oct. 10th	William Money	800	Sold for the Europe Trade.
Nov. 23rd	Matilde	250	
Dec. 1821	Resolution	272	
Feb. 3rd	Fergusson	520	
April, 16th	Brougham	220	
	Lady Blackwood	260	
May, 4th	Eleanor	305	
June, 19th	Charles Forbes	920	
July, 28th	Sultan	315	
Sept. 12th	John Adam	386	
Oct. 30th	Recovery	300	
31st	Ealder, (brig)	190	
Dec. 11th	Nimrod, (brig)	216	

Also see pp. 91-05, *ibid.*

The Committees decide for the future only to accept English-built Vessels, they to serve the Company in any part of India without exception

See Court Minutes, etc. of the East India Co. (1655-59): p. 185.

See Report of the Commission appointed by the Hon. East India Co. to visit the Rivers Danube and Rhone with the view of obtaining a conclusive opinion upon the description of Boat adopted for the Rivers in India. Calcutta—1858.

SHIPS BUILT IN CALCUTTA

Abstract account of the number of vessels with their tonnage, built in the Port of Calcutta.

Years	No. of Vessels	Tonnage
1781-1800	27	14,714
1801	18	9,679
1802	15	6,013
1803	7	2,859
1804	15	5,111
1805	10	4,165
1806	7	3,468
1807	6	2,690
1808	3	1,297
1809	3	1,626
1810	4	2,507
1811	11	5,778
1812	15	7,357
1813	18	8,640
1814	9	4,965
1815	14	6,074
1816	68	8,463
1817	10	3,803
1818	12	6,736
1819	8	3,162
1820	10	3,853
1821	10	3,632

The above, are exclusive of vessels built for the pilot service, a list of which may be seen at page 61 of *A Guide to the Commerce of Bengal* by John Phipps.

SHIPPING

Exports of Shipping from Calcutta to Great Britain

Years	Ships	Tons
1801	25	22,767
1802	11	6,771
1803	10	5,343
1804	9	5,750
1805	2	570
1806	2	555
1807		
1808		
1809	11	7,832
1810	3	2,088
1811	5	3,557
1812	7	5,090
1813	18	10,749
1814	26	15,042
14 years	129 ships	86,164

A Guide to the Commerce of Bengal—Phipps, p. 105.

Abstract of Exports of Shipping from Bengal to All Ports annually.

Years	Ships	Tons
1801	224	102,236
1802	228	95,288
1803	284	120,287
1804	285	125,782
1805	315	128,980
1806	251	101,318
1807	379	167,984
1808	183	74,880
1809	173	73,567
1810	213	77,888
1811	211	80,853
1812	286	114,821
1813	277	111,422
1814	258	96,370
1815	254	96,739
1816	336	126,248
1817	388	151,831
1818	439	180,220
1819	398	152,524
1820	269	115,670
1821	295	123,801

Articles used in ship-building at Calcutta 1822

- 1 Copper sheet.
- 2 Copper nails.
- 3 Brass work.
- 4 Wrought iron.
- 5 Cut bolts.
- 6 Iron Knees.
- 7 Iron work, repaired.
- 8 Sheathing nails (Europe).
- 9 Deck nails.
- 10 Nails of sorts.
- 11 Bottom, Ribband and spike nails.
- 12 Round head.
- 13 Country nails.
- 14 Stem, Hawser and scripper lead.
- 15 Sheet Lead.
- 16 Pump Tacks.
- 17 Copper Tacks.
- 18 Scripper nails.
- 19 Iron Screws, of sorts.
- 20 Sissoo Dead eyes.
- 21 Sissoo Blocks.
- 22 Sissoo Blocks, Brass or Iron bushed.
- 23 Lignum Vitae Sheaves and pins.
24. Wooden Spikes.
- 25 Dammar.
- 26 Mustard seed oil.
- 27 Glue.
- 28 Wax.
- 29 Tar (Europe).
- 30 Tar (America).
- 31 Pitch.
- 32 Pump Leather.
- 33 Corah hides.
- 34 Canvas (Europe).
- 35 Twine (Europe).
- 36 Deep Sea Lines (Europe).

CARGO BOATS IN MURSHIDABAD

<p>37 Log Sea Lines (Europe). 38 Canvas (country), 1st sort. 39 Canvas (country), 2nd sort. 40 Twine (country). 41 Lines (country). 42 Anchors, Stocked. 43 Cables (Europe). 44 Rope (Europe). 45 Spun-yarn (Europe). 46 Cables, Laccadive coir, tarred. 47 Cables, Maladive coir. 48 Coir. 49 Jute Rope. 50 Jute. 51 Relaying pins.</p>	<p>52 Serving Mallets. 53 Serangoose. 54 Gulgull. 55 Oa kum. 56 Cotton. 57 Grease. 58 Red ochre. 59 Scrapers. 60 Buckets. 61 Water casks (Soul). 62 Boat oars (Europe). 63 Anchor Stocks.</p>
--	--

A Guide to the Commerce of Bengal, by
John Phipps, pp. 146-147.

XXII(b)

The Common Boats of the Present day

Chhip: A fast going boat; a fishing boat.

Donga: Raft, vessel, boat, canoe.

Vela: Raft.

Pansi: Pinnance, paunceway.

Hunter: 24-prgs. p. 33.

Fatila, a large flat-bottomed boat used on the Ganges (Yule, 687). These were the boats ordinarily employed for the transport of saltpetre of Bowvey 225, 229.: The English Factories in India (1670-1677) Vol. II (New series) p. 336, foot note No. 6.

Salti: Hunter—24-prgs., see p. 33.

Bajra or Budgerow: Hunter: 24-prgs., see p. 33.

Mayurpankhi: Hunter: 24-prgs., see p. 33.

Palwar: a typical cargo boat of the Dacca District. (Hornell: p. 182.)

Bhadrakulia: Cargo carrier—principally jute. (Horness: p. 193.)

Baich:

Danrh:

Bhara: Cargo: Hunter—24 Prgs., see p. 33. (Hornell: p. 193.)

Buhit:

Bishhati:

Panchishi:

Singhamukhi:

Ghoramukhi:

Nagphani:

Baisha:

Athaisha:

Baghramukhi:

Hansamukhi:

Sankhachurh:

Durgabar:

Ranajay:

Narabhima.

Chandrapan:

Hiramukhi:

Chandrakona:

Madhukar: Manasha Mangala.

Tigari:

(Hornell.)

Saranga:

(Ibid: Taylor.)

Ghasia Dingi: (E. Bengal.)

(Ibid: Hornell.)

Kosh:

Bachari: A market boat.

(Hornell.)

Hola: Cargo carrier—(coal & brick).

(Hornell.)

Parulia: -do-

Bistupuria: -do-

Khanjai Katti: -do-

(Hornell: p. 193.)

XXII(c)

Types of Cargo Boats in Mushidabad District

(From "Selections from the Records of the Government of Bengal relating to the Nadia Rivers from 1848 to 1926, 1931, p. 412)

Melni	Flood season average	Mds.	The shape of the boat is round in front and back, the stern being somewhat higher than the bow. It is wider and deeper than other boats. Oars are worked from the roof.
	a Minimum maundage	162	
	b Maximum maundage	1700	
	Dry season average		
	c Minimum maundage	150	
	d Maximum maundage	1000	
Pattali	a	168	Flat bottomed planks joined on the outside by overlapping and fastened with big nails. Width and depth less than Melni. Oars are worked from the roof.
	b	650	
	c	150	
	d	300	

CARGO BOATS IN MURSHIDABAD

<i>Saranghi</i>	a	87	This kind of boat is not large. It is longer and deeper but less wide in comparison with its length. Bow round and stern flat, but tapering where the helm rests.	
	b	.	.	.	.	.	.	575
	c	.	.	.	.	.	.	75
	d	.	.	.	.	.	.	300
<i>Bhor</i>	a	800	A strong big boat, generally used for loading stone, coal and jute etc. Deeper and wider than ordinary boats. Width nearly equal throughout with a little tapering at bow and stern.	
	b	.	.	.	.	.	.	1200
	c	} not passed								
	d									
<i>Fookney</i>	a	475	Open, big boat with small roof at stern which is at a higher level than bow. The cargo is loaded on the hull, covered with tarpaulin or mats.	
	b	.	.	.	.	.	.	575
	c	} not passed								
	d									
<i>Sangrih</i>	a	175	Stern of the boat is higher than the bow. Bottom of hull higher at centre and sloping towards sides: carries less in flood, as sides not high up above water.	
	b	.	.	.	.	.	.	425
	c	.	.	.	.	.	.	225
	d	.	.	.	.	.	.	525
<i>Pansway</i>	a	66	A good looking boat with long roof over it. Stern is not high, bow ordinary.	
	b	.	.	.	.	.	.	625
	c	.	.	.	.	.	.	62
	d	.	.	.	.	.	.	475
<i>Ulak</i>	a	325	A kind of pansway-shaped boat with a long roof over it; there is more space in bow of pansway than in that of a ulak.	
	b	.	.	.	.	.	.	500
	c	.	.	.	.	.	.	150
	d	.	.	.	.	.	.	325
<i>Dinghi</i>	a	31	Small boat within 75 maunds capacity; no roof.	
	b	.	.	.	.	.	.	75
	c	.	.	.	.	.	.	25
	d	.	.	.	.	.	.	75

Katra The bottom is more flat than the Patteli, the planks are joined on the outside by over-lapping with big nails like the Patteli. It draws very little water; the oars are worked from inside the roof. When loaded, oars are not used but they are towed. Cargo generally consists of stone or other light materials. Their use is becoming less frequent yearly. This kind of boat only occasionally goes down with cargo, hence the average minimum and maximum maundage (of empty boats) cannot be found. Some of the measurements of this class of boats loaded with cargo which passed down during 1903 are given below:

With 300 maunds cargo measured		575 cft.	
"	700	"	1,900
"	700	"	2,000
"	1,150	"	2,900

Native Pottery

As in the case of the other mixed castes, the accounts of the origin of the Kumbhakars in old treatises are found to be at variance with each other. Thus according to the *Bramhabaibarta Purana* the union of *Viswakarma* and a *Sudra* woman resulted in the birth of nine craftsmen castes. Among these nine castes *Malakar*, *Karmakar*, *Sankhakar* and *Kumbhakar* are considered to be the important ones.

The Kumbhakars make earthen pitchers, cooking pots, images of gods and goddesses, dolls, etc., and sell them for their livelihood. In Bengal there are nearly twenty different classes of Kumbhakars and their manners and customs, modes of worship and social status vary considerably.

Barabhagya, *Chhotabhagya*, *Rajmahalia*, *Khotta* and *Magi* are the five principal classes of Kumbhakars in the *Dacca* area. *Barabhagyas*, again, are divided into two sections which in their turn include miscellaneous sections. *Barabhagyas* make red earthen pots and the *Chhotabhagyas* make black ones. *Rajmahalias*, as their name implies, originally came from *Rajmahal* and speak a patois which is a mixture of *Bengali* and *Hindi*. *Khottas* claim to belong to the *Maghaya* family of *Patua*. They take water from all Kumbhakars except *Rajmahalias*. In *Dacca* most of them belong to *Nanakshahi* but like the other Kumbhakars they also worship *Mahadev* in the month of *Baisakh*. *Khotta* Kumbhakars make water pots, pipes, toys of clay but not images. Like the *Jugis*, they perform their *sradhs* on the eleventh day. *Magi* Kumbhakars are socially out-castes. It is difficult to say whether they were polluted by the contact of the *Mugs* when the latter attacked *Dacca* or whether they have come into existence through a mixture of *Mugs* and Kumbhakars. Whatever might be the cause, they are treated as a class by themselves among the *Hindu* Kumbhakars.

Bhoolon, *Saralia*, *Chittagong* and *Sandwipa* are the four different types of Kumbhakars found in and around the district of *Noakhali*. Their social customs are different from one another's.

The five classes of Kumbhakar in the district of *Pabna* are *Sirasthan*, *Majasthan*, *Chandanshar*, *Chourashi* and *Daspara*.

It appears that *Sirasthans* originally came from the north-west. The water offered by them is not acceptable to the *Brahmin*. It is said of the *Chaurashis* that formerly they belonged to the *Chandanshar* group but later they settled down with the *Dasparas*. One day the *Nawab* of *Murshidabad* came to the

place where they were living and he was presented with a few sprays and bouquets of flowers made of clay. The gesture and the superb artistry of the presentations pleased the *Nawab* so that he immediately made a gift of 84 villages to these Kumbhakars. Since then they have come to be known as *Chaurashis*.

This unique honour established the pre-eminence of the *Chaurashis* in the Kumbhakar society. Those who acknowledged their superiority were given the title of *Paramanik* and since the others were considered socially inferior they came to be known as *Mujgarni*. Those who had given their daughters in marriage to the *Chaurashis* came to be known as *Panpatras*. Thus the Kumbhakars of *Murshidabad* came to be divided into four social groups.

In the *Murshidabad* and *Hooghly* districts are to be found the two classes of Kumbhakars—*Rahri* and *Barendra*. It seems that these names came to be associated with them after the places in which they lived. It is said that the *Barendras* owe their origin to one of the sons of *Adi Rudrapal* who committed incest with one of his sisters. There are also *Daspara* Kumbhakars in *Murshidabad* and they are said to be descendants of a son of *Rudrapal* born in the womb of a maidservant. But these are at best conjectures.

Belgachi, *Daspara*, *Nautan* and *Bhusana* are the four classes of Kumbhakars in *Jessore*. The gotras are *Aldoshi*, *Alamugan*, *Hansha*, *Kanak*, *Kashyap*, *Rishi* and *Sandillya*.

The *Bengali* or *Rahri* Kumbhakars have migrated from *Bengal* to *Bihar* and *Orissa*. *Biswas*, *Das*, *Deori*, *Kunkal*, *Mahato*, *Majhi*, *Marar*, *Narik*, *Mehan*, *Pal* and *Rena* are some of the common titles of the caste in *Bengal*, *Bihar* and *Orissa*.

The Kumbhakars of *East Bengal* marry in their own clans. In *West Bengal*, they marry their daughters before they attain puberty.

Marriage Rites.—The rite of 'Pan Patra' prevails amongst all classes of Kumbhakars in *Bengal*. It consists in the groom's father presenting the bride's father with a piece of betel leaf symbolising the dowry. The rates of dowry were very high in the past. Sometimes as much as Rs. 500 or even Rs. 1,000 were offered for a bride. The daughters of *Bikrampore* Kumbhakars command the highest dowry. Many Kumbhakars consider it derogatory to their prestige to marry without giving the requisite dowry to the bride. In *Murshidabad*, the *Paramanicks* offer dowry to the bride while the *Mujgarins* follow the

NATIVE POTTERY

opposite procedure. The marriage rites of the Kumbhakars are held in accordance with the Hindu system.

The religious rites of the Kumbhakar of Bengal and Bihar are similar to those of the higher caste Hindus and of the other castes of the same rank. Like the other artisan castes their presiding deity is also Viswakarma. The Bengali Kumbhakars make a clay image of Mahadeva and place it on their wheel and worship it on the first of Baisakh—the Bengali new year's day, the wheel is not used for a whole month, the image is immersed on the day of the Sankranti after the necessary rituals and then work on the wheel is resumed. On the day of the Paush Sankranti the Kumbhakars deposit all their tools of trade in front of Viswakarma and worship him.

Clay

In the Vedas and Purans poems of praise have been sung in honour of clay. The properties of clay have been described in great detail in ancient shastras and other treatises. In the description of the rituals of Durgapuja in the Bajashrivema Sanhita, it is stated that the clay from the portals of a harlot's house is necessary for the bathing ceremony of Bhagawati. In Yagnas, the vedi has to be built with clay. The purity of the Ganges clay to a Hindu is too well-known to need any comment. The practice of making clay images of Siva Linga and its worship is found in practically every Hindu home. Besides clay from rivers, canals, ditches, tanks, etc., is used widely for making images of idols worshipped in homes throughout the province.

Tilakmati or Gopichandan is the clay used for making the marks worn on the forehead by the Vaishnavas. A kind of yellowish loam and a kind of grey clay are used for distempering buildings. The grey clay is also used for dyeing the cloth of Sadhus and Sanyasis.

Before bathing, Hindus are enjoined to apply clay on different parts of their body in the following manner:

Twice on the genitals; twice above and thrice below the navel; six times each on the body and the legs; twice on the arms.

Then they must rub their body well, do some other rites and finally bathe after chanting a hymn set for the purpose.

Even today clay is so much in demand in practically every household in cities and towns that it is sold for money. It is used for many daily purposes. It may be mentioned in passing that at a certain stage of pregnancy some women develop a taste for burnt clay and bite small pieces of baked clay.

We are not concerned with the discussion of soil for cultivation. The clays, for our

present purposes, can be easily divided into the two broad categories of loamy and porous clay. The loam is somewhat sandy and porous clay is sticky.

Paddy husk, bits of jute fibre are mixed with porous clay for making images. But plain loam or sticky clay is used on the wheel for making potteries.

The clay is collected by the potters on their own. They mix it with a sufficient quantity of water and the solution is sifted for refining the clay suitably for use.

After a sufficient number of articles are fashioned on the wheel, the whole set is placed in the bhati or big oven for firing. It should be mentioned that the pots, etc., are first dried in the sun before being fired.

The polish or finish on the clay articles is given before they are placed in the oven. The polishing material is a kind of clay having the colour of turmeric, and is called Chandrakona after the place it comes from in Ghatal subdivision of Midnapur district. This clay costs between Rs. 8 and Rs. 9 per maund. There are also other varieties of polishing clay—a fine, dark-coloured variety costing Rs. 30 per maund, Banakmati (Chai-pat) costing about the same. The latter type of clay, dark in colour, is also available in Anantapur. In Rashgachhtala there is a kind of dark clay available at Rs. 30 to Rs. 40 per maund, excellent for polishing purposes. In certain cases, the finishing is given by a coat of Banakmati on a base of Chandrakona clay. These various types of clay contain varying proportions of minerals. They are generally refined by means of rain water and stored and exported as necessary.

The fuel used in the Bhati or the oven in Bengal is mostly wood. The oven is so constructed that a part of it remains below the ground. The potters themselves take their pots and pans to market places and hats to sell. The buyer taps the outside of the pots with his finger. If the sound emitted is deep and full then it is assumed that the pot is of good quality and has no cracks.

There are some places whose potteries are well-known all over the province for their superior quality. Wholesalers at various ganjas (marts) and towns buy them by the cartload and import them in country boats or now-a-days in trucks. The rates are calculated by the hundred. In pre-war days potters allowed a certain margin for breakages and cracks and holes, now-a-days this practice has been discarded. The breakages are generally found to be around 10 per cent.

In the recent past, the market for clay potteries has considerably shrunk. The custom of feeding guests in marriages and sradhs has become much restricted if not wholly given up. The sale of earthen glasses and cups has fallen perceptibly. The introduction of cheap aluminium utensils has all

NATIVE POTTERY

but driven the clay cooking pots from the market. But the increasing sale of curd at the sweetmeat stores has raised the demand for curd pots. Besides, these pots are also used for many purposes including drinking sherbets and eating meat.

Large numbers of potters live in and around Calcutta, especially on both banks of the Ganges. They earn their living by making clay pots, and other objects.

The more clever and skilled of these potters also make dolls and images of gods and goddesses; for not all of them possess the necessary aptitude or training.

The making of images of gods and goddesses is governed by age-old rules of iconography. These rules were strictly observed up to twenty or thirty years ago. Then a departure was made in the image of Saraswati made at the Government School of Art, Calcutta, ushering in the so-called Oriental images which were a prelude to an orgy or chaos of styles.

In the case of the image of Durga, the departure from the set rules of iconography came with the introduction of community worship. The authorities of community pujahs commissioned the Kurubhakars to make the images according to their own specifications. The result is a fantastic medley of conflicting types of images including some in which the demon looms larger than goddess Durga herself.

These new-fangled notions have naturally influenced the making of the images of Kali, Lakshmi, Kartik, Ganesh, Sitala, Annapurna, Jagadhatri, Viswakarma, Gandheswari and in these cases too we find a varied assortment of images in which no two are alike.

Images are sometimes draped in clothes, but more often in dress made of Dak or pith, tinsel, etc., curiously patterned. The various ornaments that form parts of the ensemble of the gods and goddesses include bracelets, rings, crowns, diadems, hair-pins, earrings, necklaces, etc.

Pith and silver foil are also used for adorning the wooden background of the images.

Small images of gods and goddesses such as Radhakrishna, Ganesh, Lakshmi, Sasthi, Saraswati, Siva, etc., are always painted. Now-a-days the colours used for painting images include chalk-clay, pewri or red, French green, French blue, blue, orange, gold, bronze, silver, lampblack. Previously the varnish was done in oil; at present copal varnish is used.

The skeletal structure of the image is made of light wood such as garan or bamboo. Next, the skeleton is mounted with a stuffing of straw. The clay is laid on the straw; in certain cases the straw skeleton is swathed in cloth before coating it with clay.

The hair of the images is made of jute fibres. Dyed jute fibres are sold at Rs. 1-4-0 a seer.

The face of the image is made from a cast which is generally made of clay. Sometimes wooden, brass, silver casts are also used. In the past the face was also made of neem wood.

The image is not always made by the potters, carpenters often also used to make it. Rev. Lal Behari De has written that the face of the images made by carpenters in Burdwan were more animated, vivand, life-like than those of the images made by potters in Calcutta.

Some time before festivals, potters go to various places to execute commissions. In Calcutta a few days before the commencement of the pujahs, hundreds of potters come annually to make images.

Dolls and Toys

Potters of Bengal make large varieties of toys and dolls. Particular districts are famous for particular varieties of toys. Pre-eminent in this regard is Krishnagar; the toys of this place are matchless. Krishnagar toys have been shown in many international exhibitions abroad and have won the admiration of the discerning. Unfortunately toy-making is fast becoming a lost art owing to the competition of foreign mass produced toys.

Kalighat is another well-known toy-making centre. Its Allhadi, Benebau and Narugopal toys are well-known all over the province and outside. Other interesting toys are Raths, Carriages, Palki, etc. In Birbhum we come across interesting dolls like Jantaghurni, or grinding woman, Chul-bandhuni or lady at her toilet and so on. Dolls of Bankura and Midnapur are also excellent. Many dolls and toys are plain; many are brightly painted. Some are finished with mica powder. Various types of carts and boats are made.

These toys and dolls are sold at fairs, hats and market places throughout the province. During the Kali pujah, dolls and toys made in Benaras are sold in Calcutta. These are made by non-Bengali craftsmen.

Other toys include dolls, images of gods and goddesses, parakeets, faces, Paris or female angels, pigeons, pipes, hilsa fish, peacocks, etc. These are often from 1 to 1½ cubits in length.

Pats are also painted by the potters. In our country potters have to know not only modelling but also painting; for, after the modelling in clay is done, it has to be painted in colour. The Chalchitra or the wooden background to the images of gods and goddesses is hand-painted. The procedure is to dye a piece of cloth in a particular shade

NATIVE POTTERY

of colour and then paint on it. In painting, they use brushes made by themselves. In Calcutta alone over 2,000 Durgas and 3,000 to 4,000 Saraswatis are made every year. A kind of brush, made with split bamboo strips, is used for drawing eyes, lips, nose, ears, fingers and breasts of these images. The Ghat or the pot used in the worship of Manasha is generally painted, the pot for the Itur ritual is white. Formerly, even ordinary earthen dishes had paintings on them. The Sara or a kind of large earthen dish, used in the Lakshmi pujah, is covered with appropriate designs, exquisitely painted in bright colours.

Bricks have been used in buildings from remote times. The bricks used in the past were of a much smaller size than the ones used now. The standard sizes were 3"×5"×1½" or 5"×6"×2". Now-a-days bricks of standard English sizes are used and are manufactured by big concerns in huge kilns heated with steam coal. They are also made by hand-stamping or in machines. Burn Company manufacture a large variety of bricks. Bricks are sold by the thousand.

Pan tile, brick-pantiles, etc., are used for making roofs of building. Rain water and other types of clay pipes are also locally manufactured; they are either plain or decorative.

Terra-cotta tiles have been used in Bengal from the earliest times. The ruins of Som-puri bihar, Paharpur, etc., have testimony to it. Specimens are to be found in the Indian Museum, Calcutta. The friezes on those tiles are excellent in artistry and have won appreciation from all connoisseurs of art. In Gand, similar specimens are extant. These tiles are mounted with multi-coloured glasses.

Indeed there are few temples in Birbhum, Bankura, Hooghly, Burdwan, Midnapur, 24-Parganas and Calcutta areas whose walls are not covered with Terra-cotta tiles. The artistry and the significance of the symbols on these tiles have received much attention. Except those in Paharpur, it appears that these Terra-cotta tiles are made with moulds but finishing touches need to be given by hand. These are powdered to make soorki which is used for laying bricks and other construction-purposes. There are machines to powder bricks having the capacity of producing hundreds of cubic feet of soorki at a time. Soorki is sold by the cubic feet, sometimes in Chinese gallons (4 Imp. gallons) and sometimes by the cartload.

Jhama or over-fired brick is used for building roads, laying the foundation of houses. It is interesting to note that this type of brick is also an essential requisite in ladies' toilet in Bengal. It is used to scrub the feet vigorously before putting alta or red lac paint on them.

In many cases large-sized earthen jars, pitchers, basins, etc., were used below the floor of buildings. There are houses whose foundations are seen to be full of pitchers and other objects. It is not true that in every case they were meant to hoard money or gold.*

Pitchers are widely used, the manufacturers of molasses use them in large numbers. Different varieties of pitchers are used in different areas. Of late, earthen pitchers are being replaced by canisters as containers of molasses.

Pots and pans are of numerous varieties.

*Large black earthen jars buried under the floor of living rooms were common in districts like Barisal and Dacca before the Partition. They were used to store paddy and rice—A.M.

Hides and Leather Trade in the State

The Aryans invaded India between 3500 and 4000 B.C., this is the probable date of the origin of the leather industry in India.

In the time of the Rig Veda, leather mashaks for water were well-known, and Indra is praised as piercing the rain-confining skins or Mashaks of the clouds. Bottles of the same material also were evidently in common use. For Agastya (2000 B.C.) in his poison-neutralising mantra says, 'I deposit the poison in the solar orb, like a leather bottle in the house of a vendor of spirits'. In the laws of Manu (800 B.C.) mashaks for water are alluded to under the name of Driti, and its peculiar form with the four feet left intact is pointed out. Directions are also given for the purification of leather articles. Other Smritis ordain that oleaginous articles preserved in leather bottles do not become impure by contact with the impure cowhide, and in the present day jars of that material are in extensive use in Bengal and the United Provinces for the storage of oil and ghee. In the latter place, leather bags are universally used for raising water from wells and according to the law books of Sankhya and Likhita (2000 B.C.) that water is declared pure which is kept in old leather bottles. Atri (2000 B.C.) is likewise of the same opinion, and adds that flowing water and that which is raised by machinery, are not defiled. The use of such words, as chermanta, charmapath, varatra, chasabandha, etc., in old Sanskrit works, indicates that straps, bands and strings of leather were in common use, and sails were also made of leather or hide.

In the Ramayana (1300 B.C.) we further find the leather industry as thriving among many others. The Ajodhya-Kanda tells us that the inhabitants went out with Bharata seeking after Rama in the following order:

Jewellers, Potters, Ivory workers, Perfumers, Goldsmiths, Weavers, Carpenters, Braziers, Painters, Musical Instrument makers, Armourers, Curriers, Glass makers, Inlayers, etc.

In Manu and Mahabharata (1500 B.C.) slippers are also mentioned, and the time and more of putting them on pointed out; and mediaeval Sanskrit authors allude to them pretty frequently. The Vishnu Purana enjoins all who wish to protect their person, never to be without leather shoes. Manu, in one place, expresses great repugnance to stepping into another's shoes (very modern indeed!), and peremptorily forbids it, and the Puranas (500 A.D.) recommend the use of shoes when walking out of the house and particularly in thorny places and on hot sand. Arrian (about 200 B.C.) says: They,

the Indians, wear shoes made of white leather, and these are elaborately trimmed, while the shoes are variegated, and made of great thickness to make the wearer seem much taller.

Even women of the town were in the habit of wearing shoes.

Panini speaks of the 'anupadina' a variety of boots.

Dr. Bidic says that instruments of the nature of a bagpipe are of very widely diffused origin having been used by the Hebrews, Greeks, Romans, Arabs, Persians and Hindus.

Harness and chariots in which leather was used are also mentioned in the Rig-Veda.

Re: manufacture of shoes, boots, etc., see Terry's Voyage in the East Indies, 1655.

The last one hundred years, from 1850 onwards, has been a record of continuous decline of the leather industry.

The origin of the leather industry in West Bengal is not known, but one thing seems clear that the industry was known in the United Provinces and North-West Bengal, long before it came to be known in West or Lower Bengal. Most of the Chamars and Muchis have emigrated from the United Provinces and Bihar. (See "The Arts and Manufacturers of India" by Forbes Royle.)

Indigenous method of tanning (see Report on the Dyes and Tans of Bengal by H. W. McCann: pp. 162-169, 1883).

The process of removing skins from the carcasses is as following: [Tanning and Working in Leather by Rowland N. L. Chandra: p. 5 (1904).]

The heads and the legs from the lower joints are separated. Then a long skindeep cut is made from the neck to the tail and four short cuts along the four legs commencing from the long cut and reaching down to the joints. The skin is then separated. In the case of goats and sheep, the skin is removed by simply pulling it off the body which is suspended by the hind legs for the purpose. The skin comes off as the pillow-case comes off the pillow. The skins of the larger animals—bullocks, cows, and buffaloes—have to be separated from the flesh little by little, by means of the slaughtering knife, and great care is needed in the process, as a slip of the hand will cause a puncture in the skin and reduce its value. A distinction is made between the skins of castrated goats and of those which are not castrated. The former are somewhat thicker than the latter, and have not the disagreeable odour of the latter, and fetch higher prices than the latter. Skins are sold by their measurement in inches. The length is measured from the neck to the root of the tail and the breadth

HIDES AND LEATHER TRADE

is the measurement round the belly. Skins exceeding 36" in length and 20" in breadth are called heavy and fetch the highest price. Those which are 32" to 35" by 18" are called *mael*; 30" to 31" by 18" *halka*; 28" to 29" by 18" *athais*; and 25" to 27" by 18" *sataish*. Skins of smaller dimensions are classed as kid skins and fetch low prices. Skins without hair are not sold. Falling off the hair, marks of cur, bruise or sore, and holes, are regarded as defects. When the defects are numerous or serious the skins are called *ferta*, and when they are worse they are called *double ferta*. Skins and hides are sold in entire pieces. Skins—the pellicles of sheep and goats.)

Hides: Halali, Murdari, Dagí and Rantfol or Ferta: 4 classes of dry hides: (Hides= pellicles of cows, bullocks, buffaloes and their calves.)

[See Calcutta Exhibition of Art Manufactures (1883) compiled by James W. Browne: p. 163; No. 25.]

Hides of very superior classes are called Commissariat hides. The defects in hides are of the same nature as the defects of the skins.

VEGETABLE TANNING INGREDIENTS

1 *Aora*, *Aola* *Amla* or *Amlaki*.—The leaves contain some essential oil or jat and 18 per cent. of tannic acid. The bark contains about 13 per cent. of tannic acid. The dried pulpy portion of the immature fruit contains about 35 per cent. of tannin, but in the ripe fruit only traces of the tannin are found. The leaves and barks are dried and powdered and used for making the tanning liquor. It produces white leather.

2 *Hara*, *Haritaki* or *Myrabolam* (*Terminalia chebula*).—The dried fruits are extremely rich in gallotannic acid.

3 *Boera* or *Bahera* (*Terminalia belerica*).—The fruit is used, but it is not very rich in tannin.

4 *Babul* or *Ejar* (*Acacia Arabica*).—Fruits or leaves and barks are used for the production of buff coloured leather.

5 *Dhan* (*Anogeissus Latifolia*).—Leaf is used. It produces yellow leather.

6 *Baer* or *Kul* (*Zizyphus Jujubus*).—The root dried and powdered is used. It produces brown leather.

7 *Arjun* (*Terminalia Arjuna*).—Leaf and bark are used. Gives a brown colour.

8 *Taur* or *Teri*.—The fruits are dried and powdered, are considered the best material for the production of white leather.

9 *Asan* (*Terminalia Toméntosa*).—Its bark dried and powdered, used for the final tanning of heavy skins.

10 *Bonha* or *Banda* or *Bana* (*Loranthus Longiflora*).—It grows as a parasite on mango mahua trees.

11 *Sal* or *Sakhua* (*Shorea robusta*).—Bark is used.

12 *Mahua* (*Madhuca latifolia*).—The bark and leaves are used mostly in Behar.

13 *Siris* (*Albizzia lebbck*).—The bark is used in some places.

14 *Piyal* (*Buchanania latifolia*).—The bark is used.

15 *Divi-Divi* (*Caesalpinia coriaria*).—A very suitable tanning material introduced from South Africa about the year 1834. Its cultivation however has not been favourable in Bengal.

16 *Gab* (*Diospyros Embroyopteris*).—The fruits are used for colouring leather brown or black.

17 *Jiyal* (*Lannea grandis*).—The bark, which yields a brownish-red colour, is used.

18 *Rohina* (*Soyamida Febrifuga*).—The bark is used.

19 *Kud* (*Diospyros Melanoxylon*).—The fruit is dried, powdered and soaked in order to obtain the tanning liquor.

20 *Jammu*.—Bark produces a black colour.

21 *Aswatha* or *Bur* (*Ficus Religiosa*).—The bark is used. It produces light brown colour.

22 *Sidha* (*Lagerstroemia Parviflor*).—The bark is used.

23 *Kamla* or *Alir* (*Mallotus Phillippinensis*).—Leaves are used.

24 *Am*.—Bark and leaves are used.

25 *Bakul* (*Mimusops Elengi*).—Bark is used and produces a light brown colour.

26 *Dhadki* (*Woodfordia Floribunda*).—Leaves, barks and flowers are used.

27 *Sonalu* or *Sunri* (*Cassia Fistula*).—The bark is used in Lower Bengal and Orissa.

28 *Sundri* (*Heriteria Fomes*).

29 *Jhika*.—Bark is used.

30 *Lodha* or *Nodha* (*Symplocos Race-mosa*).—The bark and leaves are dried, powdered and made into an infusion.

31 *Latkan* or *Natkan* (*Bixa Orellana*).—The fruit is powdered and used and gives a yellow colour.

32 *Gilo*.—The fruit is used.

33 *Gatiura*.—The bark is used.

34 *Giran* or *Goran* (*Cerriops Roxburghiana*).—In abundance in the Sunderbans. The bark is used.

35 *Dholso*.—Leaves are used.

36 *Saya* (*Aerua Lanata*).—Leaves are used.

37 *Guava* (*Psidium guyava*).—The bark is used.

38 *Naina*.—The bark is used.

39 *Somrail*.—The bark is used.

40 *Kanak*.—The bark and leaves are used.

41 *Tamarind*.—The raw fruit is used.

From "Tanning and working in Leather in the Province of Bengal", by Rowland N. L. Chandra, pp. 7-8.

In modern tanning practice, tanning extracts are being used in increasing quantities because they offer several advantages.

The value of myrabolam extract annually exported from Bengal is about 8 lakhs.

HIDES AND LEATHER TRADE

TANNING INGREDIENTS

1 Lime: obtained by burning ghuting or kankur.

2 Shell lime obtained by burning shells.

3 Aora, Aola, Amla or Amlaki (*Phyllanthus Embleca*).—The leaves contain some essential oil or fat and 18 per cent. of tannic acid. The bark contains about 13 per cent. of tannic acid. The dried pulpy portion of the immature fruit contains about 35 per cent. of tannin, but in the ripe fruit only traces of the tannin are found. The leaves and barks are dried and powdered and used for making the tanning liquor. It produces white leather.

4 Harra, Haritaki, or Myrabolam (*Terminalia Chebula*).

5 Boera or Bahera (*Terminalia belerica*).

6 Babul or Ejar (*Acacia Arabica*).

7 Dhan (*Anogeissus Latifolia*).

8 Baer or Kul (*Zizyphus Jujubus*).

9 Arjun (*Terminalia Arjuna*).

10 Taur or Teri (*Caesalpinia Digyna*).

11 Asan *Terminalia Tomentosa*.

12 Banha or Banda or Bana (*Loranthus Longiflora*).

13 Sal or Sakhua (*Shorea Robusta*).

14 Khari nimak or black salt.

15 Kath or Khair (*Acacia Catechu*).

16 Mahua (*Madhuca Latifolia*).

17 Siris (*Albizza lebbek*).

18 Piyal (*Buchanania Latifolia*).

19 Divi-Divi (*Caesalpinia coriaria*).

A very valuable tanning material introduced from South Africa about the year 1834.

20 Gab (*Diospyros Embryopteris*).

21 Rohina (*Soymida Febrifuga*).

22 Kud (*Diospyros Melanoxylon*).

23 Jamun (*Engenia Jambolana*).

24 Aswatha or Bur (*Ficus Religiosa*).

25 Sidha (*Lagerstroemia Parviflora*).

26 Kamla or Abir (*Mallotus Phillipinensis*).

27 Am (*Mangifera Indica*).

28 Bakul (*Mimusops Elengi*).

29 Dadki (*Woodfordia floribunda*).

30 Sonali Sunari (*Cassia fistula*).

31 Sundri (*Heritiera Fomes*).

32 Jhika.

33 Lodha or Nodha (*Symplocos Racemosa*).

34 Latkan (*Bixa orellana*).

35 Pounded rice or fermented rice.

36 Gilo.

37 Karol.

38 Gatiara.

39 Giran or Goran (*Cerriops Roxburghiana*).

40 Dholso.

41 Saya (*Aerua Lanata*).

42 Guava (*Psidium guyava*).

43 Naina.

44 Somrail.

45 Kanak (*Ehretia Umbellulata*).

46 Tamarind (*Tamarindus Indica*).

47 Bhusi.

48 Linseed oil.

49 Fish oil.

50 Bhusa Kali (lamp-black).

51 Tallow.

52 Indigo.

53 Khunkharapi or Laba (Extract from wax).

54 Hirakash: Sulphate of iron or copper or green vitriol.

55 Alta or liquid vermilion, extract of wax.

56 Sombul Khar or Sakhna, Arsenic.

57 Phitkiri, alum.—It gives a white colour. For detailed account of these ingredients, see "Tanning and Working in Leather in the Province of Bengal", by Rowland N. L. Chandra, pp. 6-7. See also p. 12.

VARIETIES OF LEATHER ARTICLES

1 Shoes; 2 Slippers; 3 Drums; 4 Leather straps or thongs for tying carts and ploughs; 5 Whiplashes; 6 Moneybags; 7 Pouches; 8 Water-carrier's bags; 9 Leather sheets for covering things; 10 Bellows; 11 Carriage cushions; 12 Scabbards; 13 Baskets; 14 Boxes; 15 Machine belts; 16 Jars for keeping oil, ghee or molasses; 17 Covering for boxes; 18 Coverings of bullocks; 19 Ropes and vessels for drawing water; 20 Saddles and bridles: made only in large towns; 21 Country harness: for hackney carriages, ekkas, etc.; 22 Dugi; 23 Tabla; 24 Dholak; 25 Khole; 26 Khanjani; 28 Mridanga; 29 Dhak; 30 Washer; 31 Chippings for race course; 31 Pabitra; 32 Mandar; 33 Asan; 34 Mundles; 35 Jhallar: coverings for bullocks.

Goat and sheep skins and calf leather are used in the villages for making strips for sewing and for shoe-edging (magji). Cow leather is mostly used in making the top parts, and buffalo leather, the soles and heels of shoes and boots. Goat and sheep skins are generally used for the inner lining of boots and shoes. Goat-skin is mostly used for musical instruments, the principal centres of the manufacture of which are Calcutta, Murshidabad, Dacca, Vishnupur, Birbhum and Midnapur.

THE IMPLEMENTS USED

1 A wooden board (*Pirhi*).

2 A wooden stick (*Benga*).

3 A chisel (*Kharpa*).

4 A chisel (*Khurpi*).

5 A Pounder (*Lohia*).

6 Pincers.

7 Sewing pin (*Khatarni*).

8 Boring pin (*Sutarni*).

9 Horn (*Singhia*).

10 Hammer (*Haturi*).

11 Phorma (*Lasts*).

12 Wedges of wood or leather fastened to the last to make it fit: paratala.

The process of manufacturing leather is divisible into two main heads, viz., tanning and currying. The operation begins with

HIDES AND LEATHER TRADE

treating raw hides and skins with tannic solutions and ends with manipulating them with fatty matters. Currying softens leather, renders it more waterproof and improves its appearance, but it is not practised by the village leather manufacturers.

The process of tanning is almost the same everywhere. The difference lies in the tanning materials used, and the care, attention and time bestowed on the work.

TANNING BULLOCK AND BUFFALO HIDES

1 *Cleaning and drying green hides.*—The green pellicle flayed from the carcass of a bullock, or a buffalo, is first of all washed well, to remove mud and blood stains, dung plasters and other kinds of dirt. Plain water is used for the purpose. After washing, it is placed on the level ground exposed to the sun, the ends being pinned to the ground by small pegs in order to prevent contraction. Two or three days' sunning is sufficient in the dry season, but in the wet season a longer period is required. In the rainy season the hide often begins to rot, and in such cases the rotten portions are clipped off to prevent the rest of the hide from being spoiled. The hides thus dried are fit for exportation and are exported in this state from the interior.

2 *Softening of dry and hard hides.*—To soften it, it is steeped in water. Another method is to apply earth and water, or water only, and to roll the hide up and keep it by for a few days.

3 *Washing the hides.*—The second washing is a more thorough process. The hides are steeped in a pan or earthen cauldron, or wooden tub, for a day, and are then rubbed with the hands or scraped with a blunt instrument, so as thoroughly to clean them of all dirt. Wet salted hides, dry salted hides, and sun-dried hides, obtained from merchants, and dealers in hides, have to be similarly steeped in water, and washed, in order to free them from salt and to render them uniformly flaccid and soft.

4 *Liming the hides.*—The flesh side of the hide is next smeared with a thick layer of lime. It is then rolled up, folded, and immersed in a strong immersion. It is usually taken out and aired every day for an hour or so. Some, however, soak it for three or four days continuously; after which they unroll it, air it, fold it up again, and put it into the lime vat for another period. During the period of its immersion it is often stirred in the solution, to assist the working of the lime, and in order to obtain a uniform spreading over the heating and rotting of the hide. In the cold weather, cowhides are kept in lime water for 8 to 12 days and buffalo hides for 15 or 16 days, but in the hot weather, the usual periods are 5 or 6 days and 10 or 12 days.

5 *Unhairing and fleshing the hides.*—The hide is then taken out of the lime-pit or tub and the water wrung out of it by twisting it tightly. It is then put on a sloping block of wood called the tanner's beam (*Kanta piri*), or on a stone called *sille*, or on the floor, or on the smooth ground as straight as possible, and the hair scraped off by means of a blunt knife called *banki* or *khurchuni*. The latter is a slightly curved instrument provided with one, but usually with two handles.

Ordinarily it takes a full day to unhair and flesh a big hide, but three goat skins can be done in one day.

6 *Washing away the lime.*—This is the last process preceding tanning proper. The hide has now to be thoroughly cleaned of lime, and for this purpose it is put into a tub of clean water and rubbed with the hands. But the use of running water is preferable, as the hide can then be cleaned better. To thoroughly clean it, the hide is rubbed with soap in a tub of bran and water, in the portion of 2 pounds of bran to a gallon of water. Instead of soap, some people rub it with alum and then wash it. Others again steep it for a period of 10 to 15 days in a diluted solution of gruel or water of boiled rice.

7 *Tanning proper.*—Tanning is carried out in two ways, *viz.*, by steeping the hide in a solution of tannic material and by infiltration of the decoction through the hide. The steeping process is as follows: The hide is put in a vat containing the infusion and is trodden with the feet or rubbed with the hands. The object of doing this is to force the tannic juice into the pores of the hide and thus to impregnate it with tannin. The treating is employed for two or three hours a day; or if it is rubbing 4 or 5 times a day generally after two to four days the hide is taken out and the superfluous moisture squeezed out. The old solution is now thrown away, and the hide is soaked in a new and stronger solution of some other tanning ingredient. Five or six steepings are considered essential for cowhides, and eight to ten for buffalo hides.

The infiltration process generally followed by the Muchis comes after that of steeping in tan liquor. For this purpose the hide is sewn up on three sides and made into a bag resembling the *bhisti's* *mashak* (leathern water-bag). A tanning infusion is then poured into the bag until the latter is quite full. The open side is then sewn up and the bag suspended from a tripod made of three bamboos or poles. The real object of this process is to complete the impregnation of the hide with the tannin. The infiltration is repeated as often as the tanner desires.

In the process of steeping, the materials commonly used are—*Harra*, *Garan*, *Teri*, *Babul*, *Am*, *Amla*, *Mahua* and *Bahera*.

HIDES AND LEATHER TRADE

In the process of infiltration the materials commonly used are—Asan, Dhawa, Sal or Sakhua, Babul, Bauha, Dhan and Arjun, but most of all, and in preference to all, the Asan.

8 *The hammering process.*—First the leather is rolled up and trampled under foot for an hour or so. After this it is unrolled and placed over the mouth of a hollow block of wood called *Ookhli* and hammered by the end of a heavy pole called *Shamat*. The hammering process lasts for a couple of hours or so, and its object is said to be to give compactness to the leather.

9 *Shaving.*—The outer side of the leather is scraped, rubbed and scoured with a knife of *Khar* wood or with merely a piece of split bamboo, somewhat like a paper-cutter, called the *pelengi*. After this, the leather is finally dried in the sun before it is subjected to the process of shaving. The leather is now spread over the shaving pin—a sloping board—with the inner side upwards, and the surface is carefully worked upon with a sharp two-handled convex knife.

10 *Smoothering.*—In villages this is done by spreading out the leather on an even surface and weights are placed over it.

11 *Polishing and Graining.*—The leather is now dressed with fish oil and tallow or pig's tard, and when the application has well soaked in, it is rubbed, by those who possess it, with a three sided steel instrument called a "sleek" to remove any crease and unevenness still left. The ordinary village *Muchi* polishes his leather by drawing over it a flat smooth piece of iron. The graining process is known only to regular tanners. This is however done by an implement with a cork surface.

12 *Colouring and Varnishing.*—Varnishing is not known to the village *Muchis*. The village *Muchi* usually colours his leather.

COLOURING INGREDIENTS

A Black ink composed of myrabolam and ferrisulph.

B Laha or Khunkharapi (for red colour).

C Lodha or nodha (white).

D Dahua or dhawa (Brown).

E Kusum (Orange).

There is no gloss or glaze in the leather.

The tanning process of goat and sheep skins are more or less the same. Sometimes these are not tanned at all, but are merely tawed by the application of *Khari*.

The skins of tigers, deer, etc., are also tanned by the village *Muchi*. (Tanning &

Working in Leather in Bengal by Rowland N. L. Chandra.)

The *chamars* are called *rishis* in Bengal. They cater for the simple needs of leather and leather goods of the poorer sections of rural Bengal. They do not fetch much price and their demand has been steadily decreasing ever since better leather and leather goods are manufactured in the modern centres of tanning like Calcutta, Cawnpore, Madras, etc. Primitive village tanning is definitely decadent in Bengal and its votaries have taken to other avocations for a living. Some of the *rishis* in villages spend a part of their time in a work allied to tanning, viz., making of musical instruments like *Dhak*, *Dholes*, *Dugis*, *Tablas*, etc., in which semi-dressed skins are used. They also often serve as musicians of the village on such ceremonial occasions as *Pujas*, marriages, etc. But this is a subsidiary occupation. Their main work is agriculture and thus the traditional tanning and leather working people of Bengal have been practically ousted from their caste profession. [Report on the Survey of Leather Industries in Bengal, by B. M. Das, pp. 18-19 (1941).]

TYPES OF HIDES AND SKINS

1 Cow hides (including calf skins).

2 Calf skins: Bengal produces the largest number of calf skins in India.

3 Goat skins: The goat skins of Bengal are the best in the world. (cf. Glace Kid.)

4 Buffalo hides: These constitute 9 per cent. of the total annual production of raw hides and skins of Bengal.

5 Sheep skins.

6 Reptile skins.

7 Lizards.

A The oval grained yellow lizards (*Varanus flavascens*).

B The round grained Bengal block lizards (*Varanus bengalensis*).

C The black and white lizards or *Ramgodis* (*Varanus Salvator*).

8 Crocodiles.

A Makars (square).

B Gharials (rectangular).

9 Snakes: cf. Bengal Pythons.

	No. of live stocks Census 1935	Average live	Estimated pro- duction of Hides and Skin per annum	Value Rupees
Cow	24,198,872	{ 4 years 6 "	6,049,718	
Buffalo	1,088,112	6 "	181,352	10,88,112
Goat	5,435,252	3-6 "	1,509,792	15,09,792
Sheep	613,677	2-8 "	219,170	1,36,989
				1,44,34,320
				8,00,000
				1,56,34,320

See Report on the Survey of Leather Industries in Bengal by B. M. Das, p. 3.

To this should be added the value of reptile skins which are estimated at Rs. 8 lakhs: *ibid*.

See also Table IX, Table X and Table XI, pp. 24-25 (*ibid.*).

See Appendix VI showing exports by sea in Tanning and Working of Leather in the Province of Bengal by Rowland N. L. Chandra (1889-90 to 1901-1902).

Reviews of the Trade in India Hides, skins and leather, Government of India, 1919.

Indian Tan stuffs and their tannage by W. A. Faraymouth and J. A. Pilgrim, *ibid*: pp. 77-169.

Dyes and Tans of Bengal by H. W. McCann, p. 157.

See Sea-borne Trade in India, 1933-34 and 1937-38.

BRUSH INDUSTRY

XXV

The Brush Industry

Brush manufacture was begun in this country about 60 years ago. By and large, the manufacturing processes remain unaltered although machines have been introduced in some establishments. But the introduction of machines has not substantially altered the sizes of brush factories and brush making is still regarded as a cottage industry. Brush factories have sprung up all over the country though most of them are situated in and around Calcutta, Bombay and Delhi.

For the greater part of its existence the local brush industry could not make much headway owing to foreign competition. The situation has in recent years, however, much improved. Needless to add that in the past it did not receive any support from the foreign managing agencies and firms. It was the patronage of semi-government and public institutions like the Calcutta Corporation, District Boards, Hospitals, etc., that kept the industry alive. At present big jute mills, cotton mills, workshops and factories have begun to use locally made brushes.

The most important raw material for brush making is the bristle which is found in abundance in India. But brushes are required for various uses and one kind of bristle cannot answer all requirements. There are jobs that call for hard brushes and there are others that require soft ones. There are brushes made to withstand water because they have to be dipped in water in the process of work; there are others made to withstand oil because they have to be dipped in oil.

In addition to bristles, therefore, fibres, sticks, wires, and recently nylon, are used for making brushes. The hair of cattle, goats and sheep, horses, hogs, etc., are locally available in sufficient quantities for making bristles. These are sold by the maund and the prices vary from Rs. 150 to Rs. 200 per maund.

Natural fibres are imported from abroad. These include Mexican fibres, Chinese bristles, palmyra fibres, etc.

The stick used for brushes is usually the rib of the cocoanut leaf. Wires are either Indian or of foreign made. The brass used for brushes is either Indian or imported.

The wood used for making brush handles is usually indigenous and includes mango, teak, geon, gambar and box-wood. These different woods are sold by the cubic foot.

The gum used in brush-making is known as rubber-setting glue. It is bought by the gallon.

Varnish.—The Varnish used for finishing brushes is generally prepared by brush-makers themselves. It is prepared by melting and mixing the necessary ingredients

with the desired colour added in proportions required.

Tools.—Borer or drill comb, hacksaw, scissor, pliers, hammer, large-sized needle and vice are the implements required in the work.

In Bengal about 2,000 people are employed in this industry. Workers include boys, young and old men as well as women. Workers are paid either fixed pay or at piece-rates, which vary from eight annas to Rs. 3 or more.

The different kinds of brush manufactured in West Bengal are:

- 1 Drain or sewer Brushes—
Length 6" to 12"
Width 2½" to 3"
Bristles 4" to 5"
Cane bristle or palmyra fibre @ Re. 1 each.
- 2 Sweeping brushes with handle—
Coir fibre (Colombo) 6" to 3' @ Rs. 12 to 30 per dozen.
- 3 Road cleaning wire Brushes—6" to 12"
—gg. 18 up. Rs. 9 to 24 per dozen.
- 4 Paint Brushes—
Chinese Bristles Rs. 12 to 48 per dozen
Turned handle, (Tin mounting).
Various qualities.
- 5 Oilbrush—
For goldsmiths and workshops
bristles Mexican fibre 1", 5", 1-0,
x ¼.
- 6 Typewriter brushes—
Hog bristles ½"×3" Rs. 3 to 6 per dozen.
- 7 Horse brushes (Syce brushes)—
Mango wood, strap handle. 8"×4".
Mexican fibre,
oval shape, Rs. 24 to 30 per dozen.
- 8 Round machine brushes—
wire or bristle 6" dia.
- 9 Marking Brushes—
Stencil marks 6"×9".
Coir bristle.
- 10 Artist's brushes—
Sable hair, Rs. 12 to 15 per dozen.
- 11 Hair brushes—
Nylon or hog Rs. 2 each to Rs. 5 each.
- 12 Shoe brushes—
Horse hair
Cattle hair As. 6 to As. 12 each.
- 13 Bottle washers—
Horse hair
Nylon with twisted wire handle.
- 14 Clothes Brushes—
Horse hair
Cattle hair
- 15 Tooth brushes—
Nylon or compound bristles.

INDIGENOUS MANUFACTURE OF IRON

XXVI(a)

The Indigenous Manufacture of Iron

Iron is intimately connected with the social life of Bengal. It is customary to use this metal on many happy as well as unhappy occasions of our daily life such as birth, Churakaran (cutting the hair), Upanayan (sacred thread ceremony), marriage and Sradhs. On marriage, girls are enjoined to wear on their left hand a piece of thin iron bangle called *Noa*, a colloquialism for iron (*loha*). A married girl is often blessed with the phrase. "May your *Noa* never wear off" which means that she be spared the misfortune of widowhood; *Noa*, along with the vermilion on the head, being the mark of a married woman whose husband is alive.

Time has brought about many and far-reaching changes in our social life, but the ceremonies and rituals of old still persist amongst us unchanged. Many household utensils have come down through the ages to us exactly in their original shapes; Weapons and tools and some types of utensils have, however, undergone a great deal of transformation. It is necessary to refer here to the fact that it was with the establishment of foreign rule in India that the beginnings were made in the direction of large-scale industrialization. Owing to the freer availability of raw materials many hereditary handicrafts were revived. Industrialization led to the manufacture of tools, various things of daily use and even firearms. But, the craftsmanship and skill that lay behind these manufactures were not really anything new.

Many parts of Bengal are waterlogged; probably a still greater part of it was so in the remote past. (Some authorities think that the word *Bangla* is derived from the Tibetan word *Bans* which means *waterlogged land*). The nature of the soil in Bengal differs from zone. The soil of the north and north western areas is different from that of the south. The soil of Bankura, Burdwan, Birbhum and Murshidabad, as we find it today, is again of a different type; it is of a brownish colour.

Yellow or waste land is generally marked by rust coloured patches, which are usually of the size of small stone chips (*banabut*) sometimes slightly bigger. This clay often used for colouring purposes, is actually ferrous clay. It can be easily broken down and is what the geologists call iron ore. Iron is generally found in two states: As iron ore and Oxide.

Until the recent past there were indigenous iron-smelting shops in the above-mentioned places. As a matter of fact these areas were

known as "Loha-Mahal" or Iron regions. Indeed it will not be incorrect to hold that the smelting of iron was carried out here for centuries. Besides, it will not be out of place to mention here that the iron produced in Bengal was of a particularly valuable quality; for even now, the *kamars* or iron-smiths are in the habit of referring to mill-manufactured mild steel as *Bangla Loha* or Bengal iron. Probably this was the name by which iron produced in Bengal was known outside the province.

With regard to the location of iron ore reserves and iron smelting in Bengal, the following is extracted from T. D. Oldham's Report of the Examinations of the districts in the (Damoodha Valley and Beerbhoom producing ore).

"Iron ores have been worked under the rough native made of smelting and plentiful qualities are found in Deocha and Dhamra in Birbhum. This is a very interesting district both from the manner in which the ore occurs and the simple process adopted in its reduction. At present (1852) the manufacture of iron is confined to the three or four villages, of which Bellia Narainpore is the largest and most important. Next to it in extent of the workings is the village of Dyoucha. Dyoucha, lying about 20 miles to the South of it (Bellia Narainpore). At Damrah, also, the position of which is intermediate, there are several furnaces at work and also at Sanpore. But there are few villages throughout that neighbourhood, adjoining which large heaps of slags and refuse of furnace workings may not be seen, giving evidence of the extent to which these operations had been formerly carried on, and of the long time during which they had been continued.

At Dyoucha, there are at present (1852) about 30 furnaces at work for the reduction of the ore into Pig Iron or what is called here *cutch* iron, and about as many more for refining it, or making it *pucca*. Each of these furnaces when at work can turn out 20 to 25 maunds of Pig Iron will be turned out during a week. The furnaces work throughout the year with only the occasional stoppages required."*

The disposal of smelted iron and fabricated iron and steel articles through the channels of trade is thus described by J. M'clelland in the Report of the Geological Survey of India for the season (1848-49), pub. 1850.

* Recently, during a visit to Deocha and Muhammadbazar, the Editor received the gift of a beautiful hatchet or battle-axe of *paghal* stainless steel, said to be about a hundred years old, from Sri Gopinath Ghosh of Puranagram—A.M.

INDIGENOUS MANUFACTURE OF IRON

"The trade is carried on in English goods and salt, brought from Calcutta; which are exchanged for iron, mica, lac, tussur, dhoona, or Saul Gum; cotton, harua a black dye, the galls of terminalia chebula; jugdeo, another dye, the flowers of *Grislea tomentosa*; amla, the fruit of *Phyllanthus emblica*, and numerous other fruits, dyes, gums, etc. the produce of Hills of these products, iron and mica are the principal.

"The Iron is manufactured by Lohars and Koles, for mahajans who make advances to them for the purpose, at the rate of two and a quarter maunds per Rupee. The mahajans convey it from various parts of the District in which it is made, as well as several marts above-mentioned, to Bancoorah and Nowadah where it is exchanged for grain, which in return is brought into the Hills, and supplied at the rate of two rupees to two rupees eight annas per maund, to the Lohars and Koles employed in the manufacture of Iron, as they never cultivate soil. The mahajans thus obtain from every maund of rice, 5½ maunds of iron; the difference between the relative value of the two articles in the hills, as compared with the plains, being the expense of transit; a fact which places the want of roads in this part of the country in a strong light.

"*Lohars*.—A numerous caste, distinguished chiefly by their employment in making iron. This they obtained from a Siliceous Oxide, an ore, which they extract from small superficial excavations or gather it in ravines or the beds of streams, etc., and when such sources of supply are exhausted in one place, they migrate to another, pay but little attention to cultivation. They are said to be generally poor, although the rate of their daily wages is higher than that of the Santals who are better labours."

Writing in 1879 his statistical report of thana Labpore, Janakinath Majumdar says: "To the east of village Labpore, there lies a waste. "Dhamga" on either side of the river Laghata, near Sarparajpore, on which, here and there, heaps of iron slag (*Louhakilta* or *Mandur*) are found, both above and underground. Heaps of iron slag are met with in the village of Lodda a Kotsal (iron factory) existed at this spot."

The mention of Bengal iron is found in *Dhanurveda* and such early classics as *Lauharnab*, *Virchintamani*, *Sharngadhara Padhati* and other books. The *Ain-i-Akbari* says that there was an iron mine in the province of *Bajuha*. Now, *Bajuha* was actually located near the present city of *Dacca*. There iron was extracted from a reddish mixture of stone and clay. The ironsmiths of those days knew the art of ironsmelting and were rewarded for their skill by the grant of *jaigirs*. The *jaigirs* so awarded were known as "*Ahangar*". (*Visvakosh*—*Nagen Basu*.)

References to *Khargas* or swords show that beautiful specimens of these were fashioned in the following places and the product of each place had its distinctive characteristic qualities.

Khati; *Khatter*, *Rishik*, *Banga*, *Sarparak*, *Bideha*, *Anga*, *Madhyamgram*, *Bedi Sahagram Kalashkar*.

It is also stated that swords made in these places and in China were not only of an excellent quality but brought good fortune.

The foregoing shows that the art of sword-making in Bengal was raised to the point of virtuosity and swords of Bengal were famed for their pliancy, strength and sharpness. From this it can be safely deduced that the *Sanga* iron that was used in their making was of a really fine quality and the art of tempering steel had reached high degree of excellence. In the *Mahabharata* we find references to these swords when we read of the kings of Bengal with their elephants and armies joining the *Kauravas* and fighting the *Battle of Kurukshetra*. Besides there are many passages in the *Mangal-Kavyas* which set forth the manner in which various things were fabricated from iron. The skilful construction of the iron chamber in *Manasa-Mangal* is, of course, too well-known to need recounting.

The *Kamars* or the ironsmiths of Bengal are one of the nine professional caste-groups collectively known as *Naba-Sakh* (literally the nine branches).

The *Kamars* are again divided into eight sub-castes. A folk tale, current in the *Midnapur* district, describes the genesis of these subdivisions. It is said that once upon a time there took place a fight between a *Kamar* and the *Iron-Demon* and the *kamar* overpowered the demon, smelted him and produced eight different kinds of iron, from which were fashioned the following eight groups of *kamars*:

1. The Ironsmith.
2. The Silversmith.
3. The Brasssmith.
4. The Goldsmith.
5. *Khatra* (smiths who make metal owls used in the worship of the goddess *Lakshmi* and such things as *Kajal Lata* the receptacle for *Kajal* or a kind of blackish eye-ointment used by women and young children).
6. The *Chand Kamar*.—These smiths make looking glass made of brass or metal.

- | | | |
|--|---|--|
| <ol style="list-style-type: none"> 7. <i>Dhokor</i> or <i>Dhokra</i> 8. <i>Tamra</i> | } | These two sub-castes of smiths live in the jungle areas of North <i>Midnapur</i> . |
|--|---|--|

INDIGENOUS MANUFACTURE OF IRON

The tribal peoples, known as Asuras and Loharas, living in the Western fringes of Bengal and in the Chotanagpur area, extract iron from the earth. We have already mentioned "Ahengar Jaigir" which has a bearing on the present topic. Writing in 1852, Oldham speaks of two different groups in connection with the extraction and smelting of iron. One of these groups engaged themselves in making pig iron. It is interesting to find that the former—the iron-smelters or makers of pig iron—were Mussalmans while the latter—the makers of refined iron and steel—were Hindus. Many so-called aborigines of the neighbouring areas were also engaged in iron smelting. Perhaps the people belonged to the sub-castes of Dhokras and *Lohars of Tamra* class mentioned in the foregoing Midnapur folk tale who lived in the jungle areas to extract and smelt iron.

Many ironsmiths are found in the neighbourhood of Dacca who, it is said, were brought there from the North West during Muslim rule.

The ironsmiths of the 24-Parganas are divided into three classes: North Rahri, South Rahri and Anarpuri. Social contacts between these three groups are taboo, the North and South Rahri are again divided into Kulins and Mauliks.

The ironsmiths of East Bengal are divided into the following three groups: Bhusanapati, Dacca, and Paschima or the Western. "Naldipati", "Chaudda Samaj" and "Pancha Samaj" are the three subdivisions of the Bhusanapati, social intercourse exists between these three groups.

The Kamars of Murshidabad are divided as under: Rarhi, Barendra, Daccawala and Khotta. As their names imply Daccawallas came from Dacca and the Khottas from Bihar and the U. P. before they took up domicile here.

In the Pabna district—Kamars were guided by Dasha Samaj and the Barendra Kamars by Pancha Samaj.

In Noakhali kamars are divided into the two sections of Jati Karmakar and Sikhu Karmakar. All social intercourse between them is taboo.

In Burdwan there are three classes of Kamars, namely Bilashi, Mamudpuria and Kamla.

In Manbhum there are four classes: Jagahiya, Dhokra, Lohasa and Basuna. Amongst the Santals we find the following four classes: Ashtalai, Churalai, Belalai and Sankhalai.

In Bengal the kamars have their gotras (clan). In Singhbhum, and Santal Parganas they are divided into 'ghars' as well as Gotras. The main gotras are as follows: Banga, Alamyam, Bharadwaj, Kasyap, Maudgalya, and Sandilya. Normally, endogamy,

that is marriage within the clan, is not permissible among the upper classes. Marriage within the same gottra (clan) is permissible if the parties are five generations removed on the maternal side and seven generations removed on the paternal. The common Bengali surnames of kamars or ironsmiths are, Das, Ari, De and Tewari. There are other surnames too, e.g., Rai, Mandal.

The Lohars of the Santal Parganas have the following subdivisions: Birubhumia, Govindapuria and Satgarhia. As it is obvious, their names are after the places which they come from viz., Birbhumbias from Birbhum, Govindapurias from Manbhum, Satgharias from Burdwan district.

Lohardanga.—Manjhan Turalya, Muktalohar, Sadlohar; Sishutbanshi; Loharia; Lahandia.

Manbhum.—Loharmanjhi; Dandamanjhi; Bandilohar.

Bankura.—Angarya; Gobra; Jhetia; Panshill; The lohars of Chhotanagpur and West Bengal are Hindus. The Dowry system prevails in marriages. Polygamy is allowed. Divorce is permissible among the lower castes.

The majority of the kamars are Vaishnabas and the others are Saktas.

In practice, however, both Vaishnabas and Saktas worship such village gods as Dali Gorai, Baranda thakur, Phule Goshai sects, Bhadu, Bharanda, Mohangiri and Manasa. The worship of Mohangiri takes place on Mondays and Tuesdays in the months of Ashar, Agrahayan and Magh. Goat is sacrificed in this pujah and prosad or the food offered to the god during the pujah, is distributed to all and sundry. The Lohars of Bankura and the Santal Parganas have their own Bramhins. In Lohardaga, Pahans, Mottojhas and Sakhas perform religious worship. In the marriage of the Sadlohars the village-barber acts as priest.

Kamars of Nepal, generally known as Kasi or Kasia, are found in many parts of Bengal. They worship the goddess Kali, and Vishvakarma is their presiding deity. Among other subcastes there are deities like Kunlai, Anardhas, and the Khodai darmasthas.

The ironsmiths of West Bengal often engage in cultivation but they never take up carpentry as their profession. In Bihar, however, ironsmiths in many cases are also carpenters. In the Santal Parganas, the womenfolk work in smithies. It should always be borne in mind that there is no bar to outsiders taking up the work of ironsmiths and this fact explains why people of many different castes are counted among the ironsmiths. Many also work as of gold-smiths. Nevertheless, about 50 p.c. of karmakars are employed in their hereditary craft. The sacrifice of goats and buffaloes at religious ceremonies is generally performed by ironsmiths.

INDIGENOUS MANUFACTURE OF IRON

In his evidence to the Board of Control Raja Ram Mohan Roy, while discussing the economic condition of the indigenous craftsmen, stated that sometimes a local ironsmith earned as much as Rs. 10 to Rs. 12 a month. (Ref. p. 320 Asiatic Journal Vol. 7, No. 28). A plough used to sell for Rs. 2-5-0 and in places for as little as Rs. 2. Ironsmiths used to repair and ploughs in return of a fee of eight annas or a maund of paddy per plough per annum (Ref. p. 29 of the Statistical Account of the Birbhum District 1874). The village smith received about 4 aris or of paddy exchange of a plough-share. Interesting details about the rates of payment to the ironsmith for his services are found in the writings of the Rev. Lal Behary Dey, Nagendranath Basu and in W. W. Hunter's Statistical Accounts. Ironsmiths are generally physically strong and robust and good social mixers. It is a fact that the Sindh Kathi, (house breaking implements) that indispensable professional tool of burglars in Bengal, are made and supplied free by kamars. When early of a morning the smith finds a piece of iron-rod lying at his door-steps, he makes with it a pair of Sind Kathies, then he leaves the instrument at a previously appointed place from where it is picked up by the "Visitor of the Night". Since for all professional services there is generally a *quid pro quo*, thieves observe a gentleman's agreement never to pay a social call upon an ironsmith.

Ironsmiths used to fashion their tools of trade, weapons and various other products of daily use from ingots of pig iron. The ingot was hammered into bands or flat-iron which went into the making of iron chests. Unlike today, no single establishment, however, produced flat-iron, iron sheets, rods and bars. The ironsmith himself made his own anvil, bellows, hammer, chisel, etc., that is, all the tools of his craft. The Smith's shop was known as the *Kamarshala* or *Kamarshal*. Besides, the ironsmiths manufactured countless other small articles of daily use, a list of which is given later in this chapter. The art and craft of the ironsmith is hereditary, the son works as an apprentice and receives training under his father, and thus the skill is handed down from generation to generation.

In the fabrication of diverse objects, it was not necessarily the ironsmith who devised shapes and sizes himself. Very often they made them according to the patterns and specifications given or ordered by the customers.

The job requiring the greatest skill in Steel manufacture is of course tempering. Tempering in Sanskrit is called 'payana' or Pan. There are references to the art of tempering in many ancient treatises like *Brihat Sanhita*. Any sharp-edged weapon or other objects requires to be tempered to its appropriate use.

Weapons and tools made of iron get rusty and blunted or break with use, if untempered. Tempering was invented to prevent rust, impart strength and sustain the sharpness of implements. Some ironsmiths excelled in this art to such a degree that their skill was the despair of other practitioners of the craft. The weapons made by such people were so sharp that practically anything could be cut or joined by them. Ironsmiths would never divulge their own formula of their particular processes of tempering to anybody except their own sons or apprentices. Instruments meant for woodwork and similar materials are subjected to a mild temper while those for working on stone or metal are given a hard temper. Briefly, anything that had to be tempered was in the first place, heated to a pinkish red and then dipped into a solution of oil or water, containing the necessary chemical. In certain cases the use of urine was also indicated. Mere theory, or the reading of books, was not nearly enough for mastering the art of tempering iron; it called for years of rigorous practical training.

After a weapon was fashioned, it was properly cleaned and the sharp edge of its blade was coated with some salty or alkaline paste. The coated edge of the weapon was then put in fire and finally quenched in water or some other liquid. The Sanskrit payana is derived from pan or to drink or quench thirst.

The treatise on the art of tempering in the *Brihat Sanhita* is indicative of the all-pervading influence of the Sastras in practically every sphere of Hindu life; it shows that although iron manufacture was a calling below the station of Brahmanas or Kshatriyas yet they directed the ironsmith's work. Sukracharya's dictum is very relevant:

He who wants to win the favour of the Goddess Lakshmi, should temper his tools in blood; he who seeks a son of noble qualities should temper his tools in Ghrita or clarified butter and he who wants wealth eternal and beyond the dreams of avarice must temper his tools in water.

He who seeks fulfilment must temper his tools in the milk of an elephant or a camel. A weapon tempered in a solution of fish bile, the milk of a mare, goat and a doe and the juice of the palmfruit, will be of such great sharpness that a single stroke of it will sever an elephant's trunk in two. A sword will not be blunted ever so little even when it is violently struck on a stone, if its blade, is first dipped in oil and subsequently coated with a mixture containing the gum of *akanda*, the ash of burnt buffalo horn, the droppings of pigeons and rats, and finally dipped into any of the solutions mentioned above. The Kharga or the sword was and still is very much in use in Bengal. It will be difficult to find a well-to-do family without the possession

INDIGENOUS MANUFACTURE OF IRON

of one. This is because in Bengal, the Saktas or the worshippers of Kali preponderate and the practice of animal sacrifice is prevalent during the Durga Pujah and many other local rituals. The Kharga or the sword was one of the principal weapons in the armoury of the landlords and Talukdars and was at the same time used by thieves and dacoits in their raids. Kharga is an ancient weapon of war and is synonymous with sword (Nagen Basu).

In the olden days there was another weapon, like the sword for slaughtering sacrificial animals, known as hoghitra. The top of its head was curved or crescent-shaped, double-edged, the width about five fingers, the colour black and the handle formidably big. This weapon was very useful in slaughtering big animals like the buffalo. One had to hold it in two hands, raise it above one's head and bring it down with one mighty effort on the neck of the animal.

A special kind of iron, different from the usual variety, was used in the manufacture of swords. It was of two varieties Sanga and Niranga.

The Asi, Tarowal or the sword has undergone many changes in shape, mostly on account of foreign influence. The sword has today become practically obsolete as a weapon and its sole function of native princes and ceremonial parades. These swords are almost invariably of foreign make. Khargas are now used exclusively for the sacrifice of goats before the Goddess Kali.

The Probe, Forceps, Pincers and Scrapers were used in surgical operations. There were no less than 28 varieties of these instruments, the instrument used for probing pores in wounds, etc., had a mouth shaped like the earth-worm's pincers and forceps used for holding surgical needles had mouths like the neelitree. Others were shaped like the snake's hood.

In Sanskrit the words Ashtra and Shastra (usually translated into English as weapons and tools) have different connotations. A weapon that is wielded by hand is known as Shastra, e.g., swords, etc., while weapons that are hurled are called Ashtras, as for example, arrows, etc. In a commentary to the Bishnu-puran it is, however, stated that those weapons that are consecrated with mantras or holy incantations are called Ashtras; all other weapons are relegated to the category of Sashtas.

In ayurvedic treatises, the shastras and their uses to the Vaidyas or physicians have been elaborately discussed. In the well known medical treatise, the following is quoted from page 91 of Surgical Instruments of the Hindus, by Girindra Kumar Mukhopadhyay.

Surgical Instruments: they are to be of two kinds, yantras and the Sastras, the blunt

and the sharp instruments. Susruta enumerates no less than one hundred and one varieties of the blunt instruments and different kinds of sharp instruments. Harita enumerates twelve sharp instruments, and four prabandhas as necessary for the operation of extraction of arrows, and other foreign bodies.

Susruta subdivides the blunt instruments into six classes:

I Srastika or crudiform instruments	24
II Sandainsa or Pincher like	2
III Tala or pick lock like	2
IV Nade or tubular or pallow	20
V Salaka or Rod or Pricker like	28
VI Upayantra or accessory	25
	101

These instruments are advised to be made generally of iron (?) or of other suitable materials, when iron is not available. Their ends often resemble the faces of some ferocious beasts, or of deers, or birds. Hence the instruments so constructed as to have the likeness of their faces, following at the same time the directions of scientific treatise, or the instructions of teachers, or in imitations of other instruments, or in adaptation to the exigencies of the time. The instruments should be of reasonable size with their end rough or smooth as required, they should be of strong make, good shape and capable of a firm grasp.

According to Harita—
Harita Samhita III (vi) the twelve blunt instruments are:

1. Godha mukha or iguana-faced.
2. Vayra mukha, grdhra mukha.
3. Tribaktra or three faced.
4. Sandinsa or pincher.
5. Caknakrti or circular shaped.
6. Anaka?
7. Kanka pada?
8. Sringa or horn.
9. Kundala.
10. Sri basta.
11. Sanbatsika.
12. Pancabaktrum, i.e., five faced—Simha mukham.

Twelve sharp instruments of Harita are:

- Arddha candra or half moon shaped.
- Vripi mukha.
- Kanka patra.
- Kutha rika.
- Karavirakapatraka.
- Salaka or sharp probe.
- Karapatraka or saw.
- Nadisa or sharp hook.
- Grdhra pada.
- Suli.
- Sucei.
- Mudgara.

The intelligent surgeon should get this twenty varieties of shastras (weapons) prepared by an industrious (probably meaning skilful) ironsmith from iron of the purest quality. While learning surgery under an expert surgeon, the student is first made to

INDIGENOUS MANUFACTURE OF IRON

operate on gourds, pumpkins, water melons, cucumbers, etc., before he can be allowed to operate on human beings (Ref. *Susrut Sutrastha*—8).

Sharpening.—The usual practice is to sharpen the weapons by grinding on smooth slabs of stone. Often the sharpness of weapons is maintained by polishing them with sand or powdered brick.

Usually iron products are sold by the piece; a piece has its own price. In some cases, however, the price is based on the making charge of the product, that is on the amount of labour it embodies, calculated at the usual market rate of wages. In many big smithies workers are hired at daily rates of wages, which are often calculated down a fraction of a day or even by the hour. Besides, in many cases piece-rates are also in vogue. Sometimes the worker is paid a part of whole of his wage in advance. In the past generally most things were made to order by ironsmiths. It is, however, true that sometimes they used also to manufacture many articles of daily use on a mass scale. Such products were usually bought up by mahajans or wholesalers who sold them in markets, fairs and melas.

Formerly ironsmiths used to have the Gira or the breadth of a finger as the unit of measurement. Now-a-days, however, they have adjusted their measurements to the British standard inch. For example one *ja* is equal to $\frac{1}{4}$ " ; one *Suta* = $\frac{1}{8}$ " ; $\frac{1}{2}$ *Shuta* = $\frac{1}{16}$ " ; $\frac{1}{4}$ *Shuta* = $\frac{1}{32}$; etc. The weight however, is still calculated by Bengali Standards except in the case of steel, mild steel and pig iron. These are bought from big workshops who follow the (avoirdupois) as the unit of measurement.

The village ironsmith makes farming implements, ploughs and other small tools, etc., and looks after their maintenance. These people are generally passably good at their work and fabricate their products from scraps imported from Calcutta.

Kanchannagar, situated about 4 miles to the west of Burdwan, is a well known centre of iron products. According to the Government of Bengal's Report on Cottage Industries 1926, fifteen families of ironsmiths lived there, all engaged in the making of knives, razors, etc. There were about 8 small workshops, each employing on an average of twenty to twenty-five people. In November 1952, the Census Superintendent of West Bengal found only three workshops functioning. The workshop of Late Premchand Mistri employed an oil-engine and a number of Lathes. From used scraps, knives, scissors and razors are made from scraps. First the scrap is hammered into thin strips and cut into the necessary size, next handles are fixed and blades are tempered and finally

sharpened by grinding them on stones specially imported from Bankura. The products of Kanchannagar are sold mostly in Calcutta.

Bonpas (Kamarpara, P. S.).—This is an important centre of iron manufacture. Sankhari (P. S. Khandaghosh). Here also knives, scissors, etc., are manufactured.

Bankura.—Knives, scissors, razors, etc., made in the Sahepur village in this district, are well-known throughout Bengal. About fifteen families are now engaged in their manufacture.

24-Parganas.—Banti, (first knife) Katari, (bill hook) Da (chopper) of Bawali, Jalilpur and Bashirhat are famed all over Bengal. The large majority of the ironsmiths of Bawali and Jalilpur still ply their ancestral trade. In Thakurpukur there are two families of ironsmiths. The locks made at Natagarh, Shimli, Nimte, Denli, Kamarpara and Dutta-pukur are famed for their good workmanship.

Midnapur.—The ironsmiths of this district are still, by and large, engaged in their hereditary craft.

Hooghly.—Nearly 40 to 50 families of ironsmiths (mahisyas) in Kumarimora and Raghunathpur earn their living by making iron locks. The fishing hooks of Dhaniakhali are well-known.

Howrah.—In this district there are many forges and iron works. The iron workers include not only the kamars but also persons from other castes such as Mahisyas, Sadgop and others. They mostly turn out various iron tools. The locks of Domjur, Hatal and Bhujeswar are well-known for their superior workmanship and are exported to many places in and outside of Bengal.

Nadia.—In Barrackpur and Hogalberia locks, knives, and scissors are manufactured. The local ironsmiths cannot handle lathes, which is generally done by the Mistries, or Mechanics. The word Mistri is derived from the Portuguese Mestra which means Mechanic.

It cannot be said with any accuracy up to when ironsmiths were still making guns. But specimens of old guns can be seen in various places and museums. The oldest brass guns made in Bengal (16th) are supposed to be those found at Bakla in Barisal. They were made in the reign of king Kandarpanarayan. Guns were made in Murshidabad and Faridpur and canon in Dalmadal and Bishnupur. Reference to these ornaments are found in many monographs.

The making of guns of the ordinary match lock type does not call for any great skill. Until recently, such guns were made in Purulia and Manbhum. Many of the workers of Monghyr Gun Factory were from Barisal and the neighbouring areas.

In 1853 (55) with the laying of the railway line a number of small ironworks came into existence in Howrah. The establishment of

INDIGENOUS MANUFACTURE OF IRON

these factories brought about a significant social change. Iron work no longer remained the special prerogative of blacksmiths, for the workers of these factories were recruited from various castes. It was from this period that the real foundation of tool-making was laid in the province.

The different lines of iron manufacture continued to develop through the succeeding decades. The first World War, 1914-18, gave a great impetus to the smaller iron workshops of the province and all of them worked to full capacity for meeting the needs of war.

The Second World War (1939-45) saw an enormous increase in the number of these factories. Million upon million of rupees worth of orders were placed by the C. C. M. P., D. G. M. P. with these smaller factories and tools of various kinds were supplied by the Bengal factories during the war. These jobs could be divided into two categories: ferrous and non-ferrous. The local mistries can use their hands with the precision. Many highly difficult precision jobs were executed by these factories.

The stoppage of imports from Britain hastened the manufacture of small tools and heavy machinery in Bengal, efforts in which direction were being made for a long time. Winches, Farthen tile making machine, Ballpress lathes, Capstan lathes, Planing, Shaping drills and Hack Saws, Knitting machine, machines for the manufacture of soaps, lozenges, etc., were manufactured. Other things like the manufacture of Treadle Printing machines, Proofing Machines, cream separator. Power Presses up to 50 tons—machinery for various surgical instruments, etc., were undertaken in small factories run, more or less on the line of cottage industries.

It is seen that in such factories even twelve years old boys can work expertly in cutting screw-threads. They begin by looking after the lathe machines at a very tender age and later pick up difficult jobs like pinion fixing for screw cutting and the calculation of the pinion teeth.

Casting.—There are many casting shops in Howrah. Of the many items cast in these foundries mention may be made of weighs, weights and measures, frying pans, railways, winding staircases, rainwater pipes, sieves, ventilators, the shells of electric fans, street name plates, various types of moulds, parts of electric motors tools and appliances for railways, blocks, valves, etc.

The castings are done by melting ingots in cupolas (crucibles) of half-ton capacity on ovens burning hard coke.

Moulding Shop.—The molten ingot is poured into the moulds which are done on the ground of the moulding shop. In every establishment there is a hot room for annealing. Work in these establishments is carried

out rather haphazardly, by a sort of rule of thumb procedure. Yet somehow the work is accomplished with a minimum of waste. The moulds are prepared by patternmaker, specialists in their profession.

Shops for the repairing and servicing of clocks and watches, stoves, gramophones, sewing machines, cycles, electrical equipment, motor cars and typewriters are found in practically all large and small towns, in their main streets, hats and hazars. The Bengal is well-known for its skilful repair work. A large number of people are engaged in this profession. Unlike hawking repairers or solderers, these people do not go about from door to door offering their services. But if necessary they visit the houses of their customers to do the work on the spot.

Sheet Metal Industries.—A large variety of trunks, such as Toranga, Cases, Trunks, boxes and cash boxes are made from metal sheets in Bengal. Some of them are exported to countries outside of India. The sheets used are usually black sheet of 22 and 24 B. S. gauge and sometimes galvanised sheets are also used. The other manufactures include 4 gallon drums, buckets, mugs, cages and traps of various types. Watering cans used for watering gardens, buckets of various sizes and Bomas or sharp sampling instrument used by wholesalers and retailers of rice or grain for piercing gunny bags to get samples without injuring the bag are also made.

Cage Making.—Wire cages are generally "woven" by hands. Free School Street and Ultadingi are the main centres of cage making.

Type.—The first Bengali type was cut by Panchanan Karmarkar over a hundred and fifty years ago. He fixed the rate for type-faces at Rs. 1-4 for each face. We can see the type faces made by him in old Bengali Books. At present many people are employed in cutting type faces and type-cutters have become an organised and skilled profession. These people engrave the letters on steel and sell them in sets. Many people earn their livelihood by engraving letters for rubber stamps. Many ironsmiths were employed in turning out wood and iron engravings for blocks. The inlaid pattern work seen on gold objects were sometimes made by placing thin strips of gold on stick lac beating the patterns on to them, sometimes also by transferring the patterns from moulds on to the gold.

A good many people earn their livelihood as dice cutters. Dices are made by cutting up rods of high speed or nickel steel into necessary sizes and engraving on them.

In addition, the dice cutters make dices for diverse objects. These include dices for small boxes, scaps, bolts and locks, visiting

INDIGENOUS MANUFACTURE OF IRON

cards, locks, etc. These people work on daily wages as well as on piece-rates.

Iron weighing Machines/Scales.—The manufacture of weighing instruments and scales is a precision job requiring great skill. The name of Uma Charan Karmarkar is still held in high esteem by the makers of weighing instruments and scales.

The manufacture of chains, pulleys and moorings are carried on a fairly large scale in and around Calcutta because of its proximity to the great port. Buoys are also made here.

In the recent past owing to a variety of reasons including the ravages of malaria, the

number of Bengali ironsmiths in and around Calcutta has decreased and their places have been taken up by Bihari blacksmiths—not all whom are ironsmiths by caste. The Bengalis have a preference for the job of designers of machanics, moulding work in foundries and other skilled jobs. Not that they are averse to physical labour, but they do not like jobs that do not call for skill and precision and are generally carried out haphazardly by unskilled workers.

Extracts from the *Dhatumala* on the extraction of iron and steel and the various processes of tempering are given below:

Extracts from the Dhatumala

SYNONYMS OF IRON

Kalayasa, Ayas, Tikshna, Asmasara, Sastraka, Loha, and Pinda.

ORIGIN

Iron of several varieties were derived from the body of the demon Lomila, who had in days of old been slain by the deities in war.

CLASSIFICATION

Iron is divided into two classes: Munda and Tikshna.

SYNONYMS OF MUNDA

Sastrayasa, Sastra, Pinda, Pindayasa, Satha, Ayasa, Nisita, Tivra, Kharga, Mundaja, Chinaha, Chitrayasa, and Ayas.

SUBDIVISIONS

The Munda and the Tikshna classes are again sub-divided into sara loha and kanta loha which are defined as follow:

SARA LOHA

That kind of iron which, when coated with acid, gradually narrows at the top like a mountain peak, is called sara loha.

KANTA LOHA

The following are the indications of kanta loha. (A) When a drop of oil is thrown on water which is boiled in a vessel made of this kind of iron, the oil does not scatter round, but remains stationary at one place. (B) Asafoetida fried on such a vessel loses its smell. (C) The bark of the Nimba boiled on such a vessel loses its natural bitterness. (D) Milk boiled on it will bubble forth, but not flow over the ground. (E) Gram soaked in water in such a vessel will turn black.

THE VIRTUES OF SARA LOHA

The Sara loha is a specific for chronic dysentery; diarrhoea; rheumatism affecting half or the whole body, colic, vomiting, inflammation of the schneiderian membrane, bilious affections, asthma, and lung diseases.

THE VIRTUES OF KANTA LOHA

The kanta loha is a specific for glandular swelling in the abdomen, dropsy of the abdomen, piles, colic, dysentery, urticaria, fistula in ano, jaundice, ascites, leprosy, consumption, spleen, liver, and headache. In a word, the kanta loha removes diseases of all kinds and gives tone to the system and sharpens the appetite.

THE PROPERTIES OF IRON

Iron is bitter, astringent and sweet to the taste. It is a laxative, it is cooling, it increases longevity, it is good for the eyesight, it reduces obesity, it improves the "Wind", it cures the affections of phlegm and bile, it is an antidote of poison, it cures colic, ascites, piles, spleen, jaundice, obesity, gonorrhoea, worms, and leprosy. Iron rust possesses the same properties as iron.

THE EVILS OF IRON

The evils of iron are heaviness, hardness, nausea, syncope, burning sensation, gravels, and bad smell.

LAUHA KITTA

The small particles which form on the iron while it is subjected to heat go by the names of Mandura, Lohasinhanika kitta, and Sinhana. The different kinds of particles possess the same properties as the different kinds of iron they form on.

THE EVILS OF UNREFINED IRON

The use of unrefined iron brings impotence, leprosy, heart-disease, colic, gravels, asthma and other diseases, and probably death. It is, therefore, necessary to refine iron before it is used.

REFINING IRON

Cut iron into thin leaves and anneal them. While warm, dip them one after the other, and three times each, into oil, curds, sour gruel, cow's urine, and the decoction of Kulattha kalaya.

INDIGENOUS MANUFACTURE OF IRON

ANOTHER METHOD

Anneal the iron, and while warm pour on it the juice of the roots of the plantain tree. Repeat the processes seven times when the iron will be refined.

ANOTHER METHOD

Boil 128 tolas of Triphala in 1,024 tolas of water, until the water is reduced to one-fourth of its quantity. Make seven thin strips with 40 tolas of iron, and anneal them. When warm dip them into the decoction. Anneal and dip seven times, when the iron will be refined.

CALCINING

Pound the powder of pure iron with the juice of Patalagaruri, and then heat on puta paka. Then rub with the juice of Ghrítakumari, and heat it for three times on puta paka. Then rub with the juice of Kuthara chhillika and heat for six times on puta paka, when the iron will be calcined.

ANOTHER METHOD

Take of Hingula one-tenth of the quantity of powdered iron, mix them together and rub with the juice of Ghrítakumari, then heat on puta paka for six hours. Repeat the processes for seven times.

ANOTHER METHOD

Take of mercury one part and of sulphur two parts. Mix them together and make a collyrium of it. Mix with it an equal quantity of powdered iron, and rub it for six hours with the juice of Ghrítakumari; make a ball of it. Put it in a copper vessel, cover it with the leaves of the Eranda, and expose it to the sun for six hours. Then put the heated ball within a quantity of paddy, cover it with an earthen dish, and let it remain thus for three days. Then after pounding it well, strain it through a piece of cloth. Pound a quantity of the leaves of the pomegranate tree with four times of water, and soak the powdered iron in it. Expose it to the sun, and when it is well dry, heat on puta paka for 21 times. In this way iron of all kinds and gold, etc., are calcined.

BHANU PAKA

Place a quantity of pure iron in a mortar of stone or iron and break it to powder with a pestle made of stone or iron. Mix the powder with water or the decoction of the Triphala, and strain it through a piece of cloth. Wash it in pure water repeatedly and then dry it in the sun. This is called Bhanu Paka or heating by the sun.

DECOCTION

Take of Triphala the same quantity as the iron required for washing and Bhanu paka and of water twice the quantity of the Triphala. Boil till the water is reduced to one-fourth. This decoction is to be used for

washing the iron and the purposes of Bhanu paka. Pour this water on the iron and dry it in the sun for three days; or, divide the quantity of the water into seven. Pour one-seventh the quantity on the iron and dry it in the sun. When dried, pour another seventh on it, and dry again. Repeat till all the seven quantities are exhausted, when the Bhanu paka will be complete.

STHALI PAKA.

After finishing the Bhanu paka as directed above, the Sthali paka should be begun. Take of Triphala thrice the quantity of the iron, and of water sixteen times the quantity of Triphala. The decoction will be ready when the water is found boiled down to one-eighth of its original quantity. Of water take four times the quantity of the very soft substances mentioned above as required for heating iron, eight times that of the substances which are neither too soft nor too hard, and sixteen times that of the substances that are very hard. Boil the water to a quantity equal to that of the iron. Of the juice of each of the substances required for the Sthali paka, take a quantity equal to the weight of the iron. Put the decoction or the juices in a pot, place refined powder of iron in it, and then heat it. The Sthali paka will be completed when the decoction or the juices get dry.

PUTA PAKA.

Dig a hole into the earth to the extent of one square cubit. Fill the lower half of the hole with Bilghuntia, or paddy husk or firewood. Set it on fire. Place iron in a pot over it, and fill the upper half by placing over the pot Bilghuntia, or paddy husk or firewood. Whether by night or day, roast for twelve hours, when the iron will be reduced to ashes. If the pot is placed too close to the surface of the hole, then iron will be reduced to ashes quickly no doubt, but it will not be so efficacious, nor will it be so if it is placed too close to the bottom of the hole. The pot should be placed therefore half way between the top and the bottom of the hole. When the paddy husk or firewood or the cow-dung cakes are reduced to ashes, and get cool, take out the iron which is covered with the ashes. Do not take it out while warm, for if that is done, the efficacy will be affected.

PRESCRIPTION

Having regard to the affections of the humours and the powers of digestion, iron reduced to ashes may be taken internally from one to nine ratis at a time.

WHAT TO AVOID

The patient taking iron reduced to ashes should eschew the following:—Kushmanda, oil of the tila seed, Mash kalaya, mustard seeds, liquors, and acids.

INDIGENOUS MANUFACTURE OF IRON

Bibliography

Serial No.	Title	Author	Serial No.	Title	Author
1	Statistical Account of Bengal	W. W. HUNTER	29	Viswakosh	ED. N. N. BASU
2	Journal of the Asiatic Society of Bengal Vol. VIII P. 144 Vol. XII P. 164 Vol. XIV P. 754 Vol. XXIII P. 279		30	The Arts and Manufacturers of Bengal	J. FORBES ROYAL
3	Selections from the Records of Bengal Government : A. Vol. VIII 1853 B. Vol. XXIII 1855 (P. 184)		31	Manasha-Mangal	KHEMANAND KETAKADAS, ETC.
4	Memoirs of the Geological Survey of India : A. Vol. XIII Pt. 2 (P. 87) B. Vol. XI (1874)		32	Kavikankan-Chandi	
5	A Manual of the Geology of India : Vol. III 1881		33	Engineers, Journal, Calcutta Vol. III (P. 112)	WELLY JACKSON
6	A Monograph on Iron and Steel Work	E. R. WATSON	34	Court of Directors to the Question of Iron manufacture	DR. OLDHAM (1852)
7	Monograph, Indian Arms and Armour	B. A. BADEN POWELL	35	Pre-historic India	FOOT
8	Indian and Oriental Armour	LORD EGERTON	36	Statistical Report on Thana Labpore (P. 10)	
9	The Antiquities of Orissa	R. L. MITRA	37	Dhatumala	S. M. TAGORE
10	The Musnud of Murshidabad	P. C. MAJUMDER	38	On the Beerbhoom Iron Works	J. BARRATT
11	Murray's Hand book to India, Burma & Ceylon		39	Report of the Iron Ores of India : Gazette of India supplement (PP. 1874, 1457/59, 1494/96)	H. BANERMAN
12	Rig-Veda		40	On Iron Industry casting etc., see Ganda Lekhamala	A. K. MAITREYA
13	Brhat Samhita		41	A. J. NS Vol. 10 N 38 PP.108/9 A. J. NS Vol. 7 No. 28 (P.320)	
14	Kautilya Arthasastra	ED. JOLLY	42	Sketches of Indian Society	RAM MOHAN ROY A. J. No. 10-27
15	Geology of Darjeeling District	F. R. MALLET	43	An account of Howrah Past and Present pp. 82/83	C. N. BANERJEE (1872)
16	The Raiharh and Hurjir coal field	V. BALL	44	Imperial Gazetter 1907, III P. 145-6	
17	Chota Nagpur	F. B. BRADLEY BIRT	45	Surgical Instrument of the Hindus Cal. University Library No. 080 C.U. 137 in 2 Volumes	GIRINDRA KUMAR MUKHOPADHAYA
18	Ethnology of India	R. G. LATHAM	Exhibits in the Pairs Universal Exhibition 1878 p. 65		
19	History of India	M. ELPHINSTONE	<i>Tarowal</i>	Sword	T-1
20	Manu's Code	W. JONES	<i>Dhal</i>	Shield	D
21	Indian Agriculture	R. WALLACE	<i>Tangi</i>	Battle-axe	T-2
22	The Farm Manual	A. C. WILLIAM and D. J. MUNGHER	<i>Chora</i>	Dagger	C
23	Reports on Trade Carried by Rail and River in Bengal (1921-22)		<i>Phala</i>	Blade	P-1
24	Annual Statements of the Trade & Navigation of British India		<i>Sarki</i>	Spear	S-6
25	Various Parliamentary Papers (United Kingdom)		<i>Ballam</i>	Spear : Lance : Dart	B
26	Public Work Department Code from 1883.		<i>Barsa</i>	Spear : Harpoon	B-1
27	Financial Review of Operations of Ordnance Factories in India (1905-06)		<i>Karech</i>	Bayonet	K
28	East Indian Railway-Time Table, February, 1907		<i>Trisul</i>	Trident : A three-pronged spear	T-2
			<i>Bichoo Barsa</i>	Forked spear	B-2
			<i>Kookri</i>	Nepali short sword	K-1
			<i>Banduk</i>	Gun	B-1
			<i>Kaman</i>	Cannon	K-1
			<i>Gola</i>	Cannon Ball	G
			<i>Chharrā</i>	Shots, grapesnot	C-1
			<i>Baus</i>		
			<i>Dangas</i>	Knout/Ironhook	D-1

COMMON IRON IMPLEMENTS

XXVI(b)

Iron Implements in Common Use

(The symbols in the margin refer to the classified list that follows in the next section)

The difference between *Astra* and *Shastra* (raths) loosely rendered into English as weapons and arms is that the former is wielded by the hand all the time, e.g. swords etc., while the latter is hurled or flung in the process of use, e.g. Arrows, Spears etc.

In commentary to Bishnu Puran it is stated that the weapon which is sanctified by *mantra* or holy incantation is called *ashtra*. The weapon not so sanctified is called *Shastra* (See the section on *Shastras-Visvakosh Vol. XXI*).

Kharga Sword K-1

An ancient war-weapon or weapon of war. *Ashi* and *Kharga* are synonymous. *Hagitra* is similar to *Kharga*. Dhanurveda gives the following synonyms for *Kharga* :

Ashi; *Bishaan*; *Kharga*; *Tikshna-Barmā*; *Dubāsād*; *Sri Garbha-Vijaya*; *Dharmapāl*; *Nishtringsha*; *Chandrahās*; *Rishti*; *Kaukshayak*; *Mandalāgra*; *Karbāl*; *Tarabar*; *Tarabāri*.

These different names are applied to swords according to their shapes and sizes. The list given above is not, however, exhaustive (and many names have been left out). Swords were made of two different types or qualities of iron—*Sanga* and *Niranga*. Both these types of iron are sub-divided into many other varieties, such as, *Kānchi*, *Gandi*, etc.

Sanga iron was of many kinds. The following ten kinds of *Sanga* iron were well-known for the making of diverse types of swords:

Rohini; *Nilpinda*; *Nayoor*; *Graibak*; *Mayoorbraja*; *Titiranga*; *Subarnabraja*; *Shaibal*; *Malan*; *Moushal-bajra*; *Kangalbraja* or *Swarhak* and *Granthibajra*.

Three types of *Niranga* iron were used for sword-making. They were as follows:

Rohini, *Pandya*, *Raksha*, or *Kandā*. (Ref:—*Louharnab*, *Virchintamani*, *Sharngdhar Padhhati* and various other ancient treatises)

Rishik, *Banga*, *Shoorparak*, *Bideha*, *Anga*, *Madhyamgram*, *Bedy*, *Sahagram*, *Kalanjar*, *Chin* (China). Swords made in Bengal were prized for their pliancy, strength and sharpness. Sword-making is an exceedingly skilled art. Various processes were adopted for tempering the swords. Sword was in wide use in Bengal; *Khars*, *Ramda*, *Da* or *Chopper* and *Katari* are all derived from the *Kharga*. The size of *Khargas* varied from one and half cubits to two cubits or more.* The width of the blade was half a cubit or more.

*One cubit = 18 inches approx.

The handle of the *Kharga* was made of iron, teakwood or ebony; its blade was damascened.

Now-a-days *Khargas* are used only for sacrificing animals at religious occasions. The slaughter of the animal is generally done by *Kamars* or ironsmiths.

In many cases the water used for washing swords is used as medicine. Householders usually sharpen their swords with sand.

Articles for Grihastha or the Householder

Chhuri Knife C-1

Used for sharpening pencil, making, cutting quill pen etc.

Main centre of manufacture—*Kanchannagar*, generally made of steel scrap; size: Breadth— $\frac{1}{2}$ " and length— $2\frac{1}{2}$ ".

Chaku Knife C-1

Made of scrap used in bamboo and cane work, the length of *chaku* is normally about 5". Those used in marriages are made of mild steel.

Narun Nail-clipper: Nail-parer N

Made of scrap; used for paring nails and cutting corns. Size—B— $\frac{1}{2}$ " and L—6".

Banti Fish knife B-4

A sort of knife fixed in a board and used to cutting vegetables, fruits, fish, straw etc.

Banti used for cutting fish is made of good quality steel. The blade is generally mounted on a wooden board.

Kātāri Chopper

It is a kind of chopper for general daily use, e.g. for cutting bamboos, chopping coconuts etc.; it is of various shapes. Size 6" and more in length.

Dāh Chopper D-1

Khānrā Sword K-2

Sanna Pincers S-1

Chimté Tongs C-2

Tikr Chimté Small Tongs for picking and arranging coals on the hubble bubble T-3

Janti Kal Mouse Trap J-1

Maduli Amulet: Charm (case) M-1

Haman Dishit and Pestle Mortar H-1

Jānti Nut cracker or arecanut parer J-1

Aero knife A

Ramda Big Chopper D-1

Chumbak Magnet C-2

Dhwajar Danda Flag Pole/Staff Standard D-2

Chulo Uncon: Oven C-3

Ishtri Iron I

Articles for Cooking or Cooking Utensils

Sanrasi Pliers S

Chimté Tongs C-2

Banti Fish knife B-4

Karāh Frying pan K-11

Janjhri Sieve J-2

Khuntii Spoon K-3

Hātā Ladle: Spoon H

Chakoo Frying Pan C-3

Sancha Mould S-1

Bedi Pliers: Chains: Fetters: Shackles B-5

Palla Small ladle P-1

Kuruni Grater K-3

Dhaka Cover D-2

Taru Ladle: Spoon T-3

Chhankni Sieve: Strainer C-14

Tawa Baking pan T-3

Lohār Thālā Iron dish or plate L-1

Khola Bid karah: K-3

A big sized baking or frying pot.

Agricultural Implements

Moi Harrow: Clod breaker M-1

Hāt lāngal Hand plough H-1

Chhota Kodāl Pishani: Small spade C-4

Kaste Sickle K-4

Kenchhi Scissors K-4

Bide (See Hunter pp. 266) B-6

COMMON IRON IMPLEMENTS

Agricultural Implements—contd.		
<i>Dumli</i>	(See Hunter pp. 78-79)	B-3
<i>Phala</i>	Lengal	P-1
<i>Pashu</i>	(Hunter-used in Dinajpur)	P-1
	Small hoe	
<i>Henso</i>	Sickle	H-2
<i>Kodali</i>	Spade	K-5
<i>Dao</i>	Bill-hook	D-3
<i>Shabal</i>	Ironbar : Crowbar	
<i>Penti</i>	Panchan : Driver's rod or stick (used in Dinajpur side Hunter)	P-2
<i>Khanta</i>	Spud	K-5
<i>Kashte</i>	Serrated edge used in Murshidabad : Sickle	K-4
<i>Nidami</i>	Weeding hook	N-1
<i>Kodal</i>	Spade Used for earth-removal, especially on fields for excavation	K-6
<i>Gainti</i>	Pickaxe	G-1
<i>Denrooah</i>	An instrument similar to the English mattock used for turning up soils (<i>vite</i> Hunter—Used in Murshidabad)	D-4
<i>Ghensure kaste</i>	Scythe or sickle used to cut grass	G-1
<i>Khurpi</i>	Spud	K-6
<i>Khar kata</i>	Knife for cutting hay	K-7
<i>Kooloo</i>	(Exhibited in pans universal exposition—1862)	K-7
<i>Tepon</i>		T-4
<i>Koolpi</i>	Small vessel	K-7
<i>Koorie</i>		K-8
<i>Kalpa</i>		K-8
<i>Ela</i>		E-1
<i>Don</i>	Water lifter (for irrigation)	D-4
<i>Ankri or Ankshi</i>	Hook	A
<i>Pat</i>	(used in Murshidabad. <i>Vide</i> Hunter)	P-2
<i>Phanra</i>		P-3
<i>Dantla</i>	A kind of weeder	D-5
<i>Dhunti</i>		D-5
<i>Shanti</i>	(Hunter—Dinajpur) used for baling out water from the field	
<i>Doni</i>	for watering the fields	D-5
<i>Chhoni</i>	for watering the fields	C-4
<i>Balti</i>	Bucket	B-6
Tools and Accessories for Transport Animals and Vehicles		
<i>Nal</i>	Horse-shoe and Cattle-shoe	N-1
<i>Balka</i>	Hammer	B-7
<i>Shamadan</i>	Anvil	
<i>Tepon</i>	Chheni : Chisel : Used for punching holes or grooves on horse-shoe	T-4
<i>Jambur</i>	Shanrashi : Nail Extractor	J-3
<i>Hal Chakar</i>	Rim of the wheel	H-2
<i>Dhoori</i>	Axle	A-1
<i>Angus</i>	Ring/Hook	A-2
<i>Nongar</i>	Anchor	N-2
<i>Gajal</i>	Peg	G-2
<i>Perek</i>	Nail	P-3
<i>Baya</i>	Bouy	B-7
<i>Shikal</i>	Chain	
Tools and Implements for Wood-work		
<i>Karat</i>	Saw	K-13
<i>Kurul</i>	Axe : Hatchet	K-9

Tools and Implements for Wood-work—conclid.		
<i>Turpoon</i>	Hand-drill ; Bowstring	T-5
<i>Vyamar</i>	Drill	V
<i>Batali</i>	Chisel	B-8
<i>Haturi</i>	Hammer	H-3
<i>Gajal</i>	Large size nail Peg (wooden)	G-2
<i>Riveted door</i>		R-1
<i>Riveted safe</i>		R-1
<i>Kabja</i>	Hinge	K-9
Tailoring Accessories		
<i>Kanchi</i>	Scissors	K-10
<i>Chhooch</i>	Needle	C-5
<i>Thimble</i>	Thimble	T-5
<i>Gan Chhooch</i>	Large needle for sewing gunny, bags etc.	G-2
Barber's Tools		
<i>Naroon</i>	Nail clipper :	N-2
	Nail parer	
<i>Kanchi</i>	Scissors	K-10
<i>Sanna</i>	Pincers	S-1
<i>Khoochhi</i>	Instrument for cleaning the ear	K-10
<i>Khooch</i>	Razor	K-11
<i>Mastola</i>	Corn scraper	M-1
<i>Goonji</i>	Awl : Hair-pin : Used in sacred thread ceremony, etc.	G-3
Implements for Lathe Shops		
<i>Batali</i>	Chisel	B-8
	Used for making angles of various types.	
<i>Shan</i>	Stropper	S-4
Cobblers Tools or Tools for Leather Work		
<i>Chanchi</i>	Scraper	C-5
<i>Churi</i>	Knife	C-1
<i>Palu</i>		P-5
<i>Chhooch</i>	Needle	C-5
<i>Binde</i>	Awl	B-8
Musical Instruments		
<i>Angta</i>	Ring	
<i>Tar</i>	Wire	
Building Implements		
<i>Karnik</i>	Trowel	K-12
<i>Gajal</i>	Peg	G-2
<i>Chheni</i>	Chisel hammer-haturi	C-6
<i>Kodal</i>	Spade	K-6
<i>Shabal</i>	Crow-bar : Iron bar	
<i>Gainti</i>	Pick axe	G-1
<i>Khilen</i>	Aroh	K-13
<i>Hoorko</i>	Bolt	H-3
<i>Hanskal</i>	Bolt	H-4
<i>Shikal</i>	Chain	
<i>Olan</i>	Plumbline	O-1
<i>Garad</i>	Bars	G-3
<i>Kara</i>	Rings	K-11
<i>Hugta</i>	Ring/Hook	H-2
<i>Kapikat</i>	Pulley	K-13
<i>Karat</i>	Saw	K-13
Tools for Making Boxes, Trunks, etc.		
<i>Häl</i>	Flat iron/Band	H-4
<i>Chäddar</i>	Sheet plate	C-6
<i>Ripit</i>	Rivet	R-1
<i>Kulup</i>	Padlock	K-13
<i>Tälä</i>	Padlock	T-6
<i>Huder</i>		H-5
<i>Hambor</i>	Hammer (heavy) weight 5 lbs. or more.	H-5
<i>Haturi</i>	Hammer	H-3
<i>Chheni</i>	Chisel	C-6

COMMON IRON IMPLEMENTS

Tools for Making Boxes, Trunks, etc.—concl'd.

<i>Nehai</i>	Anvil	N—3
<i>Samadan</i>	Anvil	
<i>Shanrashi</i>	Tongs	S

Dice-cutting, Punchmaking, etc.

<i>Haturi</i>	Hammer	H—3
<i>Chheni</i>	Chisel	C—6
<i>Panchu</i>	Punch	P—6
<i>Type</i>	Typeface	T—6

The first type-cutter in Bengal was Panchanan Karmakar, a well-known ironsmith.

Tools and Accessories for the Smithy or the Forge

<i>Nehai</i>	Anvil	N—3
<i>Shamadan</i>	Anvil (small)	
<i>Hamboor</i>	Hammer (heavy) weight 5 lbs. or more	H—5
<i>Hathuri</i>	Hammer	H—3
<i>Chheni</i>	Chisel	C—6
<i>Shanrashi</i>	Tongs	S
<i>Shan</i>	Sharpner : Stropper	S—4
<i>Byana</i>	Punch	B—9
<i>*Katur</i>	A board of seat	K—14
<i>Chimle</i>	Tongs	C—2
<i>Panchu</i>	Punch	P—6
<i>Uko</i>	Iron file	U
<i>Moochi</i>	Crucible	M—2
<i>Lathe</i>	Lathe	L—1
<i>Hall</i>	Flat Iron	H—4
<i>Chulo</i>	Oven	C—3
<i>Hapor</i>	Fire bellows	H—5

*A board or seat in the Indian oil mill, which is loaded with stones or other weights for expression of oil

Articles for Goldsmiths and Sliver-smiths

<i>Shamadan</i>	Anvil	
<i>Haturi</i>	Hammer	H—3
<i>Sanna</i>	Pincers	S—1
<i>Tar</i>	Steel wire	T—7
<i>Thokai</i>	Hammer objects	T—7
<i>Niki</i>	Hand scale	N—3

Weaver's Accessories

<i>Maku</i>	Shuttle	M—3
<i>Choonch</i>	Needle	C—5
<i>Takli</i>	Spindle	T—7
<i>Charaka</i>	Spinning wheel	C—7
<i>Nalai</i>	Reel	N—4
<i>Chiruni</i>	Comb	C—8
<i>Chaku</i>	Knife : small spindle	C—1

Implements for Shell-work

<i>Karat</i>	Saw	K—14
<i>Uko</i>	File	U

<i>Chanchi</i>	Scraper	S—4
----------------	---------	-----

Soldering and Enamelling

<i>Tatal</i>	Soldering Iron	T—8
<i>Scraper</i>		S—4
<i>Katuri</i>	Cutter	K—15
<i>Shanrashi</i>	Tongs	S—1
<i>Khurcheni</i>	Soraper	K—5

Weighing Implements

<i>Kanta</i>	Scale (big) fitted with needle	K—16
<i>Dandi</i>	Scale (small)	D—6
<i>Niki</i>	Small hand scale	N—3
<i>Palla</i>	Scale-pan	P—4
<i>Batkharā</i>	Weights	B—9
<i>Man</i>	Weight measuring 40 seers or 80/82 lbs. avoirdupois.	M—3

Hookah

<i>Nalchi</i>	Hookah pipe	N—1
<i>Khol</i>	Shell	K—16
<i>Chhinch/Chhincka</i>	Skewer (A pin of metal to clean the upright pipe of the hookah.	C—9

Implements for Mat Weaving

<i>Chāku</i>	Knife	C—1
<i>Dāh</i>	Chopper	D—1
<i>Binde</i>	Awl	B—8

Implements for Hogla Work

<i>Chaku</i>	Knife	C—1
<i>Dah</i>	Chopper	D—1
<i>Binde</i>	Awl	B—8
<i>Henso</i>	Torque	H—2

Implements for Bamboo Work

<i>Dah</i>	Chopper	D—1
<i>Kātāri</i>	Chopper	K—1
<i>Satakaj</i>		

Instruments used for Thefts and in their Punishment

<i>Beri</i>	Shackles/Fetters/Chains	B—5
<i>Hātkārā</i>	Handcuff/Manacles	H—6
<i>Shul</i>	Impaling stake	S—5
<i>Sind Kati</i>	House-breaking implements	S—6

Gardening Tools and Implements

<i>Kalamkātā Churi</i>	Pen-knife	C—9
<i>Jhari</i>	A water-pot with a spout	J—2

Tools for Book Binding

<i>Paloo</i>		P—4
--------------	--	-----

Fire-Crackers

<i>Lohāchoor</i>	Iron-filings	L—2
------------------	--------------	-----

Articles for Godowns

<i>Bomā</i>	Scoop	B—10
-------------	-------	------

Articles for Moiras, Sweetmeat Makers

<i>Tejēl</i>	Small portable oven	T—8
<i>Khola</i>	Large baking and frying pan.	K—2
<i>Tāru</i>	Ladle (large)	T—3
	Spoon (large)	
<i>Karā</i>	Frying pan	K—11

Tools for Pith or Sola Works

<i>Chaku</i>	Knife	C—1
<i>Dāh</i>	Chopper	D—1

COMMON IRON IMPLEMENTS

Bells, etc.

<i>Petā Ghari</i>		P—5
<i>Dāker Ghanta</i>		D—1
<i>Ghanti</i>	Bells	G—4
<i>Ghungoor</i>	Small bells	G—5

Toys

<i>Lālim</i>	Spinning top (toy)	L—2
<i>Khānchā</i>	Cage	K—10
<i>Pichkāri</i>	Sprayer	P—6
<i>Jhum Jhumī</i>	Rattle	J—1

Implement for Physical Exercise

<i>Mudgar</i>	Indian Club	M—3
<i>Gola</i>		G

(See Dharmamangal.)

Punches and Dices

<i>Type</i>		T—6
<i>Chhanch</i>	Mould	C—10
(for gold ornaments, etc.)		
<i>Lohar Chhap :</i>	<i>Lanchan :</i> Iron Mould	L—2
	(needed during bath, at the Ghats on the Ganges etc.)	

Surgical Instruments

<i>Naroon</i>	Nail-parer : Nail clipper	N—2
<i>Chhuri</i>	Knife	C—1
<i>Chhunch</i>	Needle	C—5
<i>Tār</i>	Steel wire	T
<i>Khoor</i>	Razor	K—11

Requisites for Toilette

<i>Kajal Latā</i>		K—16
<i>Lohār chhāp</i>	Lanchan	L—2
<i>Kāntā</i>	Hairpin	K—16
<i>Chirooni</i>	Comb	C—8
	(also used by the barber in hair cutting)	

Things Needed by the Newborn Babe

<i>Kājalkāti</i>	Collyrium Applier	K—18
<i>Jānti</i>	Nut-cracker	J—1
<i>Churi</i>	Knife	C—1
<i>Kajal lata</i>	Collyrium-holder	K—18
	Stibium-holder	
<i>Chhoonch</i>	Needle	C—5
<i>Angti</i>	Ring	A—2

Things Needed at a Person's Death

<i>Loha</i>	Iron	L—3
-------------	------	-----

Things Needed in Marriage

<i>Jānti</i>	Nut-cracker	J
<i>Chhuri</i>	Knife	C—1
<i>Noā</i>	Iron bangle	N—4
<i>Chaku</i>	Knife	C—1

Things Needed during Churakaran

<i>Chhuri</i>	Knife	C—1
<i>Chhoonch</i>	Needle	C—1

Things Needed during Sacred Thread Ceremony

<i>Loha</i>	Iron	L—13
<i>Goonji</i>	Hair pin ; Needle	G—3
	(for piercing the ear lobes)	

Hunting Implements

<i>Tāngi</i>	Hatchet	T—2
<i>Chhora</i>	Dagger	C—12
<i>Sarki</i>	Spike	S—6
<i>Ballam</i>	Spear	B—6
<i>Barsha</i>	Spear	B—1
<i>Karech</i>	Bayonet	K—1
<i>Chhuri</i>	Knife	C—1
<i>Chaku</i>	Knife	C—1
<i>Tir</i>	Arrow	T—9
<i>Khencha</i>		K—19
	(needed in fishing)	

For Preparing Medicines

<i>Haman dishte :</i>	H—1
-----------------------	-----

(It is useful both for Kaviraji and household purposes.) Previously it used to be made of wrought iron ; now-a-days it is cast. It is used to pulverise powder things needed for medicinal and other purposes ; is often used to smash betel and betel nuts for the toothless.

Surgical Implements

Details about surgical instruments and their use have been given elsewhere in this book. Shussruta, the well-known ayurvedic treatise mentions the following twenty types of shastras or surgical instruments : (which are not sanctified by appropriate incantation).

Mandatagra ; Antarmukh ; Krapatra ; Briddipatra ; Nakhashastra ; Munika ; Utapalpatra ; Ardnaahar ; Soochy ; Kushpatra ; Antimukh ; Shenarimukh ; Trikurchak ; Kutharika ; Bihimukh ; Aya ; Belashapatrak ; Barshi ; Danta Shanka ; Eshani

Besides, Shushruta mentions many other types of Shalak surgical needles, etc. (See Visvakosh, Vol. XX p. 236)

Aero : (Chopper) A

The handle is wood.
Size: Approximately 12".

Ankri : A kind of weeder A

It is an agricultural implement consisting of a raw of pointed iron spikes mounted on a or projecting from a wooden or iron frame. Serves the purpose of a weeder. Also used for turning over a paddy when quantities of it are spread in the sun to day.

Dhuri : Axle A—1

Used in bullock cart and other vehicles.

It is often encased in a wooden beam roller. Made of fine grade steel, it is exceedingly sturdy in construction and can withstand a great deal of strain, wear and tear. The wheel is fixed/mounted to/on the axle. At the extremity/of the axle there is a hole ; a large sized nail or a piece of cylindrical iron is inserted in it to keep the wheel from slipping off the axle.

COMMON IRON IMPLEMENTS

Angta: Iron Ring A—2

It is made of flat-iron and also of iron rods in the case of lamp stands. (It is there shaped like the rattle or the knocker on doors.) It is also used as wheel rim.

Angti: Ring A—2

The wearing of iron ring is often prescribed by astrologers to counteract the evil influence of malignant planets.

In some cases some other metals are also mixed with iron. Often valuable stones are mounted on these rings.

These rings are generally made by Goldsmiths.

Ballam: Lance B—1

Ballam (lance) Barsa (spear) look more or less alike. Both edges of the lance blade are sharp and a vertical rib runs across its centre.

It is sometimes damascened. It is usually mounted on the top of a bamboo-pole. Formerly it was used in hunting and in war.

Now-a-days its main purpose is decorative.

Barsha: Spear B—1

(See Ballam or Lance.)

Bichoo Barsa: B—2

Its blade is sometimes straight and sometimes rolled or curved to impart greater strength to the weapon.

It was used in the territory of Burdwan.

Bandook: Gun B—1

Guns were being made in Bengal for the past two or three hundred years. They were generally of the matchlock type.

The main centres of gun making were Burdwan, Kamarpara, Bishnupur, Murshidabad, Pratapnagar, Nagar, Barisal, Faridpur, Dacca, etc.

The guns used by Maharaja Tilak Chand Bahadur in his battle against the British forces under Captain Martin-White were made at Kamarpara.

Specimens of old guns are to be found in the Indian Museum, Calcutta, Burdwan Raj Palace Museum, Murshidabad Museum and at some other places.

Banti: Fish-Knife B—4

Banti or fish-knife is of numerous varieties. It is usually made of steel. Ironsmiths in every district of Bengal are able to make excellent fish-knives. It is found in every home in Bengal and is used for cutting and slicing vegetables, fish, etc., and mowing hay.

The fish-knife is firmly mounted on a wooden board. Sometimes the blade of the knife can be clasped in. The fish-knives of Bawali Burdwan and Bankura are famous.

In some knives there is an extra blade with serrated teeth to grate cocoanuts, etc.

During *Charaka* celebrations held on the Chaitra Sankranti day, some enthusiastic devotees dive from high boards onto beds of spikes and on Bantis or knives. The latter are, however, different from the fish knives used for household purposes.

Specimen is in the Indian Museum—Anthrop:

Bedi: Rings and Fetters B—5

A type of Rings used in homes for removing pots and pans from ovens and fires. These are made of iron rods and vary in length from 1 to 1½ cubits (i.e., 18" to 27").

B—5

Convicted thieves and criminals are often put in fetters to prevent them from escaping.

Barisia: Fish-Hook

Fish hooks are widely used for angling throughout Bengal. Hooks made at Dhane-khali in Hoogly are well-known all over the country. Usually made of steel, of late fish-hooks are also being made of mill-made wire. Size— $\frac{1}{2}$ " and upwards.

Bide: Rake B—6

An implement for cultivation. It is used for digging and twining up the soil.

Balti: Bucket B—6

Formerly buckets were made by rivetting together small pieces of iron bands. Size varied from 5 to 10 seer capacity. Now-a-days it is made of sheet iron. The sheet is rolled into a sort of cylinder gradually narrowing down towards the base. At the side of the wall where the rolled ends overlap each other, they are firmly riveted.

A seam or band is carefully soldered to the bottom of the rolled sheets. The base on which the bucket rests is also riveted or soldered.

The handle is fixed to the bucket by means of eyelets made of 16/18 gauge iron sheets. The handle is made of $\frac{3}{8}$ " rods by bending or twisting them as required.

The eyelet is rivetted to the body of the bucket and the handle is passed through its eyes.

Buckets are made of galvanised sheets or are galvanised after they are made.

Balka: B—7

It is a hammer used for driving in the nails in horse shoes, and is like tapering cylinder. It is about two inches in length and between $\frac{1}{2}$ " and $\frac{5}{8}$ " wide at the base and $\frac{3}{8}$ " and $\frac{1}{2}$ " wide at the top. It is fitted with a bamboo handle.

Boya: Buoy B—7

Manufactured from iron bands or flat iron it is only made to order.

COMMON IRON IMPLEMENTS

Batali: Chisel B—8

There is a variety of chisels for wood-work, stone-work (?) iron work, etc. Different grades of steel, variously tempered, are used in the making of different types. Chisels vary in size—being $\frac{1}{2}$ ", $\frac{3}{4}$ " and $\frac{1}{2}$ " width and $\frac{1}{2}$ " in height.

Binde: Awl B—8

It is a kind of needle. Its head is carved/bent like a small fish-hook to draw thread.

Used for leather work, cane work and mat-weaving.

Byana: B—9

A sort of bunch with a round but tapering head, for extracting broken pieces of rivet that get stuck in rivet holes.

Its length is 3" and above; the diameter $\frac{1}{4}$ " and above and that of the head $\frac{1}{8}$ " or more.

Batkara: Standard Weights B—9

All weights up to one seer are known as *Batkara*. Now-a-days these are made by casting. A large variety of *Batkaras* are in daily use.

Boma: Scoop B—10

It is a type of scoop, consisting of a hollowed and elongated basin tilted slightly and joined at the top and fitted to a wooden handle; it is used in godowns and grain stores to take out samples of foodgrains from closed sacks. The procedure is to stick the scoop through the wall of the sack. After the scoop is withdrawn with a quantity of grain, the hole made shuts up. Length—6" to 8", width— $\frac{1}{2}$ ", depth— $\frac{1}{2}$ ".

Another kind of scoop, flatter than the above types, of an even width throughout and open at the top is used in the retail grainshops for scooping up rice and other grains.

Chhora: Dagger C—1

There are many varieties of daggers. It is usually worn on belts and hangs vertically along the flank of the wearer. It is used for both attack and defence. Generally double-edged but some are single-edged.

Length varies, the standard sizes being 6", 8" and 10" in length and $1\frac{1}{2}$ ", 2" and 3" in width. The rib, running along the centre of the blade vertically, is raised. In Burdwan, Murshidabad, and as a matter of fact, practically all over Bengal daggers of superior quality were made in the past. The handle of the dagger was made of ivory, iron/steel and even gold. The case was also of ivory, iron and gold. The Blade of the dagger and the case were very often damascened chased.

Chhuri: Knife/Pen-knife C—1

Used for mending pencils, making quill pens, etc. The usual sizes are 5" to 6" in length, the length of the blade being 2" to $3\frac{1}{2}$ " and breadth $\frac{3}{8}$ " to $\frac{1}{2}$ ".

Pen-knife is usually made of file scrap. Now-a-days the blades are sometimes nickel-plated. It can be shut and is generally fitted with a safety lock. The number of blades is often two or even three. The handle is of Buffalo horn, bone or wood. Kanchannagar and Sahapur are well-known knife-making centres.

Chaku: Knife C—1

Mostly used in the rural areas for bamboo work, cane weaving, for mending pencils and sundry other purposes. Made of scrap file. The blade and the handle are all of a piece—the handle is much thinner than the blade; is usually round in shape. The blade is $\frac{3}{8}$ " in width. The cutting edge is straight while the other end runs straight for the greater part and suddenly dips towards the tip, where it is only $1/16$ " in width. This knife is one of the many essential items required in marriages and other customs and rituals.

Chharra: Shots C—1

Made of lead.

Chimte: Forceps: Tongs: Pincers C—2

In the past wood was the main source of fuel in every home in Bengal. Tongs were used to shift pieces of burning wood to adjust the fire as required. They are also used for taking out *roti* or bread from the fire when baking and for removing brinjals, etc., from the fire (burnt brinjal is a much relished and common dish in Bengali homes). Tongs are all indispensable tool to Sannyasis.

Tongs are made by twisting pieces of flat-iron into the requisite shape with a loop in the centre for gripping. Now-a-days they are being made also of 20 Gg. mild steel.

Chumbak: Magnetic Iron C—2

It is stated in the Kalika Purana that plate for food made of magnetic iron is most beneficial in ailments like anasarca, anaemia and jaundice. (Ref. Monograph in p. 6, name of the monograph data is not mentioned in the original Bengali.)

Chulo: Oven (Portable) C—3

Usually made of sheet iron and iron rods. The sheet iron is rolled into a cylindrical drum or a bucket.

A little below the centre through holes on the side walls iron rods are placed length-wise to form a grater.

On one side of the wall, below the grater, an opening is made to allow air to enter the oven and for removal of the ash after cooking.

Goldsmiths and wax-workers use a small-sized oven for their work. Cast-iron ovens are also available.

Chatoo: Frying Pan C—3

Indispensable in every home for baking *chapatis*, etc.

COMMON IRON IMPLEMENTS

Pieces of sheet iron are either cut or hammered into the required shape. Sometimes frying pans are fitted with rings for convenience of handling.

Chhanka: Strainer: Sieve

Used for sifting flour, etc. It consists of a piece of circular or rectangular wire netting framed by a three-inch high rim of iron or tin.

Chhota Kodal: Small Spade C—4

It is hammered into the requisite shape on the smith's anvil. The ring for fixing wooden handle is a part of the spade (and not separately soldered to it.) It is used for work on fields, in gardens and for laying narrow drains.

Chhankni: Sieve C—4

Chhoni: Splasher C—4

Used for irrigation purposes.

Chhamar: Fly Brush C—5

The handle of the fly brush is sometimes made of iron. Sizes are usually 8", 9" and 10".

Chunch: Needle C—5

In the past there was a large variety of needles for surgical purposes—for probing wounds, lancing boils, etc., also ordinary needles for sewing and darning.

A kind of large needle, the *Goon chhunch*, is used for sewing gunny bags and sacks. Ordinary small needles are now imported.

Chanchi: Scraper C—5

Used in leather work. The blade made of steel, is crescent shaped and is usually 3½" to 4" in length. Like the axe, it is broader at the tip and narrower towards the base. The edge is exceedingly sharp.

Generally used for leather tanning.

Chheni Haturi: Chisel Hammer C—6

Used for cutting and breaking bricks and crushing rubble.

One end of the hammer has a blade like edge and a handle is fitted through a hole or a groove in its centre. The blade is made of steel and is 1½" to 2" in width.

Chaddar: Sheet Plate C—6

Sheet plate is used generally for making boxes, trunks, chests, drums, frying pans, etc. In the past sheet plate was made by hammering out blocks of iron. Now-a-days factory-made sheet plates of various gauges are available on the market.

Chhent: Chisel C—6

It is a very old tool and has been used for centuries to cut stones, iron, gold, etc. It is

made of high grade steel and available in various sizes. If it gets distempered/blunted, tempering restores its sharpness.

Charka: Spinning sheel C—7

It is an indigenous machine for spinning yarn. Generally made of wood, it is sometimes wholly made of iron.

Chirooni: Comb C—8

Made of small strips of sheet plate by denting one side so that a row of blunt teeth is formed. Used by barbers for hair cutting. Also a variety of comb is used for carding processes by weavers.

Chhinch: Skewer C—9

A pin of iron metal to clean the upright pipe of the Hookah.

Kalam Kata Chhuri: Pen-Knife C—9

Pruning Knife.

See *Chhuri*: Knike.

Chhanch: Mould C—10

Made of cast iron as well as by hammering blocks of iron. A large variety of moulds are made for clay and metal work.

Daker Ghanta: Postman's Bell D—1

Small bell, made of iron rung by Postmen when they are doing their daily round.

Dah: Chopper D—1

Dah and Katari are the same thing—a kind of chopper. It is a most useful tool to the householder and is used for a host of purposes in daily life. It is one of the stock tools to the bamboo and cane-workers.

Its length is about 8", the curved blade measures 2" to 3" in width and ¼" to 3/16" in thickness. The blade is often damascened chased. The handle is made of teak and other varieties of choppers made in Burdwan, Kamarpara and Bawali are well-known.

Ramdah: D—1

A large-sized chopper. It was in much use in East Bengal generally as a weapon. Now-a-days familiar also in West Bengal. The blade is usually about one and a half cubits or about 27" in length.

Dhwaja Danda: Standard D—2

Made of iron and sometimes of other metals. The shape of the standard is simple and geometric—generally like a trident or a crescent. The shapes represent different sectarian marks.

Dhaka: Cover D—2

Used as a cover for foods, etc. Made by hammering out pieces of flat-iron. Usually circular in shape, the diameter varies from 10" to a maximum of 30". A handle of twisted iron rod is rivetted to the top of the cover.

COMMON IRON IMPLEMENTS

- Dauli:** D—3
An agricultural implement.
- Dao:** Bill Hook. D—4
See *Dah*.
- Denrooah:** D—4
An agricultural implement.
- Don:** D—4
An agricultural implement—used in irrigation.
- Dantla: Weeder** D—5
Used for clearing weeds, shrubs and other undesirable growths on the field. Also for levelling uneven patches. Made of flat iron. Also made by mounting longish iron spikes on a thick iron rod.
- Dhunti:** D—5
An agricultural implement.
- Doni:** D—5
An agricultural implement.
- Dhal: Shield** D—1
The Dhal or shield is one of the oldest defensive weapons. It is made of iron and also, sometimes, of leather. It is so tempered that any weapon that strikes its surface gets either broken or blunted.
The shield should normally be as light as possible because the user has generally to carry it by hand for long stretches.
The surface of the shield is damascened and sometimes inlaid with other metals. Burdwan, Bankura and Murshidabad were well-known centres of shield making.
- Dhalai: Castings.**
The articles of common use that are made by casting include railings, doors, rain-water pipes, street name plates, irons, strainers or sieves, ventilators, weights, pans, ovens, man-hole lids, pillars, lamp posts, bed-joiners, railway appliances, pistons, chairs, garden benches, covers, etc. etc.
- Dangas: Iron-Hook: Knout** D—1
Used by Mahout.
The Mahout (elephant driver) strikes the elephant on the head with the iron-hook when the animal slackens its pace or shows a reluctance to advance.
It is identical to Tangi in shape; the size is generally small and the handle and the blade are all of a piece.
- Dhunuchi: Incense-Burner: Censer** D—6
A meceptade to burn Dhuna or a kind of incense. The cup, made of flat-iron is rivetted to one end of a rectangular plate. The handle, longish and curved is rivetted at one end to the cup and at the other to the plate on which cup is mounted.
- Dandi: The Beam of Scale** D—6
The beam of a pair of scales generally made of wood and sometimes also of iron.
- Dero: Scraper**
Used for scraping. The blade is 1" to 1½" in width.
It is shaped like the Greek letter Omega and is used by inserting one's finger in the holes at two ends of its base.
- Ela:** E—1
An agricultural implement, was exhibited at the International Exposition in Paris (1862).
- Gola: Cannon Ball** G
An iron ball. It is said that cannon balls were made by pouring down molten iron on a sloping surface strewn with sand. The more plausible assumption, however, is that they used to be cast from moulds.
Bishnupur, Birbhum and Murshidabad were the centres for Cannon ball making.
- Gainti: Pickaxe** G—1
Used for digging and turning up the soil. One end of the pick is flattered and is 1" to 1½" in width. The other end is pointed. At the centre of the pick is the hole for inserting the handle.
Made of steel. The length of the pick is 2½' to 3'. It is made in Howrah and Burdwan.
- Ghesure Kaste: Sickle** G—1
(For Grass cutting.)
The curvature of this sickle is different from that of the ordinary sickle more than and the cutting edge may or not be serrated. The blade is thin and the length varies from 10" to 18".
- Gajal: Peg** G—2
Peg nails made of pieces of iron rod. The heads available in many sizes for use on joints, hinges, doors, boats, etc.
Some pegs are U shaped and are used for joining pieces of wood. These can be seen on old doors, country boats, etc.
- Goon Chhunch: Sack Needle** G—2
The pointed end is curved and rather flat like the hood of the snake, is usually around 4" in length. Used for sewing sacks, Gunny bags, etc.
- Goonji:** G—3
Used like hair pins, for doing up the hair. Also worn in earlobes (specially by young girls immediately after their earlobes are pierced to prevent the hole from filling up. Later the goonjis are replaced by earrings, etc.).

COMMON IRON IMPLEMENTS

Garad: Bars G—3
Made of circular or rectangular iron rods. Used in windows, etc.

Ghanti: Bells G—4
Made by rivetting and rolling strips of flat iron or by hammering from the same shape. The pendulum is hung from the inside of the bell by means of a rod or a ring. Sometimes just a piece of thin rod, was hung inside the cylinder by a ring from the top.

Then tiny bells are generally hung round the neck of the cattle and other domestic animals. They sound sweet and clear.

It is made practically everywhere in Bengal.

Ghungoor: Jingling Bells G—5
Sometimes these bells are of iron. Made either by hammering or by joining together two tinny cups by a seam. At the top of the bell is a loop for fastening the thread. The jingling bells produce a marvellously sweet sound.

Hamandishte: Mortar and Pestle H—1
Indispensable to the householder in the preparation of medicines. In the past these were made by hammering small blocks of iron; now-a-days they are cast. Available in various shapes and sizes.

Hat Langal: Hand Plough H—1
An agricultural implement of wide use specially in the cultivation of turmeric, ginger, etc.

Generally hand plough is wooden but in some cases, when the soil demands it, the plough is fitted with an iron share.

Henso: Sickle or Torque H—2
Widely used for weeding purposes. The length is 18", often more, or less. The blade is sharp and approximately $\frac{1}{4}$ " in thickness.

Hal: Rim H—2
Made of thick sheet plate the Hal is mounted like a tyre on the wheel of bullock carts. It is either rivetted or joined by crimping to the outer ream of the wheel by evenly heating it on a slow fire of cow-dung.

Haturi: Hammer H—3
Haturi is literally a "jack of all trades", an item of wide use in many handi-crafts. Made by hammering small blocks of iron it is available in many sizes, large and small.

Hoorko: Bolt H—3
Bolts are made of wood as well as iron. Used for fastening doors and windows.

Hanskal: H—4
It is fitted on doors and windows to open and shut them with ease. Made of sheet plate, the portion on the door is fitted with ring/rings and that on the wall with a rod.

When closing the rod is inserted in the ring/rings below to securely fasten the door.

It serves the same purpose as door hinges and is locally made everywhere in Bengal.

Hal: Sheet Plate H—4
The thin variety is known as hal and the thicker chaddar. Formerly used for making chests, bucket-shaped drums, etc.
It is made by hammering.

Hudor: H—5
An iron bar $1\frac{1}{2}$ " to 2" or more in diameter and 8" or over in length. While rivetting, it is placed under the things being rivetted to prevent them from being dented in the process of hammering. It is one of the most useful tools in the forge.

Hammer: Hammer (Large-sized) H—5
It is a hammer weighing 5 to 10 lbs. used for hammering sheet plates and other sturdy materials.

It is used in the forges as well as brass factories.

Hata: Ladle H—5
Haturi: Hammer H—5
Hapor: Bellows H—5

Made of leather, the sides of the bellows are seamed with strips of flat-iron.

It is used for fanning the fire in the forge.

Hat Kara: Handcuffs H—6
A pair of rings joined by a chain to handcuff criminals.

Ishtri: Iron I
Iron is made by casting. Available in various shapes and sizes. A particular type has a fire inside its body which obviates the necessity of frequently placing it in the fire.

Janti-Kal: Mouse trap J—1
Made of bands of flat iron. It is available in various sizes. The mechanism is simple. At the centre of the trap the bait hangs by a hook. As the mouse reaches for the food, there is a twitch in the hook which releases the catch by which the two blades are kept apart. As a result two blades are shut with a bang and the mouse is trapped.

Janti: Nut-cracker J—1
It is a most useful tool to the householder. It is necessary in various rituals and ceremonies including marriages. Sometimes people who have a dread for ghosts place it under their pillows when they go to bed.

The more mundane and indubitable utility of this tool, however, to be found in the fact that it is essential for slicing betel nuts.

Considerable skill and care went into the making of jantis. As an Orissa and Madras, so in Bengal they were moulded into erotic shapes. This type of janti was used

COMMON IRON IMPLEMENTS

for nut-cracking by newly-married girls. Nut-crackers are generally damascened and sometimes inlaid with other metals. The blade is exceedingly sharp and 4" or more in length. It is fitted onto the base by means of a hinge at the head.

Jantis are produced on a big scale in Kanchannagar, Kamarpara, Bawali, Murshidabad and other places.

Jhum Jhumi: Rattle J—1
Jhanjri: Strainer, Sieve J—2

Used in the kitchen of every home and of sweet sellers in preparing certain varieties of sweets—specially where the things are being boiled or fried in oil or ghee and need to be picked up and turned over frequently in the process of cooking. The circular top, made of flat iron, is perforated like a sieve so that ghee or other cooking mediums can pass through it. Its diameter/circumference is 4" or more and a long handle, made of iron strip is rivetted to it.

Jhari: Watering Bucket J—2

Used for watering the garden. Made of flat iron, the spout with a sieve at its mouth, is joined at an angle to the bucket. The latter is made of galvanised sheet.

Jamboor: J—3

It serves the purpose of *Byana*—sort of round-headed chisel. It is used for pulling out worn nails from horse-shoes. Its blades open and shut, like the scissors'.

The length is around 8" and the width/thickness of the blades is about $\frac{1}{2}$ ".

The extremity of one of the handles is tilted up to a length of about 1".

Kookri: K—1

A short curved dagger, an indispensable item in the accoutrement of the Nepali. Primarily a weapon of self-defence, it is, however, used for practically all purposes that require the service of a knife.

Karech: K—1

Generally mounted on the tip of the gun like a bayonet. Many people fix it also on top of a pole. Usually around 8" in length and about $\frac{3}{4}$ " broad at the base.

Kaman: Cannon K—1

There was a time when cannon were made in large number in various places throughout Bengal. Many specimens of old cannon recovered from Birbhum, Burdwan, Bishnupur, Murshidabad, Dacca and Suri.

It is difficult to find specimens of arms which one can be sure were made in Bengal. There is a large cannon now lying at Murshidabad, known as the "Jahans Kosha", made

of iron which bears an inscription to the effect that it was manufactured at Jehangir nagar alias Dacca under the supervision of Shere Mohammed and the clerkship of Haraballav Das by Janardan Karmakar in the month of Jawadinssani of the year 11 of the joloos, i.e., 1637 A. D.

Rennell, in his Memoir p. 61 gives the measurements of the gun near Dacca, mentioned by Dow. It is now fallen into the river, together with the bank on which it rested. "As it may gratify the curiosity of some of my readers," says the Major, "I have here inserted the dimensions and weight of this gun. I took the measure very carefully throughout, and calculated each part separately. It was made of hammered iron; it being an immense tube formed of 14 bars, with rings of 2 or 3 inches wide driven over them, and hammered into a smooth surface; so that its appearance was equal to that of the best executed piece of brass ordnance, although its proportions were faulty.

Whole length	22' 10 $\frac{1}{2}$ "
Diameter at the breech	3' 3"
Diameter 4 ft. from the muzzle	2' 10"
Diameter at the muzzle	2' 2 $\frac{1}{2}$ "
Diameter of the bore	1' 3 $\frac{1}{8}$ "

The gun contained 234,413 cubic inches of wrought iron, and consequently weighed 64,814 pounds avoirdupois, or about the weight of eleven of our 32 pounds. Weight of an iron shot for the gun 465 pounds. Selection from the Asiatic Journal Vols. 1-28, 1816-1829 (1875) p. 270, see Table p. 271.

Katari: Chopper Dah and Katari are the same. K—1

See—Dah.

Khanra: Sword. K—2

Khanra is a colloquialism for *Kharga*: See *Karga*.

Khola: Frying Pan (large) Sweet-seller. K—2

Khancha: Cage.

Made of thin bars of flat-iron. The door of the cage is fitted with a bolt. Available in various sizes.

Khunti: Ladle. K—3

An indispensable article of daily use in the Kitchen. Used for boiling, frying in oil and ghee, etc. Formerly it was made of iron rod, one of its ends is flattened by hammering. Now-a-days sheet plate is used. The flattened head is around 2" in width and the handle approximately 12" in length. The edges of the flattened head are generally regular and sometimes slightly curved.

COMMON IRON IMPLEMENTS

- Kurumi: Grater.** K-3
Used for grating coconuts. Shaped rather like a fish-knife, its blade, however is not sharp. At the top of the blade, there is a thin disc about 1½" to 2" in diameter, sharply dented all around.
- Khola: Big Pan.** K-3
Made by rivetting together pieces of sheet plate or by casting: generally used by professional cooks and sweet-makers for cooking at wedding feasts, etc. The capacity of these pans is 1 md. to 2 mds.
- Kaste: Sickle.** K-4
An indispensable tool to the cultivator. Used for harvesting paddy, etc. The blade is shaped like a crescent, is thin, sharp and has slanting teeth. It is generally mounted on a wooden handle. The blade is 1/16" in thickness. It is made everywhere in Bengal.
- Kanchhi:** K-4
It is used for digging hard soil.
- Kanti:**
This implement to dig hard soil looks like a pickaxe with one of its sides missing.
- Kudali: Axe.** K-5
Used for felling trees, chopping wood and other purposes. The handle is made of strong wood or bamboo.
The blade of the axe and the ring for the handle are all of a piece. The blade is 2" in width and 5" to 6" in length.
It looks like a spade but actually serves the purpose of an axe. It is used for scraping wood.
- Khurchheni: Scraper.** K-5
- Khonta:** K-5
A tool with a broad flat head for earth-digging especially prior to planting saplings.
- Kodal: Spade for earth cutting.** K-6
An agricultural implement. It is made by hammering on and is fitted with a sturdy handle of wood or bamboo.
- Khurpi: Spud.** K-6
For doing odd jobs on the field, such as digging and turning up the soil. It has a broad and flat head about 1/16" thick and is fitted with a handle of wrought iron.
- Khar Kata: Knife for cutting hay.** K-7
- Kooloo:** K-7
An agricultural implement.
- Koolpi:** K-7
An agricultural implement.
- Koolpt:**
The shell for making 'deshi' ice-cream cones. It looks like extremely narrow drinking glasses, and is made of thin sheet plate.
- Koorie:** K-8
An agricultural implement.
- Kalpa:** K-8
An agricultural implement.
- Kurul: Axe.** K-9
See *Kudali*.
- Kabja: Hinges.** K-9
Made of sheet plate. These hinges are fixed on doors, windows, chests, trunks, etc., by driving in screw-nails through the perforations provided on them, for the purpose.
- Kanchi: Scissors.** K-10
- Khunchi:** K-10
Measures for weighing paddy, etc. Made of sheet plate, as measures often chased at Dubrajpur, Burdwan, Birbhum and various other places.
- Khancha: Cage.** K-10
- Kankhoncha:**
Ear-pick made of steel wire.
- Khoor: Razor.** K-11
An indispensable item in the barber's shaving kit. The tempering of the razor must be done very skilfully to prevent it from rusting.
The length of the blade is generally 4" or more and the handle is made of buffalo horn. The razors now made here are shaped like those of English/foreign made.
Kanchannagare razors are famed throughout the province for their sharpness and durability.
- Karp: Frying Pan.** K-11
Used in the kitchen, in house construction, etc. Sheet plate is first hammered into circular shape and then fitted with rings at the sides to serve the purpose of handles. Sometimes the pan and the rings are of a piece.
- Casting:**
Pans are also cast by pouring molten iron into the mould which is fitted with handles cut from 12/14/16 GG wires.
Sold by the weight or are priced according to number indicating the size.
- Karnik: Trowel.** K-12
An essential implement for the mason. Used for plastering walls, with brick dust,

COMMON IRON IMPLEMENTS

lime and sand. Made of wrought iron. Shaped like the betel leaf, 1/16" thick, attached to a wooden handle.

Khilen: Arch. K—13
Iron rod used for supporting arches in buildings.

Kopikal: Pulley. K—13
Used for lifting weighty objects, drawing water from deep wells, etc. A cast-iron wheel is placed between two side plates and are held together by passing a thin iron rod horizontally across the centre.

The wheel is channelled or grooved so that the rope or iron chain can fit in and move freely on it, either way.

Kulup: Lock. K—13
See *Tala*.

Karat: Saw. K—13
Made of sheet plate and serrated at one end. Used mostly in the carpenter's shop. Saws for ivory work or other purposes are shaped and tempered differently. This type of saw is used in conch-shell.

In the ordinary type, the top edge of the saw is extended on both sides to form handles that can be gripped by both hands while using.

The average length of the blade is 8" to 10"; the teeth 1/8" to 3/16" in thickness.

Katur: Cutter. K—14
Sankher Karat: Saw for cutting Shell. K—14
Saws for cutting shell are double-edged and cuts bothways. As in the ordinary saw, handles jutting-out from each end of the top. The length of the blade is 8" to 10". Only made to order. Shell-cutting Saws of Bankura and Burdwan are well-known throughout the province.

Katuri: Snips or Shears. K—15
Made of high-grade steel for cutting wire or thin sheet plate. When closed, the snips look exactly like a betel leaf. The blades are gently slanting, width 1 1/4" or more or less across the centre and 1/16" thick.

Khur Chheni:
An implement for agriculture used in Burdwan.

Kanta: K—16
It is used for 'dragging' the well when things get lost in them. It consists of an iron rod from which a large number of hooks branch out in pairs in all directions. It is also known as *Jhugrao*.

Kanta: Hair Clips.
Made of wire.

Khol: Shell of the Hubble Bubble. K—16
It is often inlaid with other metals—damascened.

Kajal Lata: K—16
This receptacle for Kajal or Collyrium or Stibium is a favourite article of toilet for daily use and also necessary in marriage ceremonies. The Kajal is produced by holding it on the top of a candle-flame.

The receptacle is divided into two chambers 3" to 4" in length and generally hollowed to a depth of about 1/2". The one below contains the Kajal, the upper chamber is moveable. These chambers are made of flat iron and is rivetted to a handle which is around 4" in length. The Kajal Lata is often damascened and engraved. It is made practically everywhere in the province:

Kanta: Hair Pins.
Used in hair-dos. Made of iron wire. Sometimes the top is mounted with a flower.

Kajal Kati: K—18
It is sometimes made of iron. The head is pointed and the bottom somewhat flattened and engraved. Sold in markets and fairs.

Khencha: K—19
Shaped like a broom. It consists of a cluster of iron spikes mounted on the top of a *Kās* pole. Used for fishing.

Lohār Thālā: An Iron Dish. L—1
A large-sized dish/plate made of iron. Used generally for kneading flour.

In certain diseases, the patient is advised to use it as the receptacle for his food.

Lathe: L—1
The lathe used in Bengal is different from the English types.

Lohachur: Iron Filings. L—2
It is used by pyrotechnicians and *kavirajas* (physicians) as a basic ingredient for fireworks and medicines.
Now-a-days the main source of supply are the Lathe shops.

Latin: Spinning Top. L—2
The 'nail' is made of iron and is supplied by the local forges.

Lohār Chāp: Lanchhan. L—2
It is used by the more religious minded to put sandal paste imprints of tridents, names of gods of goddesses, lotus-feet, etc., on their foreheads, chests and upper arms.

Loha: Iron. L—3
Iron is used in various happy and unhappy events, as birth, marriages and deaths and also in many other rituals by the Hindus.

COMMON IRON IMPLEMENTS

Nut-cracker, chopper, Kajal Lata, or the receptacle for Kajal, Knife, Key, etc., are the forms in which iron is used on the occasions mentioned above.

Maduli: M—1

The *Maduli* or the charm-box and talismans are sometimes made of flat iron.

The Charm-case is usually hexagonal in shape and the sides are ribbed. The length is about $\frac{1}{2}$ ".

The *kavacha* or the talisman though generally rectangular is also available in other shapes.

Both Charm-cases and talismans are intended to hold medicines, roots, etc., supposed to possess magical properties and are worn either on one's fore-arm or round one's neck.

Moi: M—1

See *Shekals* or Chains.

Mas Tola: Corn Scraper. M—1

It is like a large sized *Naroon*. Or Nail-parer used for treating/cutting corns.

Masalchi: M—2

A torch consisting of a cup-shaped receptacle mounted on a handle, straight and narrow, of about 5" to 6" in length. Made of flat-iron.

The 'cup', i.e., the lamp is filled with oil and is lit by means of a wick made of a piece of rolled cotton cloth or rolled jute.

Moochi: Iron Basin: Crucible. M—2

It is shaped like a small, rather flattish, cup and is often made of iron. Used for melting gold and other non-ferrous metals in Goldsmith's shops, etc.

Mud Guards:

Formerly these were imported, at present manufactured locally on a large scale.

Maku: Weaver's Shuttle. M—3

Generally made of bamboo or wood, it is also sometimes made of flat-iron.

Man: Weight Measuring 40 Seers or 80/82 lbs. Avoirdupois Approximately. M—3

A weight measuring, as its name implies, a maund or about 80/82 lbs. Now-a-days it is generally made by casting. Howrah is the most important manufacturing centre.

Mudgar: Mallet. M—3

Also a mallet, a weapon formed like a hammer, a staff armed with iron at the lower end for the purpose of breaking clods (Carey's Dictionary). Carpenter's hammer.

Iron Mallets are used by wrestlers. Also an essential to the Physical culturist.

Nidani: Hand Hoe: A Weeding Instrument (Carey) N—1

It is an agricultural instrument belonging to the weeder group. The handle is made of thick, round branch of a tree or teak wood. The blade is thin like a *neem* leaf but not very sharp. The breadth of the blade is $1\frac{1}{2}$ " to 2". The stem is about $\frac{2}{16}$ " to $\frac{1}{4}$ " thicker than the blade, and is 8" to 10" long. Approximate price Rs. 4-4-0 or Rs. 4-5-0. At present mainly made of mild steel rods. Used all over Bengal.

Nal: Horse-shoes. N—1

The hoofs of bullocks that are employed and horses as beasts of burden are shod with horse-shoes. These look like an orange flake or an inverted U. They measure from 2" to $2\frac{1}{2}$ " or 3" in length and $1\frac{1}{2}$ " to 2" in width. The thickness of these shoes' are about $\frac{1}{16}$ ". Along the top edge of the *Nal*, there runs a groove $\frac{1}{8}$ " wide. On this groove are a number of apertures or holes $\frac{1}{16}$ " wide and rectangular in shape. Nails are driven in through these holes of the *Nal* into the hoofs of Cattle and Horses. These nails, are $\frac{1}{2}$ " to $\frac{5}{8}$ " in length and flat-headed.

The *Nal* or shoes have to be changed every tenth or twelfth day. The smiths who do the work of shodding cattle-hoofs with iron get 0-2-6 to 0-5-0 for each operation.

Nalchi: Hookah Pipe. N—1

Nongar: Anchor. N—2

Generally made of M. S. rods. Its hooks are often joined together by means of a ring. Anchors used in country boats are different from those used in ships and steam-launches.

Usually sold by the weight or in a lump. The standard of measure is both Indian and English. Almost all big country boats use anchors these days. Anchors are usually three to five-pronged.

Naroon: An instrument to pare the nail. N—2

The common *Naroon*, or a small knife is used for many purposes such as paring nails, cutting corns, etc. Some *Naroons* have an earpick at one end. Other special types of *Naroons* were used for surgical purposes. Also used in various Hindu ceremonies and rituals. In certain handicraft implements almost identical to *Naroon* are used for engraving purposes. It is made of steel. The blade is curved at an angle of 40° to 45°, the head is flattened, thin and sharp like a razor. The other end is pointed like a needle. The usual length is from 5" to 8".

Nehai: Anvil. N—3

The anvil is perhaps the most useful article in the forge, the centre of practically every activity and indispensable to all metal crafts.

COMMON IRON IMPLEMENTS

On it, things are hammered into the requisite or desired shapes.

Formerly the blacksmiths/iron smiths used to make their own anvils. Now-a-days most of them use imported ones made generally of steel and sometimes of mild steel.

The local anvils are sold by the weight.

Nikti: A pair of small Scales. N—3

Made of steel, these delicate scales are intended to weigh things up to 1 tola. Its making calls for expert skill as the slightest defect would upset the accuracy of the weighing. The length is usually 6" to 8". Manufactured on a fairly big scale.

Natai: Reel. N—4

Made of iron, generally of mild steel rods. Used usually for the purpose of winding threads or wire. The usual size is 1", sometimes bigger.

Noa: N—4

Indispensable in Hindu marriages. All girls immediately on marriage and married women, whose husbands are living, are strictly enjoined to wear a piece of iron bangle on their left hand.

Available in many of sizes—the thickness of the bangle generally being 1/16" to 1/8". Very often the bangles are damascened/chased the patterns being generally geometric.

Olon: Plumb Line. O—1

The plumb line is used by masons to ensure as well as test that a newly built structure, e.g., wall, is vertically straight/level (?) It consists simply of a round or conical piece of solid iron with a loop on top. A line is tied to the loop for suspending it from roofs etc., while using.

Phala (Langul): Blade. P—1

Phala or blade or shear is fitted to ploughs, spears and arrows, and is always made of steel.

Sometimes a pointed blade like that of the arrow is mounted on top of a pole for cutting and turning up earth etc.

Pashu: Small Hoe. P—1

It was in extensive use in Dinajpur and the neighbouring areas for weeding purposes (Hunter).

For the rest: See *Tangi*.

Perti: P—2

An agricultural implement (Hunter).

Palso: P—2

Pat: Iron sheet. P—2

It serves as the raw material for the making of numerous products.

Phanra: P—5

An agricultural implement.

Perek: Nail or Spike. P—3

The small-sized nail.

Palla: Scale Pan. P—4

These circular iron pans are used in the locally made hand weighing scales. A pair of them is suspended by means of thin rope from each end of the horizontal beam of the scale.

The scale of a pair of balances (Carey).

Paloo: P—4

Palu: P—5

An agricultural implement.

Peta Ghari: Iron Gong. P—5

It is struck to announce time. It is an iron disc 1/4" or more in thickness, 10" or more in diameter.

Panchu: Punch. P—6

An indispensable tool in the forge and goldsmith's shop. It is used for punching holes and also for impressing purposes. Made of steel, it is usually 2" or more long, 1/8" or more thick and has a tapering end pointed head.

Pichkari: Sprayer. P—6

Rivetted Door: R—1

Doors are generally rivetted with pegs or large nails. These pegs are made of soft iron.

Rivetted Safe:

Wooden cases or boxes were rivetted with pegs having a broad head and a flattened end.

Ripit: Rivet. R—1

There are many different kinds of rivet used for a variety of purposes, such as for joining pieces of wood, used in bow string, lathe, spinning tops, etc.

Sancha: S—1

Sanna: Pincers. S—1

Available in many sizes, big and small. Used for plucking hair and among other things, for handling and picking, lifting infinitesimal quantities of gold. Made of steel with a high degree of springiness. The sharp head of the pincers can be used for cutting purposes also.

Sanrasi: Tongs. S

An article of daily use in every household. Two types of tongs are used in the forge. The ordinary type for lifting iron articles and the other with two grooves. The second

COMMON IRON IMPLEMENTS

groove is used to hold the chisel and also for lifting red-hot iron from the forge. Tongs are produced on a fairly big scale.

Shan: S—4

Knives, scissors, razors, etc., are sharpened and polished by means of a revolving iron disc. The revolving is done by either pushing a pedal or turning a handle.

Scraper. S—4

The flattened blade is so slanted that the edges taper to a point at the apex. From the point where the slant begins, the edges are sharp. As the name implies it is used for scraping purposes.

Sul: S—5

An iron pole or a stake, gradually narrowing towards the top, used in the past, for impaling criminals.

Trisul:

The distinctive weapon of Mahadeva or Siva. Used in temples.

Sind Kathi: Implement for housebreaking.

S—6

An implement like the *Shabal* or an iron bar or crow but much smaller in size; the exclusive professional tool of the thieves in Bengal. It is said that the thieves, the users, and the blacksmiths, the makers of *Sind-kathi* never meet. If, early of a morning, the blacksmith discovers a piece of iron rod lying at his doorsteps, he makes with it a *Sind-kathi* free of charge and places it outside his door. The thief manages to take it away surreptitiously.

Sarki: Spear. S—6

A weapon belonging to the category of lance. The blade or barb made of steel, is mounted on the top of a pole, and is hurled to strike the enemy. Now-a-days it is used mainly by lathials and shikaris.

Tarowal: Sword. T—1

Tarabar, *Tarabati* and *Tarowal* are included under the category of *Kharga*. *Tarowal* and *Ashi* are also synonymous. *Ashi* is of the following varieties:

Nishtringsha; *Chandrasah*; *Rishti*; *Kauksherak*; *Mandalagra*; *Karapal*; *Kripan*; *Prabalak*; *Bhadratmaj*; *Rishta Rishti*; *Dhanabish*; *Koukshaya*; *Tarabari*; *Tarabaj*; *Kripanak*; *Karabal*; *Kripani*; *Shastra* and *Bishasan*.

Owing to outside influences, the shape of the *Tarowal* has undergone wide modifications. The curvature of the blade, specially, has changed a good deal.

The length of the blade is usually 3' sometimes it is more, sometimes less. The

width of the blade is broadest near the handle and it becomes narrower and narrower until it tapers to a point at the apex/head. The handle is generally showy and is made of iron, silver, gold or ivory.

The sword case is made of flat iron lining with a covering of cloth on top. The cloth cover is often inlaid with gold and silver.

In the past swords were christened with many fanciful names, e.g., *Gangajal* (The Ganges water).

Tangi: T—2

The erstwhile name of *Tangi* was *Pashu*. The blade is either curved or shaped like a crescent and is usually 6" or more in length. Only one edge of the blade is sharp. The handle, generally made of bamboo, is inserted through the loop at back of the blade.

Trisul: See *Shul*. T—2

Tiker Chimte: Tongs: Pincers. T—2

Small tongs, used to handle the small balls of a composition principally made of charcoal dust for kindling the tobacco on a Hookah. Length about 6", width about 1/2".

Taru: Ladle or Spoon (Big). T—3

Generally of wood, it is also occasionally made of iron. It is a cooking implement, more or less like a big spoon or ladle, used generally for making sweetmeats, specially for picking and turning over things in boiling oil or ghee (clarified butter). One edge of the blade is slanted to fit in with the curvature of the *Kara* or hollowed (cooking basin) frying pan.

Tawa: T—3

Chatu and *tawa* are the same thing, a sort of frying pan. Mostly used for baking *roti* (bread), etc.

Tepon: A kind of Punch. T—4

It looks somewhat like the *Panchu* (Punch) and used mainly for making square holes on the grooves of the horse shoe. It is 2" or 3" in length, 3/8" or 1/2" in diameter. The head is oblong or squarish but in both (1/16 sq. in.) cases it tapers to a point at the apex.

Tepon Chheni: Chisel-Puncher.

Chisel-punchers are more or less like the *Tepon* above but in addition to the pointed head, there are also other varieties of head.

Toorpoon: Bow-string: Fiddle-Drill: Gimlet.

T—5

Made of iron, it is used for drilling holes. Generally made to order. The *Vramar* or the drill is fitted to the bow-string with screws.

COMMON IRON IMPLEMENTS

Thimble:

Worn round the second finger while sewing to protect it from needle-pricks. Made of pieces of thin/flat-iron. The thimble is open at one or both ends. The length is usually $\frac{1}{2}$ " to $\frac{5}{8}$ ".

Tar: Wire.

T—5

It is made by drawing thin iron rods on a wooden wire drawing machine. It is tempered after it is drawn. It is used to string musical instruments, to tie weapons to bamboo poles and various other purposes. Now-a-days the major part of the demand is made by mill-made wire.

Tala: Lock.

T—6

Formerly locks fitted with long handles were made at Natagarh, Serampur and other places. The mechanism of those old fashioned locks were different from the English type of locks fitted with lever which have captured the market to-day. The catch of the lock works on the same principle as the ordinary bolt.

Type:

T—6

Types or type face is cut from steel. The Bengali type face was first cut by the celebrated Panchanan Karmakar.

Now-a-days a large number of people is engaged in this profession.

Tar: Steel Wire.

T—7

See *Tar*.

Takli:

T—7

An old implement for spinning yarn. It consists of a long iron needle, with a hook like an inverted fish hook at one end and

fitted with a small but weighty iron disc about $\frac{1}{2}$ " (or more) above the bottom end.

The needle is $\frac{4}{5}$ " or more long, the disc $\frac{1}{2}$ " to $2\frac{1}{2}$ " in diameter.

Thokai: Hammer Objects.

Used for soft soldering. The soldering iron has a hammer-like head on top of an iron rod mounted on wooden handle. The head is either pointed or like that of the ordinary hammer.

When using, the hammer is heated and the soldering alloy is applied with its head for joining pieces of metal, etc.

Tejel:

T—8

It is a small moveable oven made of flat iron. Used in the Burdwan district and other areas.

Tir: Arrow Head.

T—9

The arrow head must be made of pure highgrade steel. It is ribbed vertically across the centre. The usual length is 2" to 3".

Generally the arrow head is either tied to or driven in on the top of a light cane or a bamboo stick. Sometimes, however, the whole arrow is made of iron.

The arrow was formerly one of the principal weapons of war. Now-a-days its use is confined to hunting only.

Tenro: A long-headed spade.

An agricultural implement mostly used in the District of Nadia.

Uko: Iron File.

U

Vramar: Drill.

V

It is the drilling rod or needle fitted to bow strings.

The Brass and Bell Metal Industry

Kanshari (local abbreviation or patois of the original Sanskrit *Kāngshakar*): *Kansharis* are that caste of the Hindu trading classes who engage themselves in making and selling articles and utensils made of bell metal and other metals. Other names of this caste are *Kangshakar*, *Kangsha banik* and *Kangshyakar*. In Bombay the *Kansharis* are known as *Kanshar* and *Kangshar* and in the U. P. and Bihar as *Kashera*, *Kanshera* and *Tashera*.

Local lore has it that the *Kansharis* came to Bengal from the north-west. In the upper provinces the *Kansharis* call themselves genuine *Vaishyas*. They wear the sacred thread and are divided into seven branches which are indicated by seven different surnames. These are: *Purbia* (Easterners), *Pachhaman* (the Northerners), *Gorakhpuri*, *Tanka*, *Takshara*, *Bharia* and *Golar*. [The *Purbias* represent a well known family of craftsmen (10th century) of Bengal.] Social and cultural contacts between these seven branches are taboo. These people are most numerous in the district of *Mirzapore*. In *Bihar*, too, there are many *Kangsharis*.

The *Kansharis* of Bengal are subdivided into many branches with different titles and belonging to different families and gotras or clans.

The common titles are: *Kunda*, *Pramanick*, *Das*, *Daw*, *Pal*, *Nandan* and *De*.

The main families are *Saptagrami*, *Mamadbadi*, *Maota* and *Maiti*.

Gotras: *Sankharishi*, *Sandillya*, *Sapta-barshi*, *Rishikesh* and *Dadhirishi*.

Marriage between the members of the same gotra (Intra-gotra) is not allowed. On the occasion of a marriage a *Kanshari* is socially enjoined to invite all the other sections of the *Kanshari* residing in the village. That is why the poorer *Kangsharis* marry off eight or nine daughters of their families at a time.

Apart from the *Kansharis* various other castes also adopt the brazier's profession. For example, the *Golam Kayasthas* of *Dacca* and many *Mahisyas* of West Bengal work in bell metal.

In *Dacca* it is mainly a section of blacksmiths who used to ply the trade of goldsmiths and braziers. Similarly the blacksmiths of *Calcutta* gave up their hereditary profession and engaged themselves in making gold ornaments and copper articles and utensils.

All castes, without distinction, seem to have trespassed into the hereditary profession of the braziers themselves and are seen busy hammering copper, moulding brass and polishing bronze or selling the utensils as

wholesale merchants, retail shop keepers or wandering brokers. "In the hilly districts (1894 A. D.) of Western Bengal, metal-artisans, or at least certain section of them, seem to have gradually evolved out of aboriginal and semi-aboriginal iron-smelters. As they became hinduised and improved their professional position by advancing from iron-smelting to iron-working and from iron-working to working in more valuable metals....."

BRASS

Brass is an alloy produced by combining copper and zinc whose proportions are varied to produce different types of brass for different uses. Two parts of copper (the ratio might be anything between 63 and 91 per cent.) and one part of zinc mixed with a kind of yellowish substance go to make bright brass.

Pittal, *Pital*, *Petal*, *Kancha Petel* and *Ful-brass* is referred to by any of these five synonyms in Bengal. Broadly brass in this province is divided into two classes—*Byanga* and *Bharan*. *Bharan* brass is hard and yellow, *Byanga* is mild and the colour golden. According to *Rajanirghanta*, the former belongs to *Suklabarna* or the white category and the latter is *Swarnavarna* or gold coloured. The white-coloured is mild and excellent for making fine wire and the gold-coloured is clear and represents the genuine *RITI* brass as it is called in Bengal. The *Ayurveda* describes the therapeutic properties of Brass and the methods employed in its purification. According to *Baidyaka* it is bitter, soothing and salt. Purified brass is indicated in jaundice, gout, worms, spleen and in bilious conditions (*Rajanirghanta*). *Bhabaprakash* calls *Rajapittala Kapila* and *Brahmapittala Pingala*. (*Kapila* and *pingala* both represent the shade of colour which can be called tawny.) Brass, a combination of copper and zinc, contains not only the properties of the latter two substances but also an additional quality that emerges as a result of their union. Unless properly purified, brass acts as poison. As has been already stated purified brass has valuable medicinal properties: it is acrid, bitter and salt. It is a cure for jaundice and worms.

According to *Rashendrasar Sangraha* the process of purifying brass is as follows: First, flatten the brass into a thin strip, next coat it with a paste of salt and juice of *Akanda*. Finally, immerse it in a solution of *Nishinda* leaf.

Bell Metal: It is an alloy produced by mixing tin and copper. The Sanskrit names of

BRASS AND BELL METAL INDUSTRY

bell metal are the following: Kangsa, Kangshasthi, Tamrardha, Sourashtraka, Ghosa, Kangshiya, Bahnlohaka, Diptiloha, Ghorahusya, Diptikangshya, Kangsa.

Rajanirghanta describes its properties as bitter, stimulating, acrid, costive or astringent, light, appetising and digestive. It is beneficial to the tissues and the eyes, and cures wind and phlegm. According to Rajaballabha it has acid properties, acts as a laxative and is effective in biliousness. It is said that the bell metal known as *Sukhabodh Kangsha* is strengthening and promotes longevity. The method of purifying bell metal is identical with that of copper. There are however, other means of purification.

BRASS & BRONZE

Bronze is an alloy of copper and tin and sometimes also of some other metals. In Bengal a number of varieties of bronze are available, e.g., Ful, Kansa, Bharang, etc. Once upon a time Bengal was well-known for its metal images. It is quite possible that the huge eight foot image of Buddha at Nalanda, described in the accounts of ancient travellers, was made in Bengal. Of course, in those days Bengal was geographically more extensive and the language spoken was either Prakrit or an allied patois.

The miniature images, found in Nalanda and now preserved in the Indian Museum, Calcutta, testify to the high degree of perfection the art of casting reached in Bengal at that time. Another remarkable example of skill in casting is to be found in the metal elephant of Mahasthan in Rangpur. This elephant, with its graceful and flowing curves, looks as though it is all of a piece and one vainly looks on it for joins in the lines. Some people think that in such works the craftsmen employed the method of casting known as the *cire perdu* or the tallow wax process for which Benin in Africa was world famous.

In this process no marks of the mould are left on the finished products unlike ordinary mouldings and castings.

Taranath, a well-known historian of the 17th century, has praised in glowing terms the virtuosity of Bengal's craftsmen in Bronze who, he said, possessed the feel of what constitutes the very essence of the arts. Prior to him, references to the skill of Bengali artists are to be found in Tibetan manuscripts. They give the first place in the art of bronze casting to Bengal, second to Persia and next to China.

The two artists and workers in bronze, etc., Dhiman and Bhitpal referred to by Taranath, were exponents of Madhyadeshya and the "Purbi" schools. The Bharut and afterwards Mathura steps also influenced the

Bengal artists. Geologists have not been able to discover any metal deposits in Bengal. As a matter of fact Bengal had to depend for her supplies of metal wholly on Tibet and the neighbouring mountains and jungle lands. The emergence of the extraordinary excellence in the art of metal-craft thus appears all the more surprising. The fact that among the objects that have come down to us there is a sustained standard of excellence can probably be explained by saying that the craftsmen were in the habit of melting and recasting their handiworks if the latter did not turn out well. For example, in many cases copper sheets were fashioned into ploughshares. There are many examples of small, run-of-the-mill casting in the temples of various gods and goddesses all over Bengal. In most cases the images of Gods and Goddesses were made of bronze with just a soupcon of Octo-alloy. The word Octo-alloy has been coined by Nalini Kanta Bhattachali to describe the alloy of eight-metals often used in the making of images.

(Ref. Bronzes of Nalanda and Hindu Javanese Art, p. 13).

The images were often gilded or according to some coated with a solution of some rare and precious metals.

In Navadwip one can see specimens of casting, consisting generally of lifesize statues of the Vaishanava Acharyas or Preceptors. [Such statues, hewn in wood, are, of course, common in the various *Sreepats* (Vaishanava holy places) throughout Bengal.] Those huge statues pose certain problems relating to the technique adopted in their castings. It is unlikely that they were the result of one single operation. It is more probable that the metal was molten in small crucibles and the different parts of the figure were cast in a number of small moulds and finally pieced together. [The Bara Aulia Astana of Sadekbag, to the north of Jiaganj town (Murshidabad) contains a most extensive collection of metal images.—A.M.] Images apart, bronze was also used in the casting of guns and many examples exist of the latter. The gun of Kandarpanarayan is quite an early example. Its length is 7'-5½", width 2¼" and that of the mouth 19½". The technique of gun making was probably introduced into Bengal from Persia, some time in the eight century A.D.

There is a bronze compass in the Indian Museum of Calcutta which was found at Burdwan. It is, however, not certain as to whether it was actually manufactured in Bengal or not. Apart from utensils and other articles, Bronze was also used in the manufacture of such toilet requisites as mirror. These mirrors were made by craftsmen who

BRASS AND BELL METAL INDUSTRY

though Kansharis by caste were known as Chandkamars. These bronze mirrors are still a necessity in Hindu marriages in Bengal and is carried by the groom during the marriage ceremony.

Crucibles for melting metals, made with clay, cow-dung and paddy husks, are made by the craftsmen themselves and baked in the sun. The fuel in most places is firewood but in the industrial areas of Calcutta, hard coke is used and the melting of metal is done in crucibles of foreign/British make. Bronze ingots are always available on the market and scraps are on sale in Rajkatra in Bara Bazar and also in the Mirzapore Street area. The price normally fluctuates within certain limits. Big merchants secure their supplies of scrap from foreign countries.

Brass or Bronze sheets are locally manufactured and also imported from abroad. Twelve square angle channel rods, pipes made of copper and bronze are also manufactured locally and imported. The sizes are ascertained according to the gauge and are rolled in sheet rolling machines.

Bronze/Brass ornaments are generally made by hammering or by the ball-press method. The so-called chemical gold companies of Calcutta use a chemical process to gild but the finish is generally much inferior to that of foreign rolled gold products. Bronze ornaments used to be sold in quantities in Basirhat, Howrah, Santipur, Bankura, Midnapur and other places and the buyers were mostly women from the poorer classes. There are some varieties of bronze ornaments which are locally known as 'Silver'. In most cases these were either enamelled or electro-plated.

Now-a-days ornaments made of chemical gold are being widely used among the *bhadralogs* or the poorer section of the middle classes. The shine of these ornaments, however, wears off soon. Recently bronze *churis*, bangles or bracelets have come into vogue. A set consists of eight pieces and costs quite a lot because the copper band of each bracelet is covered with a very thin foil weighing about 1/8 tola of gold. Among the most recent manufacturers of bronze images, the firm of M/s. Tin Couri Das is pre-eminent. They manufacture a wide range of images. They get the mould, made of porous clay, modelled by the potters of Kumartuli and buy the bronze scrap from the market. They can cast up to a size of two mands (over 164 lbs. avoirdupois). The image of Rajarajeswari at Muzafferpur, Gandheswari in Chorbagan, Radhakrishna, etc., are representative specimens of their work. They also manufacture the arms and weapons that are required in furnishing the paraphernalia of clay images of Gods and Goddesses, e.g., the

image of Goddess Durga, and also make miniature images of Lakshmi, Gopal, Owl, Peacock, etc., for which there is a perennial demand in the market. There are numerous small establishments in the district of Howrah engaged in making incense burners, images of gods and goddesses like Lakshmi and Radhakrishna, owls and so on. These people have tiny little workshops that are the last word in makeshift inventiveness. The "bellows" that feed the flame, consisting of fans made of tin, are driven by discarded bicycle wheels or spinning wheels moved by a handle, the furnace is tucked under the floor and the molten metal is poured into moulds that are placed inside two round frames, made of flat iron, which in their turn rest on detachable bottoms made of small pieces of planks. The way in which the molten metal is actually poured out is rather fearful because to an onlooker it appears that the act is attended with considerable physical risk. In most of the bigger bronze manufacturing shops, however, this is the method followed in the casting of *Bharang*. Recently, Bibhuti Sen has introduced in Bengal a new method of casting which he learnt under Jogman Sakya-bansha of Nepal. The method is as follows:

First, wax and Dhuna or a kind of incense made of resin are mixed in proportions of 16:1 in summer and 16:2 in winter and the mixture is moulded into the shape of the requisite image with the help of implements made of buffalo-horn, into which moulding channels are grooved when necessary. The crucibles are made by the craftsmen themselves with the husk of *chura* or parched rice, clay and charcoal mixed in the ratio of 1:1:1. The Nepalese name for the crucible is "wandhurni". Its top is closed tight when using and the melting is done on charcoal fire.

After the wax model is ready, it is given a bath in a solution of fine ganges-clay and cowdung, and then dried. The process is repeated three times in succession. Then it is coated with a solution of sticky clay, loam and husk mixed in equal proportions (1:1:1). Finally when it is fully dried, the wax is melted on a slow fire and is drawn out and the molten metal is poured into the hollow mould. This method of casting was in use in Bengal long ago and was revived in Santiniketan. In some cases indigo was also used.

Bibhuti Sen's most well-known work is his lifesize statue of the prime minister of Nepal. In executing this commission, he cast the front and the back separately and finally welded the pieces together. His other works include a bust of Talcher and Ghosh and the octo-alloy image of Dhakeswari

BRASS AND BELL METAL INDUSTRY

weighing 14 seers or over 28 lbs. He has plans to open a school of metal casting. He is also an expert in gilding work.

SOME ANCIENT BRASS FIGURES

- Chandi:** Gold-plated (gilt): Size 10" probable date of manufacture: 800 A.D. It was found at Chandra village, 14 miles south of Comilla. It was stolen in 1918. The inscription read: Dedicated by Deba Kharga or the Debakharga Dedicated by Maharani Prabhavati Devi.
- Vishnu:** Size 10", probable date: 8th century A.D. Found in Mahasthan (Rangpur). Now in Kensington Museum, London.
- Lokenath:** Size 6": probable date: 8th Century A. D.
- Vishnu:** Size 9" found at Nalanda. Inscription: 'Made by Devapala'.
- Kuvera:** Size 6" found at Nalanda.
- Horiti:** Size, found at Nalanda, made by Devapala.
- Maitreyi:** Size 2" made by Devapala.
- Buddha:** Size 10" made by Devapala.
- Avalokiteswar:** Size 8" made by Devapala.
- Tara:** Size 10", found at Bhrikattu (Bogra), Barendra Research (Bogra).
- Durga-Kartikeya:** Size 3" found at Udandpur, District Patna. Made in the 54th year of Narayan Pal.
- Buddha:** Size At present in the Ashutosh Museum.
- Umamaheswar:** Size 6" made of bronze; probable date 10th/11th century.
- Chandrasekhara Siva:** Size 6½" made of bronze found at Rangamati, Murshidabad. Probable date 8th Century A.D.
- Mahishardini:** Size 2½" Probable date 17th Century A.D. found at Tribeni.
- Durga:** Size 4" made of bronze.
- Panchamukhlingam:** Probable date 18th Century A.D.
- Kali:** Size 22" Probable date 19th Century A.D.
- Krishnayanani:** Size 3" 12th Century: found at Tribeni.
- Vishnu:** Size 2½" (Copper) Probable date 13th Century.
- Ganga:** Size 2½" (bronze) 13th Century—Mahasthan (Bogra).
- Vishnu:** Size 4"x2½"—10th Century.
- Deer (miniature):** N. Bengal, 16th Century.
- Chaturmukhlinga (Tat):** Murshidabad 10th Century.
- Indrasachi:** found at Virsinhapur (Midnapur). Probable date: Early 19th Century.
- Vishnu Garur:** Size 9"x6½" found at Sundarban. Flate bronze (1196 A.D.)
- According to Hunter there were 2,341 Kanshari (braziers) and 6 Kalaikars

(Tinmen) in Burdwan, 383 and 3 in Birbhum and 770 and 21 in Bankura. Khagra in Murshidabad is the most famous centre for the manufacture of Brass and Bronze utensils in Bengal. Khagra ware is in great demand in Calcutta and outside. According to Hunter the metal not infrequently contains a considerable quantity of silver (p. 154 Murshidabad). The polish of the utensils made at Khagra even now is of an altogether superior excellence but it is doubtful if the practice of mixing silver with the metal still continues.

There are to-day no less than 53 firms engaged in the manufacture of utensils at Khagra. In most cases the proprietor of the establishment is himself an expert craftsman. Each establishment employs, on an average, 8 to 10 persons. The wage rate is fixed on the basis of the weight of the utensils made. The finished product is sent from the shops to the wholesalers direct and are disposed of to him at a profit of anything between Re. 1 and Re. ¾ per seer. The products manufactured generally include eating plates, drinking glasses, ordinary cups and tea cups, flower vases, trays, etc. Bell metal products are also made here. The proportion is 2:2 tin (?). Other requisite raw materials are secured from old scraps, sometimes from new brass sheets and other sources. After the casting is done, the products are scraped and polished. The polishing is done by fixing the utensil on the lathe by means of lac and turning it.

Besides Khagra, the brassware of Kandi is also well-known. "Bidri" work of Murshidabad was also famous in the past. The process (of bidri work) consists in inlaying silver in pewter which is blackened with sulphate of copper.

Hooghly—Gholsara.—The local braziers used brass dust as raw materials. Ghungurs (ankle or toe bells) and hinges produced here have a steady market. There are 37 families of braziers in the place. Most of the work is done by hand, unaided by machine. Goods worth Rs. 15 to Rs. 20 thousand are sent out from here monthly to Chetla hat and a few other places. In 1926, a Co-operative society was formed among the artisans to enable them to retain a greater share of the fruits of their own labour.

Bansberia (Hooghly-Chinsurah town) and Bali Dewanganj (Arambag).—This is also an important centre for the manufacture and export of brassware. More than 300 families of braziers live here but the profession is not a monopoly of the braziers alone. Among the artisans are found many Dules, Bagdis and Mahisyas. The products made here include Kalsi (water pots), Ghara (water pot),

BRASS AND BELL METAL INDUSTRY

Jug, etc. The wages are sometimes on a piece rate basis, sometimes calculated on the basis of weight of the fabricated products and sometimes are in the form of fixed salaries. The average artisan earns anything between Rs. 40 and Rs. 60 per month, their assistants Rs. 20 and Rs. 25 per month. The brass scraps are bought from Calcutta and the work is generally done with the help of spinning lathes.

Janai-Srirampur.—There are 4 to 5 families of ironsmiths who do the work of the braziers.

Dika-Srirampur.—Here about 40 to 50 families of Bairagis are engaged in making brass ornaments. Their ornaments are sold in Calcutta as well as many villages throughout Bengal.

Howrah.—In the town of Howrah and elsewhere in the district there are many gun metal, bell metal, white metal and galvanising workshops. Mostly machine parts are manufactured in these establishments. These include: Bush, bearing, Valve, Screw, Pin Sewing machine, machines, Lozenge making machines, Pencil cutters, etc.

Kalyanpur is a Centre for both brass and bellmetal manufacture. Locks are made at Mansinghapur (Thana—Jagatballavpur), Dowjwe, Hatal, Bhujeswar (Panchla thana) and also in other places. These locks are sent to Calcutta, Bombay, Delhi and many other towns.

Brass and bell-metal crafts are carried on in Bashirhat, Baduria, Dum Dum, Garia, Baranagar and various other places in the 24-Parganas.

Calcutta.—There are over 200 small casting shops in the City which produce numerous articles of daily use in Bengali homes. In the Kansharipara of Simla, various products are still manufactured from bell metal sheets. After partition, many families of braziers of East Bengal have come and settled in Calcutta and run small establishments of their own. In Bhowanipore there are also many braziers but they have discarded their hereditary calling and taken to goldsmithy.

Nadia.—Sheet work (?) is carried on at Matiari, Dharmada, Sadhanpara, Navadwip, Bahirguchee, Dainhat, Ranaghat and Faridpur (Kaliganj Thana). In Matiari alone, over 300 families are engaged in this trade. The rate of profit varies between annas four to annas ten per seer. The total output of the district reaches the figure of nearly 25,000 maunds per annum.

Birbhum—Nalhati.—There are about ten to twelve families of braziers here, and many workers are employed in their trade. Nalhati is famous for the polish of its utensils. The scrap is supplied by the whole-

salers and the braziers do their work at their own homes.

Dubrajpur.—About 30 families of braziers reside here and in each family there are, on an average, two to three engaged in the trade. Here too, the brazier's profession is not a monopoly of the caste, members of blacksmith, Hari and Bostom castes are also engaged in it. Most of the products of this centre are sold at Raniganj and Asansol. In the village of Tikarbata (Thana—Illambazar) various types of bell metal products are made.

The pali work of Luxmipur, however, is famous throughout the country. It was, however, one solitary person who carried on this work. The palis are measures turned by wood and inlaid with brass. The sizes varied from a Chatak ($\frac{1}{4}$ lb.) to ten seers (20 lbs. approx.) These measures had a ready market. Europeans purchased them, whenever obtainable, as curios—they were made to order only.

Burdwan.—Bronze sheets are made at Dainhat, casting is carried on in Katwa, Begunkhola, Ketugram, Parbastali. Other centres are Kalna, Chupi, Jabui, Saheb-bazar, Dignagar, Kaitara, Bonpas, Kamarpara and Galshi. Ghati and Kalsi (water jugs and pots) are made of sheet metal and cups and glasses are made by casting.

Bankura—Patrasair.—There are over 200 families of braziers in this place. Water jugs, cups and glasses are made by casting. The Mahajans or wholesalers supply the scrap and buy up the finished products. Their products are sold mostly at Calcutta, Chotanagpur and Bankura.

Vishnupur.—In this well-known centre there are no less than 200 families of braziers. On an average, in each family 3 to 4 members are engaged in the trade. The brass and bronzeware of Vishnupur are beautiful and well-known throughout the country. A major part of the local output goes to Chotanagpur and the U. P. and other places. Here too "the brass and gun metal workers are controlled by Mahajans....." to quote the Reports of 1926 ".....they supply them raw materials and take the finished goods".

Midnapur, Kharar.—There are over a hundred forges run by the Mahajans, each employing 60 to 70 persons, sometimes more. The daily rates of wages vary from 6 annas to Rupees three. "The man working at the forge earns the highest, those who clean and polish, lowest."

The bell metal plates made locally are of a high quality. Before the war, raw materials were imported from the Strait Settlements and Japan, now-a-days they are mostly brought from Calcutta.

BRASS AND BELL METAL INDUSTRY

Other centres of brasswork, etc., are Udayganj, Krishnapur and Rai Dhanda.

Nearly 50,000 maunds of products are produced in this district annually.

Patuabazar.—There are 25 families of braziers here and on average, two members are gainfully employed in every family. Cups and pots are the principal local products, made by casting. The daily output per family is generally in the neighbourhood of 10 to 12 lbs.

Other centres of brass and bell metal works are Chandanpur, Gopmahal Ghat, Palasapai, Chandrakona and Ghatal.

Maldah.—The braziers of Nawabganj (Now in Pakistan) are quite clever in their craft and their products are in demand outside of the district.

Englishbazar.—There are twenty families of braziers in this place. The *Midulpur* pots,

made here, are well-known all over Bengal. They are fabricated from sheets of brass and bell metal. The wage is fixed on the basis of the weight of the finished products.

In addition to the local braziers, craftsmen from Burdwan, Bonpas and Khamarpara come to this place and work for seven months in the year from November to May. There are also a dozen families of blacksmiths in this place. In 1926, 70 maunds of raw materials, valued at Rs. 2,000, were fashioned into 75 maunds of finished products with a valuation of Rs. 35,000.

Kaligram (Thana Kharba) there are 14 families of braziers and the total number of metal workers is in the neighbourhood of 300. Other important centres of metal work are Sankarbati, Charjyot, Pratap, Sajpara, Bilpara, Ajoypore. In these villages there are about twenty forges employing about 130 artisans all muslim.

Gold in Bengal

The Suvarna Banik is the most well-known trading caste in Bengal.

References to the Subarnabaniks are found in the context of trade and commerce of the fifteenth century in Bengal. At that period three main centres of their settlements were at Karjananagar near Burdwan, Jessore and Saptagram or Satgaon. Despite their depressed status, they managed to amass big fortunes by engaging in trade and commerce. Thanks to their wealth, the Subarnabaniks had much influence at the courts of Muslim Nawabs who honoured them with such titles as Saha, Mullik, Chaudhury and Rai. At this time there was a very rich man and a prominent member of the Subarnabanik community in Karjana called Abjar Chandra Mullick. The Nawab made him the chief treasurer for Bengal, Bihar and Orissa and honoured him with the title of Khan. In 1492 A.D. he arranged for a census and compiled a genealogical history of the Subarnabanik Community. It was found that there were then 792 families of Subarnabaniks living at the place which included all the principal families of the community except the Naths.

But around 1514 the dispersal of the Subarnabaniks of Karjana began. The genealogical history gives the reason as being "a political illness that struck all members of the community without exception" and made them and their families "homeless wanderers in many a land".

Of the 792 families of Karjana, some went over to Saptagram and settled down there. In 1537 A.D. when the 390 families failed to attend the sradh of Abjar Khan, they came to be known as Saptagramya and the 402 families who were living in other places were given the appellation of Rahri.

The Rahrils lived in the following places: Karjana, Burdwan, Balgana, Kumul, Gangapur, Govindapur, Bamunara, Barasthal, Khandagram, Baranda, Mondalgram, Palashan, Saptabriksha (Satgatchia), Bagan, Mullikpur, Sulpur, Nabagram, Ajhapur, Muktipur, Panchra, Hiranyagram, Betragarh, Osmanpur, Matsar, Singerkon and Kulti.

There is no intermarriage between Rahrils and Saptagramis.

With the expansion of business and commerce, the Subarnabaniks were gradually dispersed all over Bengal. In the 16th century, many of them left Subarnagram and settled down at Hooghly and Gholghat and entered into trade relations with the

Portuguese. A little while afterwards when Subarnagram was systematically sacked and plundered by the Pathans, the impoverished Subarnabaniks left Subarnagram *en masse* and settled down at various places such as Hooghly, Gholghat, Bansa-bati, Sahaganj, Serampore and Chandernagore. Later when the Britishers established their firm hold on Calcutta, many Subarnabaniks of Rarh went over to Dacca or Murshidabad, many to Hooghly and from there to Calcutta to escape the oppression of the Pathan tyrants.

In many cases the words Subarnabanik and Subarnabanikya were used as synonyms for Subarnabanik. Sometimes again they were called Kanak Kshetri because of the fact that Sanaka, the ancestor of the caste was born in the womb of Kanaka, a daughter of the Vaishyas.

At present Subarnabaniks are divided into a number of classes and subcastes. The main division is Septagrami and Rahri. The Rahrils are again divided into Uttar or North Rahri and Dakshin or South Rahri. Besides, the Subarnabaniks of Murshidabad call themselves Fateysinhas.

Ornaments:

OLD STYLE

ORNAMENTS FOR WEARING ON THE HEAD: Malya, Garbhak, Lalamak, Apiree, Balapashya, Paritathya, Hanshatilaka, Dandak, Churamandan, Churikalamban and Mukut.

Malya or garland: Malya is also known as mala or shrak. Women weave garlands with flowers and wear them on their hair done in the shape of a bun.

Garbhak: It is also known as Prabhastak. Many people think it was a kind of mala or garland to wear on hair-dos. Others hold that it was a kind of hair-pin. Maheswara, in his commentary to Amara, has noted that the garland which is worn on the hair is known as Garbhak while the type which dangles entwined on plaited hair is called Prabhastak.

Lalamak: Amarkosha has included Lalamak in the category of mala or garland. It looked rather like the Sinthi and like that peacock-shaped ornament was also worn just above the forehead. The surface of the ornament was mounted with three parallel strips of gold plates, jewels were set in the middle in the shape of a crescent moon whose sides were studded with rare stones and from the base hung a tassel of pearls across its whole length. The ornament came to acquire its name because of

GOLD IN BENGAL

the fact that the tassel of pearls used to hang down the forehead of the wearer.

Apiree: It is also known as Sekhara. It is worn on the head.

Balapashya: According to Maheswara it was an ornament worn on the head while some believe that it was actually a rope of pearl which used to be worn entwined with the plaited hair.

Paritathya: This was the old name for the peacock-shaped ornament which is known as Sinthi now-a-days. It is made of gold and set with diamonds and rare stones. According to Amarsinha, Balapashya and Paritathya are merely two different names for the same ornament.

Hanshatilaka: It was made of gold and resembles the aswatha leaf in shape. It was also mounted with stones and jewels. Women used to wear them just above the forehead.

Dandaka: This ornament resembled the bangle. It was made of gold plates, studded with pearls. Movement of the head caused it to produce a soft, melodious sound somewhat like that of the rattle.

Churamandak: This was fitted on to the top of the Dandaka to enhance its beauty. It resembled in appearance the Ketaki flower and was made of gold.

Churika: This ornament, made of gold, resembled the lotus and was worn in back of the lace-shaped hair-do.

Lamban: This ornament was called lamban because it used to dangle down the Churika. It is still used in up-country and is known as Jhala. It consisted of a string of small flowers made of gold, with pearls hanging down their sides and set with *Indranil* and other precious stones at the centre.

Mukut: Mukut or crown or diadem is the traditional head-dress of queens from the ancient times. Mukuts are of many varieties. It is made of gold and set with jewels and stones. Beautiful bird-feather was put on the top of the mukut.

EARRINGS AND OTHER ORNAMENTS FOR THE EAR

Muktakantak: Pearls of identical size were strung together on a thin piece of wire in the shape of a ring and were worn by both men and women in the past. These are used even today.

Dwirajik: It is now known as Birbauli. Shaped like small bangles, the surface is set with pearls and a blue stone in the centre.

Trirajik: It is a variation of Birbauli. When a Dwirajik is set with another row of pearls instead of the blue stone in the centre, it is called Trirajik.

Sarnamadhya: When a Birbauli is set with a piece of gold instead of the blue stone, it is called Sarnamadhya or literally the gold-centred.

Bajragarbha: In the north-west parts it is now known as Gimda. At the centre of the ornament is set a piece of jewel, with pearls on either side. From the pearls dangle noserings of rare stone. It is merely a variation of the earrings, now used in Bengal.

Bhurimandan: It is an ornament more or less identical to Bajragarbha. Pearls, diamonds and jewels are set in the manner described above.

Kundal: It consists of several tiers of diamonds set together in circular rows. Both men and women are still in the habit of wearing this ornament in the Punjab, Rajputana and Gujerat. The Kundal is also known as Karnabestan.

Karnapur: A kind of flower-shaped earring. This ornament is now known as Karnaphul, Jhumko, Champa, Jhampa, etc.

Karnika: It is also known as talpatra or tarpatra; in Hindi it is called Ilabar, in Bengali, Kantadka. This earring has now fallen into disuse.

Srinkhal: It is a kind of earring which can be called a variation of the ornament called Jhala.

Karnendu: A kind of earring which women formerly used to wear in the back of their ear-lobes.

Lalatika: It is also known as Patrapashya. It is a gold crescent or square or pentagonal piece of ornament with a stone set in the centre.

ORNAMENTS WORN ON THE NECK

Pralambika: It is a gold chain that reaches up to the naval of the wearer. It is ordinarily known as Lalantika or Lamban. Amara has included it in the category of mala or garlands.

Urah Sutrika: A pearl necklace reaching up to the naval of the wearer.

Debachhanda: A necklace consisting of exactly a hundred pieces of pearls.

Guchhya: A necklace consisting of 36 strands or ropes of pearls.

Guchhyardha: A necklace consisting of 24 strands or ropes of pearls.

Gostan: A necklace consisting of 4 strands of pearls.

Ardhahar: A necklace of 12 strands of pearls or according to some of 64 beads of pearls.

Manabak: A necklace of 20 strands of pearls.

Ekabali: A necklace of a single strand of pearls of biggest size.

Nakshatramala: A necklace of a single strand of 27 pearls.

GOLD IN BENGAL

Bhramar: A necklace of a single strand of pearls of medium size.

Nilabanika: A necklace of 5, 7 or 9 strands of pearls with beautiful Indranil at the end. The pearls are strung together on wire-rings made of gold. The wire-rings are of a continually diminishing size but their ends converge to a point and are strung together. Indranil hangs from this converging point. From the centre of each strand again is hung a locket made of Nilkantamani.

Barnasar: The design is the same as that of the Nilabanika, only Hiranmani and Nilmani takes place of the Indranil and the Nilkantamani of the latter.

Sarika: A necklace that claps firmly on the neck made of nine or ten pearls.

Bajrasamhalika: It is Sarika fitted with a cluster of Nilkantamani.

Baikakshik: A necklace that hangs down to the breast in the manner of the sacred thread.

Padak and Bandhuk are variations of the locket and are worn on the breast hung from the neck by means of a thread. These are of many varieties, mostly shaped like hexagonal or octagonal flowers or leaves and are made of gold. The more precious lockets are leaf-shaped. Generally set with stones at the centre and also around the sides.

ORNAMENTS FOR THE ARMS AND LIMBS

Keyur: It is a kind of bracelet with the ends shaped like the head of a lion. When not set with stones it is called Ananta. It is also called Angada though others hold that this name should be reserved for bracelets without the cluster of precious stones. It is called Bahubat or Bajubandh in Hindi. It is worn just a little above the elbows.

Panchaka or Painchha: a chain round the waist.

Katak: Gold bracelets set with jewels.

Bala: Bracelets worn on the wrists. It is variously shaped to resemble the head of a tiger, lion or makara, a mythical water animal.

Chur: A tight-fitting kind of bracelet, made of rows of gold sticks stuck together by means of pins inserted through holes.

Kankan: Bracelets that clasp tight on the wrists—available in many different designs.

Rings: In Puranas mention is found of seal rings. The rings with monograms on them were known as mudras (Amar).

Duihirak is that type of ring with a Hiranmani or Nilmani, set in the centre, flanked on both sides by diamonds.

Bajra: A ring shaped like a triangle at the top and set with three diamonds at the

three corners of the triangle with a mani or jewel at the centre.

Rabimandal: A circular ring with diamonds set all around with a jewel at the centre.

Nandyabarta: A square-shaped ornament with the centre in relief or raised and set with a diamond.

Nabaratna or Nabagraha: A ring fitted with the following nine stones such as Subag Manik, Uttam Mukta, Suramya Prabal, Marakat, Pushparag, Hirak, Indranil, Pitamani and Baidurjya.

Bajra-bestak: A ring with the entire surface studded with diamonds.

Trihirak: A ring set with a big diamond with two smaller diamonds on either side.

Sukti-mudrika: A ring shaped like the snake's hood. Its entire surface is studded with diamonds and set with jewels and stones at the centre.

Kanchi: An ornament like the gott consisting of a single strand.

Meḅhala: A Kanchi with eight strands. It probably resembles the ornaments known as Chandrahar and Suryahar.

Rashana: A Kanchi consisting of 16 strands.

Kalap: A Kanchi consisting of 25 strands.

Kanchidam: An ornament about 4 finger-width in breadth, consisting of gold tassels fitted with tiny balls as in ankle-bells. It is worn round the waist and rests on the buttocks of the wearer.

Padachur: Like the chur, it also is made of gold sticks and is worn round the ankles. These are often mounted with jewels and stones.

Padakantak: Also known as Paijor. Made of three tiers of gold sticks joined together by means of pins inserted through holes. Square, hexagonal or octagonal in shape. Fitted with small balls of gold. It produces a sweet jingling sound with every movement of the wearer's feet.

Padpadma: Also known as Charanchhap or footprint and Charanpadma or lotus feet. It consists of three to five pieces of chains mounted with jewels at the point where these chains are joined together.

Kinkini: Also known as Ghungur or ankle-bells. The hollow gold balls contain small pellets that produce a melodious jingling noise.

Mudras: Made of jewels and blood-red in colour. Produces a sweet sound with every movement of the wearer's feet.

Nupur: Ankle-bells, made of gold, set with stones and jewels. It is worn round the heel and covers the feet from the heel to the knuckles or the roots of the toes. Like other varieties of ankle-bells it also makes a jingling noise. The variety worn by dancers these days is made of brass.

GOLD IN BENGAL

Punte : It is shaped like the bead of the Mallika flower but slightly bigger in size. Worn on the bead-shaped hair-do.

Sinhi : It is a curved tiara-like ornament that covers the entire forehead from ear to ear. The ground is made of gold wire, set at intervals, with valuable stones. A row of pearls hangs along the entire length of the base of the tiara and is hung with a locket at the centre.

Jhinjir : A sort of tape made with gold and jari and is worn entwined round the plaited hair.

Nose Rings : A small piece of stone hanging from a thin thread of gold.

Ear Rings : Chaudhani and Birbauli.

Necklace : Bai Dhunri.

Churi : Mardana, Jabdana, Palankanti, Khaijenoe, noe, Gajra, Rasno, Tar (for babies), Kar Padma.

Bichhe : Key-rings, Bang (for babies), Bore (for babies), Komarpatta (for babies).

Legs : Angot, Ghutki, Ghujri Pancham, Paora.

Now-a-days goldsmiths and jewellers' shops are to be found in almost every lane and byelane of Calcutta. As a matter of fact there are more of them than sweet shops. The paraphernalia of the typical shop consists of a chest, a balance and a testing stone. The standard weight is the tola and its lower denominations, sometimes rati and also anna— $\frac{1}{2}$ anna and even a kunch. The stone is used for testing the gold.

Gold, used for making ornaments these days, is generally mixed with alloy in specific numbers of carats. Guinea gold or 22 carat gold is accepted as the standard quality and has the widest demand. Old gold is called *mara* or literally dead gold and it contained pan or silver or copper alloy in generous proportions. While gold also has a market and is generally used for ornaments which are set with jewels and stones.

Tools : Oven fitted on hollowed basin, hand-bellows, tongs, pincers, hammer, die, lampstand, wire gauge, 2" x 5" plate, lamp, blowpipe and borax crucible.

Dies : Dies are cut by skilled workers. A large variety of designs is available in the market. Die-cutting establishments are mostly localised in the area of Garanhatta. Smaller goldsmith shops which do not buy die for themselves get their designs done from other establishments.

Polishing : There are many shops which specialise in electroplating and goldsmiths entrust the job of polishing gold ornaments to them.

Pattern-engraving : Relief work, images and other similar types of work are done by skilled craftsmen. The gold strip is mounted on lac and is then worked upon. Gold is melted in crucibles by mixing sohaga or borax. The molten metal is then poured on to moulds placed on tiles and are then hammered into strips of desired size and thickness.

An alloy of silver or copper is used in every case of joining work. The alloy is considered as gold when the ornament is sold but its weight is deducted from that of the gold when the ornament is bought back by the goldsmith. The quantity of alloy varies with the number of joints in an ornament.

There are also ornaments into whose making gold, iron, silver and copper are used, either separately or by mixing them together.

The rates of wages vary. Rs. 2, Rs. and Rs. 5 are standard rates for different types of work. Naturally the more skilled jobs are higher paid. Now-a-days many books on designs of gold ornaments are available. They are mostly based on the catalogues originally issued by the firms of M/s Lavchand Motichand, the ancient house of diamond cutters in Calcutta, and later by M/s Mitra Mookherji & Co. of Bhowanipore.

Many Bengali craftsmen are employed in the European jewellers' firms. Bengali goldsmiths are to be found in large numbers in Bombay and also all over the rest of India.

GOLD

Extracts from the Dhatumala by S. M. TAGORE

Whatever are produced in the interior of the earth and in the caves of mountains are called minerals. They are divided into four classes, viz., (1) *Ratna* (gems), (2) *Upa-ratna* (minor gems), (3) *Dhatu* (metals), and (4) *Upa-dhatu* (minor metals). Diamond and other valuable stones come under class 1; crystal under class 3; and talc and other minerals, under class 4.

The Eight Dhatus

The Dhatus (metals) are principally eight in kind. These are (1) *Svarna* (gold),

(2) *Raupya* (silver), (3) *Tamra* (copper), (4) *Ranga* (tin), (5) *Dasta* (zinc), (6) *Parada* (mercury), (7) *Sisaka* (lead), and (8) *Lauha* (iron). Some authorities exclude *Parada* (mercury), and hold that the metals are seven in kind.

The meaning of the word 'Dhatu'

The root-meaning of the word 'Dhatu' is 'that which supports'. Gold and other minerals are called Dhatus because they

GOLD IN BENGAL

serve to support human body, inasmuch as by giving tone to the system by their use, they prevent undue accretion of fat, relaxation of the skin, greyness of the hair, baldness, debility, and decrepitude.

Suvarna (gold)

Gold is either natural or artificial. Natural gold is that which is obtained in

the interior of the earth and in the caves of mountains, and artificial gold is that which is produced by the action of mercury and other substances. Natural gold is of two kinds, namely that which is found in a state of absolute purity, and that which is found mixed with iron and other substances and which has to be rendered pure by chemical process.

ORIGIN OF GOLD

The contact of water and fire with the clay in the interior of the earth produces such an effect on the combination as to give birth to the gold. It is said that Mahadeva, the Hindu Deity, was the first to discover the existence of gold. Hence this metal is called Harateja, or the fire of Mahadeva. Gold ranks the highest of all metals.

Synonyms

Suvarna, Kanaka, Hiranya, Hema, Hataka, Tapaniya, Satakumbha, Gangeya, Bharmam, Karvvura, Chamikara, Jatarupa, Maharajata, Kanchana, Klakna, Karttasvara, Jambunada, Ashtapada, Kanchchura, Rugma, Bhadra, Bhuri, Panjara, Dravina, Gairka, Chandra, Champeya, Bharu, Abh-raka, Agnivija, Kalyana, Uddhasaruka, Agnibha, Kaladhauta, Sparsamani-prabhava, Agni, Teja, Lohavara, Ujjvala, Nishka, Agneya, Jambava, Mukhyadhatu, Satakaumbha, Manohara, Pinjana, Bhaskara, Dipta, Agniviryya, Apinjara, Bhringara, Diptaka, Mangalya, Agnisikha, and Saumanjaka.

Superior Gold

The test of superior gold is that it turns red on being placed on fire, becomes white on being cut, takes the colour of the saffron when rubbed on the touchstone, is free from the admixture of silver and copper, and is cold and soft to the touch and heavy in weight.

Inferior Gold

The test of inferior gold is that it is of white colour, is hard, rough, full of dirt, full of layers, brittle, light in weight, and turns black when cut or put on fire and white like ghee when rubbed on the touchstone.

The Virtues of Refined Gold

Refined gold is cooling, invigorating, heavy in weight, smooth, pure, stimulating, sweet in flavour after heating, sweet, bitter, and astringent to the taste, good for the eyes, productive of intellectual and retentive

powers, fascinating to the sight, conducive to longevity and physical beauty and to the purity and steadiness of the voice, and is a specific for insanity, fever, consumption, poisoning of all kinds, and the disorder of the three humours of the body.

The Necessity for using Refined Gold

The use of unrefined gold brings loss of strength, and various diseases, and untimely death. Physicians should, therefore, take particular care and use only the refined gold in their medicinal preparations.

Refined Gold

Cut the gold into very thin strips, put them on fire, and then dip them into the following liquids successively, namely, oil of sesamum, butter-milk, sour gruel, cow's urine, and decoction of Kulattha Kalaya. This process is to be repeated thrice, that is, after annealing once put the metal into the oil of sesamum, do this three times and then repeat the operation with regard to the next item (butter-milk), and so on. This will refine the gold. Silver and other metals may be refined under a similar operation.

ANOTHER METHOD

Take the Pancha Mrittika (five kinds of earth) and liquefy it with the juice of the Taba Lebu. Anoint the thin strips of the gold with this solution, and have them dried in the sun. Do this frequently during the day, and repeat the operation for five days. Then sublime the gold with earth, ashes, and salt. This will cause the gold to be refined.

ANOTHER METHOD

Have the Pancha Mrittika well pounded with the juice of the lime and sour gruel. Smear the strips of gold with this paste, keep for three days and then sublime in slow fire.

ANOTHER METHOD

Pound the Pancha Mrittika with rock salt, burnt clay, lime juice, and sour gruel. Paste this on the strips of gold and then sublime.

GOLD IN BENGAL

Calcining Gold

Mix the strips of gold with twice their weight of mercury. Pound this with acid, and make into a ball. Take an equal quantity of powdered sulphur and put it on the top and bottom of the ball. Put this ball into an earthen crucible, and place a similar crucible over it in an inverted position, so that one joins the other. Close the two well by putting a piece of cloth over it and plastering it with moist clay. Then sublime with thirty pieces of Bilghuntia for fourteen times, and at each sublimation plaster with sulphur. This process will certainly reduce the gold to ashes, and prevent it from recovering its previous character.

ANOTHER METHOD

Melt the gold. Throw into it lead of the weight of one-sixteenth of the gold. Remove from fire, and have it well grounded into powder. Pound it with some acid, and then make into a ball. Cover the top and bottom of the ball with powdered sulphur, and put it into a crucible in the manner already described. Then sublime. The gold will be completely calcined after the repetition of the sublimation seven times. At each sublimation, powdered sulphur is to be applied as before.

ANOTHER METHOD

Take mercury and sulphur in equal parts and make them into a collyrium. Have it pounded with the juice of the Rakta Kanchana. Paste the gold leaf well with this, and make into a ball. Make two crucibles out of the bark of the Rakta Kanchana, and place the ball within. Place this in an earthen crucible and put upon it another, the joining parts being well closed. Cover this with a piece of cloth and a paste of wet clay, and put to sun. Sublime thrice in quick fire and the calcined gold will be fit for all purposes. Vishalanguli, or Manah-sila may be used in the same way as Rakta Kanchana.

ANOTHER METHOD

Take Manah-sila and vermilion (red oxide of lead) in equal parts, and have them well powdered. Soak this in the secretion of the Akanda, and dry in the sun. On the operation being repeated for seven times, throw this into the molten gold, in the same quantity as the gold. Anneal in quick fire so that the quantity thrown in may lose itself in burning. When the operation is repeated thrice, the gold will become completely calcined.

ANOTHER METHOD

Pound Svarna-makshika and powdered lead with the secretion of the Akanda.

Paste this over the gold leaf, and sublime. The gold will be instantly calcined.

ANOTHER METHOD

Mix pure mercury with gold. Pound it into a cake. Place powdered lead over and under it, and then sublime.

ANOTHER METHOD

Melt the gold. Put one-sixteenth part of powdered lead into the molten metal. Remove from fire. Mix well with the juice of the Narangi. Mix this with an equal quantity of mercury and make it into a ball. Place the ball in a new earthen dish (concave), and put over the ball an equal quantity of powdered sulphur. Cover the dish by placing another over it. Sublime with fire made of 30 pieces of Bilghuntia (cowdung-cakes) for seven times, and the gold will be calcined.

ANOTHER METHOD

Mix powdered tin and Manah-sila with the secretion of the Manasa plant. Paste this on the gold leaf and sublime.

ANOTHER METHOD

Pound calcined tin with the secretion of the Manasa or with any acid. Paste this on the gold leaf, and after covering it well, sublime on Gajapata. Repeat the operation eight times.

ANOTHER METHOD

Pound a quantity of pure mercury, pure sulphur, pure Svarna-makshika, and the gold leaf, with tamarind. Sublime eight times.

ANOTHER METHOD

Take two parts of mercury and one part of gold. Pound well for three hours with acid. Take pounded Svarna-makshika of the same weight as the gold. Place the former (gold and mercury) in the crucible. Put upon this the latter (Svarna-makshika), on which again put a quantity of Svarna-makshika. On this last put an equal quantity of powdered sulphur. Close well and sublime six times in quick fire. All the stuff within will be reduced to ashes. When the ashes become cool, take one-fifth of the total quantity, an equal part of borax and an equal part of powdered white glass, and pound with honey and ghee, and make into a ball. Put some fine dust of the Dhanya-bhra into a crucible, and then place upon it the ball and sprinkle over it some more of the fine dust of the Dhanyabhra, close well and sublime in quick fire for two hours.

ANOTHER METHOD

Take one part of Svarna-makshika, one part of Avota Makshika and three parts of

CARGO BOATS IN MURSHIDABAD

<p>37 Log Sea Lines (Europe). 38 Canvas (country), 1st sort. 39 Canvas (country), 2nd sort. 40 Twine (country). 41 Lines (country). 42 Anchors, Stocked. 43 Cables (Europe). 44 Rope (Europe). 45 Spun-yarn (Europe). 46 Cables, Laccadive coir, tarred. 47 Cables, Maladive coir. 48 Coir. 49 Jute Rope. 50 Jute. 51 Relaying pins.</p>	<p>52 Serving Mallets. 53 Serangoose. 54 Gulgull. 55 Oa kum. 56 Cotton. 57 Grease. 58 Red ochre. 59 Scrapers. 60 Buckets. 61 Water casks (Soul). 62 Boat oars (Europe). 63 Anchor Stocks.</p>
--	--

A Guide to the Commerce of Bengal, by
John Phipps, pp. 146-147.

XXII(b)

The Common Boats of the Present day

Chhip: A fast going boat; a fishing boat.

Donga: Raft, vessel, boat, canoe.

Vela: Raft.

Pansi: Pinnance, paunceway.

Hunter: 24-prgs. p. 33.

Patila, a large flat-bottomed boat used on the Ganges (Yule, 687). These were the boats ordinarily employed for the transport of saltpetre of Bowvey 225, 229.: The English Factories in India (1670-1677) Vol. II (New series) p. 336, foot note No. 6.

Satti: Hunter—24-prgs., see p. 33.

Bajra or Budgerow: Hunter: 24-prgs., see p. 33.

Mayurpankhi: Hunter: 24-prgs., see p. 33.

Palwar: a typical cargo boat of the Dacca District. (Hornell: p. 182.)

Bhadrakulia: Cargo carrier—principally jute. (Horness: p. 193.)

Baich:

Danrh:

Bhara: Cargo: Hunter—24 Prgs., see p. 33. (Hornell: p. 193.)

Buhit:

Bishhati:

Panchishi:

Singhamukhi:

Ghoramukhi:

Nagphani:

Baisha:

Athaisha:

Baghrumukhi:

Hansamukhi:

Sankhachurh:

Durgabar:

Ranajay:

Narabhim.

Chandrapan:

Hiramukhi:

Chandrakona:

Madhukar: Manasha Mangala.

Tigari:

(Hornell.)

Saranga:

(Ibid: Taylor.)

Ghasia Dingi: (E. Bengal.)

(Ibid: Hornell.)

Kosh:

Bachari: A market boat.

(Hornell.)

Hola: Cargo carrier—(coal & brick).

(Hornell.)

Parulia: -do-

Bistupuria: -do-

Khanjai Katti: -do-

(Hornell: p. 193.)

XXII(c)

Types of Cargo Boats in Mushidabad District

(From "Selections from the Records of the Government of Bengal relating to the Nadia Rivers from 1848 to 1926, 1931, p. 412)

	Flood season average		Mds.	The shape of the boat is round in front and back, the stern being somewhat higher than the bow. It is wider and deeper than other boats. Oars are worked from the roof.	
<i>Melni</i>	a Minimum maundage		162		
	b Maximum maundage		1700		
	Dry season average				
	c Minimum maundage		150		
<i>Patteli</i>	d Maximum maundage		1000	Flat bottomed planks joined on the outside by overlapping and fastened with big nails. Width and depth less than Melni. Oars are worked from the roof.	
	a		168		
	b		650		
	c		150		
	d		300		

GOLD IN BENGAL

Herodotus tells us*, paid annually as tribute from the province into the treasury of the great king.

Silver from natural sources was at that time less plentiful in India, but was attracted thither in large quantities in exchange for gold, which was cheaper there than elsewhere in the ancient world. In India, however, the origin of earliest coinage like so much of her early history is still shrouded in mystery.

This much can be said of its earliest stages. Certain small ingots of silver, whose only mark is three circular dots, represent probably the earliest form. Next in order are some heavy bent bars of silver with devices stamped out with a punch on one side¹. These two classes of coins are computed to have been in circulation as coins at least as early as 600 B.C., but they have not been found in any quantity. On the other hand, from almost every ancient site in India, from the Sundarbans in Bengal to Kabul, and as far south as Coimbatore, have been recovered thousands of what are known to numismatists as "Punchmarked Coins". These are rectangular and circular flat pieces of thin silver (much alloyed), or more rarely copper, cut from a hammered sheet of metal and clipped to the proper weight. One side (the obverse) is occupied by a large number of symbols impressed on the metal by means of separate punches. In the oldest coins the other, the reverse side, is left blank, but on the majority there appears usually one, sometimes two or three, minute punch works; a few coins have hath obverse and reverse covered with devices. These devices appear in wonderful variety more than three hundred have been enumerated; they comprise human figures, trees, birds, animals, symbols of Buddhist worship, solar and planetary signs. It seems probable that in India coins were first actually struck by goldsmiths or silversmiths, or perhaps by communal gilds. C. J. Brown (the Coins of India) is of opinion that the "punch marked" piece was a natural development of the paper hundi or note of hand; that the coins had originally been struck by private merchants and gilds and had subsequently passed under royal control, etc., etc., (Pp. 15/16). Most writers agree, as indeed their shape, form, and weight suggest, that the "punch marked" coins are indigenous in origin, and owe nothing to any foreign influence.

Indian coins may be divided into two classes—Northern and Southern. This distinction between north and south is rather important. The reason for this is that Northern India, was subjected to a series of

foreign invasions; the indigenous coinages of the north were, therefore, continually being modified by foreign influences. After the general devastation caused by the invasion of the Huns, few princes could have retained sufficient wealth in their treasuries to imitate their Kushana or Gupta predecessors. The most notable imitations were the product of a mint, secured by its remoteness from the ruthless hand of the invader, in Central Bengal. These remarkable and not uncommon coins with Siva reclining on his bull Nandi on the obverse, and the goddess Lakshmi seated (N.B.) on a lotus on the reverse, were struck by Sasanka, king of Gauda (circa 600-625). In Bengal, too, for many years after the passing of the Gupta Empire, were current flat gold pieces with crude reproductions of Gupta designs, and, with the exception of the word "Sri" on the obverse, completely illegible inscriptions.

The Coinage of the Muhammadan States

All the states whose coinages form the subject of this chapter, with the exception of Kashmir, were once provinces subject to the Delhi Sultans, and owed their independence to the ambition of powerful viceroys, who took advantage at various times of the weakened control of the central power. The earliest issues of each state were more or less close imitations of the Delhi currency, but local conditions soon introduced modifications in standard and fabric, and in the course of a century each had generally acquired a well-defined and characteristic coinage of its own. Prosperity was usually shortlived; the inevitable period of decay set in; and the coinage, confined at the close to ill-struck copper pieces, illustrates history in striking fashion. Bengal, however, was able to maintain its silver currency to the last.

The Coinage of the Governors and Sultans of Bengal

Bengal was brought into subjection to the Delhi kingdom in 1202 (A. H. 599) by Bakhtiyar Khilji, who became the first governor of the province. Till 1338 it was nominally ruled from the capital, Lakhnauti, by independent governors; but at least six of these issued coins in their own names; and after 1310 there was a divided governorship, the rulers of East and West Bengal each assuming the right to coin. Independence was gained under one of the rulers of East Bengal, Fakhru-d-din Mubarak; and, after a year of discord, Shamsu-d-din Ilyas Shah, in 1339, brought the whole province under his control. From 1339-1358 Bengal was ruled by four dynasties, the house of Ilyas Shah, 1339-1406 and 1442-1481, the

* Herod III 94. See also Coins of Ancient India by Cunningham. P-12.

¹ Cf. Indian Museum Catalogue, P. 136, Nos. 1, 2, 3 (ingots) Nos. 4, 5, 6 (bars).

GOLD IN BENGAL

house of the Hindu raja, Ganesh, 1406-1442, the Habshi kings, 1486-1490, and the house of the greatest of Bengal kings, 'Ala-ud-din Husain Shah, 1493-1538. Bengal was then ruled from Delhi by Sher Shah and his family; then independently from 1552-1563 by younger members of his dynasty; and finally by three sovereigns of the Afghan Kararani family till 1576, when Bengal became a province of Akbar's empire.

Gold coins of Bengal are very scarce, and but one bullion coin, of the governor Ghiyas-ud-din Bahadur (1310-1323) has been found. The place of copper, it is supposed, was supplied by cowries. Silver coins are known of twenty-nine out of the fifty-six governors and sultans, but the silver is inferior in purity to the Delhi coins; and that of the Sultans is struck to a local standard of 166 grains: they are frequently much disfigured by counter marks and chisel-cuts made by the money-changers. The coins of the governors and Sultans until Shamsu-d-din Ilyas Shah show Delhi influence in fabric and inscription, and this influence reappears occasionally later. The issues of the earlier governors bear the Kalma on the obverse; for this later governors substitute the name of the last Khalif of Baghdad, Al Must'asim. The independent kings adopt various titles expressing their loyalty to the head of Islam such as "The right hand of the Khalif, aider of the commander of the faithful" and "Succourer of Islam and the Muslims". The convert, Jalalu-d-din Muhammad (1414-1431), revived the use of the Kalma, which is continued with two exceptions by all his successors till 'Alau-d-din Husain Shah's reign'. The most usual personal titles are "The mighty Sultan", or "The strengthened by the support of the Compassionate", but certain rulers adopt striking formulae of their own. Shamsu-d-din Ilyas Shah, following 'Alau-d-din Muhammad of Delhi', called himself "The Second Alexander", and Sikandar Shah (1358-89) was evidently imitating Muhammad bin Tuglaq in "The warrior in the cause of the Compassionate". One of the most curious and interesting titles appears on a coin of 'Alau-d-din Husain; it runs as follows: "The Sultan, conqueror over Kamru and Kamtah and Jainagar and Urissah", alluding to his invasions of Assam and Orissa.

The coinage assumes a characteristic local type first under Sikandar son of the founder of the house Ilyas, and henceforth there is much variety of design, the Sultan's name and titles being enclosed in circles, squares, octagons, sometimes with multifoil borders or scalloped edges; margins occur more usually on the reverse only, sometimes on both sides, in which are inscribed the mint

and date in Arabic words. Nasiru-d-din Mahmud I (1442-59), abolished the marginal inscription; and from his reign the mint name and date, in figures, appear at the bottom of the reverse area. For some of his coins Jalalu-d-din Muhammad used Tughra characters, which, owing to the up-strokes being enlongated to the upper edge of the coin, give the curious appearance of a row of organ-pipes. It must be admitted that the majority of Bengal coins are entirely wanting in artistic form, the depths being reached perhaps in some of the issues of Ruknu-d-din Barbak (1459-74); the calligraphy is of the poorest quality; and the Bengali die-cutters frequently reveal their ignorance of Arabic. The fine broad coins of the two Afghan dynasties display an immediate improvement; they are identical in form and inscription with the Delhi Suri coinage, and are struck to Sher Shah's new silver standard. A special feature of the Bengal coinage is the number of its mints; twenty-one names have been read on the coins, but it is uncertain whether some of these are not temporary names for better-known towns. The most important mints were Lakhnauti, Firozabad, Satgaon, Fathabad, Husainabad, Nasratabad and Tanda. Also certain coins are inscribed as struck at "The Mint and "The Treasury". The broad silver coins of the little state of Jayantapura, though struck two centuries after the independent coinage of Bengal had disappeared, seem to be a late echo of the popularity it achieved, particularly in the neighbouring hill states.

Gold Mines

Tavernier in his account of this country (Tipperah) remarks:

"There is here a gold mine but the gold is very coarse." He also states that the gold from this mine was exported to China and exchanged there for silver.....The gold coin called kaltis (KALTIS) is supposed by Wilford, to have been the refined gold named CANDEN, for which India was celebrated in ancient times (A. S. Researches Vol. p. 269). A small fragment or piece of gold of an irregular shape, having either a plain surface, or a few obscure symbols marked upon it, constituted the earliest type of a gold coin in India; specimens of this description of coins have been found in Southern India and the Sunderbands. (JASOB Nov. 1835 No. 47 p. 627). As stamped coins, however, were current in India in the time of Arrian, it is probable that Kaltis was one of them.

STUCKIUS mentions a coin called Kallais which was current in Bengal in his time. Tavernier, speaking of Tipperah, states that

GOLD IN BENGAL

the Rajah "makes thin pieces of gold like to the aspers of Turkey, of which he has two sorts; four of the one sort making a crown, and twelve other." The modern gold coin of Tipperah has on one side the singha or lion resembling at the same time the Chinese dragon. The era employed is that of salibahan, which dates 78 years later than the christian. (See Marsden Numismatia Orientalia). Kattis, however, appears to have been the coin of the lower part of Bengal in which Ganga regia was situated. The name of Sonargong or Suvernagrama (the town of gold) seems to imply, that it was a place of great wealth, or what is not improbable, the appellation may have been given to it, from the large quantity of gold that was brought to it in the course of trade. Formerly, a considerable quantity of gold was imported into the eastern part of Bengal from Arracan and Pegu. Speaking of the vessel in which he sailed from the latter country to Chatigan, Caesar Frederick remarks: "save victuals and ballast they had silver and gold and no other merchandise." (Hakluyt's voyages. Vol. II p. 379) Gold is still brought annually (1847) from Pegu to Naraingunge; and no doubt it was one of the chief imports into Sonargong in ancient times. Sonargong was the seat of a mint in the time of the Mahomedan Kings of Bengal, as appears from coins of the sultan Shumsooddin having the word Sonargaun marked upon them, and bearing the dates 754 and 760 of the Mahomedan era.

Gold Ornaments

See Calcutta Exhibition of Art-manufactures (1882) by James W. Browne, pp. 176-251.

Bichha; *Ghunsi*; *Chandra har*. (A zone of gold or silver worn on the waist); *Lahar Bichhe*: also pendant; *Gulbandh*; *Chik har*; *Patal*; *Hansuli*: a kind of ornament for the neck; *Matar mala*; *Churi*: Bangle; *Chur*; *Bala*: Bangle; *Kan Kan*: Bracelet; *Ratan chur*; *Taga*: Armlet; *Painchha*: an ornament for woman's wrist consisting of beads of gold; *Bauti*; *Ananta*: armlet; *Tabij*: amulet; *Araih painch*; *Jasam*; *Bauju*: armlet; *Labanga*; *Kauti*; *Phul*; *Makri*:

ear-ring; *Jhumko*: woman's ear-ring; *Passion-flower*. *Pasha*: Kan; Earring; *Dul*: Ear-ring. *Nakchhab*: a nose pin; *Nolok*: nose ring; *Nath*: a large nose ring; *Tiara*; *Tikli*; *Jhapta*; *Chiruni*: Comb; *Pash chiruni*; *Phul*; *Mukut*: Crown; *Chandra kala*; *Hair pin*; *Brooch*; *Angti*: Ring; *Labanga*; *Kauta*: a small casket. *Kan khuski*; *Dant khuski*; *Mantasa*; *Ghari*: watch; *Gharis chain*; *Dant Bandhano*; *Sonar kajl lata*; *Sosan kajal kati*; *Sonar jhinuk*; *Sonar duder bati*; *Bati*: Cup; *Garu*; *Sonar chusi kati*; *Sonar jhum jhumi*: Rattle; *Sonar tar*: String; *Stabak*; *Pushpa*; *Sonar chamar*: Chowrie; Gold in lay. *Ghorar saj*: Harness; *Ghat*: Pitcher; *Patra*: leaf; *Golap dan*: Rose-stand; *Atan dan*; *Phuldan*: flower vase; *Golap*: Rose; *Dowat kalam*: Pen and Ink pot; *Subarna kharam*: Sandal; *Sonar Murti*: Idol; *Sonar Singhasan*: Throne; *Rath*: Chariot; *Gambuj*: Dome; *Pasha*: Dice; *Daba*: Chess; *Sonar khat*: cot; *Trisul*; *Nishan*: Flag, standard. *Sonar Darja*: Door; *Sonar khancha*: Cage.

Fitzgerald sent to the Annual International Exhibition of 1872 a collection of the grass ornaments worn by the wild Thakurs and Katkaris of Matheran and the western Ghats of Bombay, which had been made by D. J. Y. Smith, the accomplished Superintendent of this Hill Station, and by the side of these grass collars, necklaces, bracelets, anklets, and girdles were exhibited also gold jewellery made of thick gold wire, twisted into the girdles, bracelets, anklets, necklaces, and collars, which are worn all over India, fashioned in gold exactly as the Matheran ornaments are fashioned in grass. Paris Universal Exhibition, 1875 (Birdwood); pp. 69-70.

Kharu: a scalloped ornament worn by women on the wrists; *Mal*: Anklet of dancers; *Nupur*: a jingling anklet for dancers; *Tora* for Bride usually worn above "Painjora"; usually worn above "Gujri" ordinary use (children); *Painyajore* anklet made of chains and lotus loofs. (pendents); *Ring*; *Chutki*: Inlay, etc.; *Rath*: Chariot; *Khat*: *Palanka*: Cot; *Murti*: Doll, Idol. Image

BIBLIOGRAPHY

XXIX

Bibliography Books

- Abou—Abdallah, Mahomet—Ibn—Bathouka, de Tanger, Voyagea ver 1325 dans l' Egypte, la Syrie, la Perse, l' Arabie, la Zangnebar, l' Asie-Mineure, la Kaptshack, la Karizm, l'Inde, la Chine, Ceylon, la Nijer et le Soudan, the book written by him on return in 1365 is entitled: Cadeau fait anx observateurs et traitant de la singularite' des villes et des merveilles qu'offrent les voyages. See *Revue Générale*, Brouxelles T. 37 (1883) p. 740 n. I.
- Ancient Indian Colonies in the Far East. Vol. I. Champa. By R. C. MAZUMDAR. Lahore 1927; Pp. XI-XII. Pp. XVI-XVII.
- Ayeen Akbery or the Institutes of the Emperor Akbar. Tr. By FRANCIS GLADWIN in two volumes.
- The Soobah of Bengal. PP. 2-22, Vol. II.
- Tuksaem Jumma or the Assessment of Bengal. Pp. 169-193. Vol. II.
(A. S. O. B. Library)
- Alberuni's India. An account of the Religion, Philosophy, Literature, Geography, Chronology, Astronomy, Customs, Laws and Astrology of India about A.D. 1030 in two volumes. By EDWARD C. SACHAU.
(A. S. O. B. Library)
- Aspects of Bengali Society from Old Bengali Literature. By TAMONASH CHANDRA DAS GUPTA.
- Annals of Rural Bengal, The. By W. W. HUNTER. London 1868.
(W. B. S. Library)
- Ancient India. From the earliest times to the 1st century A.D. By E. J. RAPSON. P. 170. Vanga, the old form of the modern name Bengal. It denoted the western and central districts of the present province, viz., Murshidabad, Birbhum, Burdwan and Nadia.
- An Arab account of India in the 14th century. Being a translation of the chapters on India from *Al-Qalqashandis Subh Ul-A'shā*. By OTTO SPIES. Stuttgart: 1936.
- Arrian's voyage round the Euxine Sea. Translated and accompanied with a geographical dissertation and maps, to which are added three discourses: (1) On the Trade to the East Indies by means of the Euxine Sea, (2) On the distance which the ships of Antiquity usually sailed in twenty-four hours, (3) On the measure of the Olympic stadium.
Oxford: 1805
- Birds of India, The. Being a natural history of all the birds known to inhabit continental India: with descriptions of the species, Genera; Families, Tribes, and Orders, and a brief notice of such families as are not found in India, making it a manual of Ornithology specially adopted for India. By T. C. JERDON. In three volumes, Calcutta 1864. Appendix. Index. XLV, Pp. 876, XXXII.
- Bengal Peasant Life. By REV. LAL BEHARI DEY. Macmillan & Co. 1892.
(National Library)
175. D. 507
- Bengal Plants. In two volumes. Calcutta 1903. A list of the phanerogans, Ferns and Fern—allies, indigenous to, or commonly cultivated in, the Lower Provinces and Chittagong with definitions of the natural orders and Genera, and Key to the Genera and species. By DAVID PRAIN.
(W. B. S. Library)
- Bangabhasa O Sahitya. By DINESH CHANDRA SEN.
- Bangalir Itihas—Adi Parba. By NIHAR RANJAN ROY.
Book Emporium, Calcutta, 1356 B.S.
- Banga-Parichaya. By PRABHAT KUMAR MUKHOPADHAYA. In two volumes, Calcutta. Chap. 4, P. 19, Pp. 502-37. Cottage Industry of Bengal.
- Bangey Chal Tattwa. By SONTOSH NATH SETH of Chandannagor. Calcutta. 1392 B.S. a good book on rice in Bengal.
- Berigt Van Eeu Mahometaans Koopman, AAngaande Cambalu mitsgaders de moeijelijke Reys Van Benedictus Goes, gedaan Van Lahar over Land door Tartaryen na China, in 't jaar 1598 en vervolgens. Nu aldereerst nyt het Portugys vertaald, met nodige Konst—Printen en een Register verrijkt.
TE Leyden: 1706.
- A. Bogaerts Historische Reizen door d'oostersehe Deelen Van Asia.
Amsterdam: 1711, p. 424.
- Baharistan-I-Ghaybia. A History of the Mughal wars in Assam, Cooch Behar, Bengal, Bihar and Orissa during reigns of Jahangir and Shahjahan. By MIRZA NATHAN.

BIBLIOGRAPHY

- Translated from the Original Persian. By M. I. BORAH in two volumes. Vol. II, p. 501. Rare cloths of Bengal.
- Changing Face of Bengal, The. A study in riverine economy. By RADHAKAMAL MUKERJEE.
University of Calcutta: 1938
- Cocon de soie, Le. By E. DUSEIGNEUR—Kleber P. 137.
- Contes Orientaux, tires des Manuscrits de la Bibliothèque du Roi de France. 2 Vols. 12 mc. La Haye 1743.
- Coins of India, The. By C. J. BROWN.
- Commercial Relations between India and England (1601 to 1757). By BAL KRISHNA. (With a Map. London 1924.)
- P. 26: Paradise of Nations, extent and nature of trade.
- P. 28: The principal exports of Bengal.
- P. 29: Imports.
- P. 29: Muslins.
- P. 281n: Bengal vessels.
- P. 98: Raw Silk of Bengal.
- P. 100: Saltpetre: The same: P. 199.
- P. 105: Sugar.
- P. 108: Woollens.
- P. 110: Metals.
- P. 139: Hugly as one of the trading centres.
- P. 141: Hugly as one of the trading centres.
- P. 142: Bengal Silk.
- P. 158: Cotton yarn.
- P. 197: Silk Industry of Bengal under The United Company of Merchants of England Trading to the East Indies.
- P. 255: Chapter x: Protection against Indian Textiles. The book contains a good bibliography.
- Cotton Hand-Book for Bengal being a digest of all information available from official records and other sources on the subject of the production of Cotton in the Bengal Provinces. Compiled by J. G. MEDLICOTT; Calcutta—1862.
(W. B. S. Library)
- Calendar of the Court Minutes, A, of the East India Co. (1655-1659). By ETHEL BRUCE SAINSBURY.
- Commercial Products of India, The. An abridgement of "The Dictionary of the Economic Products of India". By SIR GEORGE WATT, London 1908.
- Captain Pogson's Narrative during a tour to Chateegaon, 1831.
Serampore Press. 1831
- Caesar Frederiks agticu—jarige Reys, na endoor Indien, anno 1563 en vervolgens seer naauwkenrig door hem selfs beschreven.
Leyden: 1706, p. 27.
- (The) Commerce and Navigation of the Ancients in the Indian Ocean. By WILLIAM VINCENT. In two volumes.
London: 1807.
- Description Historique et Geographique de l'Inde. With plates. 3 Vols. 4to Berlin, 1786. By J. BERNOULLI.
(A. S. O. B. Library)
- Descriptive Catalogue of Bengali Books. By J. LONG. Calcutta 1855.
- Dhatumala or a Garland of Metals, compiled and translated into English from various Sanskrit works. By RAJA SIR SOURINDRA MOHUN TAGORE, Thacker Spink & Co. Calcutta 1903.
(W. B. S. Library)
- Doctrine classique de la Médecine Indienne, La. Ses origines et ses parallèles Grecs. By JEAN FILLIOZAT. Paris 1949.
- O Descobrimento do Tibet pelo P. Antonio de ANDRADE da companhia de Jesus, em 1624, narrado em duas cartas do mesmo religioso. Estado Historico por Francisco Maria Esteves Pereira.
Coimbra: 1921.
- (A) Description of the coasts of East Africa and Malabar in the beginning of the 16th century. By DUARTE BARBOSA. Translated from an early Spanish manuscript in the Barcelona Library with notes and a preface. By E. J. STANLEY, pp. 178-181. Section entitled, "Bengal".
- Empire of the Nabobs, The. A short history of British India. By LESTER HUTCHINSON. London.
- "Nabob, nabob, n. A deputy or Governor under the Mogul Empire: a European who has enriched himself in the East: any man of great wealth, (Corr. of Hindi Nawwab, a deputy)". Quoted from Chambers's Twentieth Century Dictionary by the author as an explanatory note on the word Nabob. Re: Irrigation see P. 11.
- Early History of India, The. From 600 B.C. to the Muhammadan conquest including the invasion of Alexander the Great. By VINCENT A. SMITH. Fourth Edition, revised By S. M. EDWARDES. Oxford. 1924. P. 412: Pala and Sena Dynasties of Bihar and Bengal.
- Excavations of Bangarh (1938-41). By KUNJA GOBINDA GOSWAMI, Calcutta University. 1948.
- (An) Exact and curious Survey of all the East Indies, even to Canton, the chief citty of China: All duly performed by land, by Monsieur de Monfart, the like whereof was neuer hetherto, brought to an end. Wherein also are described the huge Dominions of the great Mogor, to whom the honourable Knight Sir Thomas Roe, was lately sent Ambassador from the King. Newly translated out of the travellers Manuscript. London 1615. p. 25. Bengalla. "It is a country full of all sorts of commodities. Among the rest they have prettie coverlets, of yellow linen-cloth, all pinkte and wrought with

BIBLIOGRAPHY

- needle-worke, whereof some are to be seen in these parts." (Kantha?).
- Foe-Koue-Ki on Relations des Royaumes Bouddhiques: Voyage dans la Tartarie, dans l'Afghanistan et dans l'Inde, exécuté à la fin du IVe siècle par *CHY FA HIAN*. Traduit du chinois et commenté par M. Rbeu Remusat. Ouvrage posthume revu, complété et augmenté d'éclaircissements nouveaux par MM Klaproth et Landresse. 4to. Paris, 1836. (A. S. O. B. Library)
- Fairs and Festivals in Bengal. By CHAS. A. BENTLEY. Calcutta, B. S. Book Department (1921). (W. B. S. Library)
- Fairs and Festivals in West Bengal. By A. MITRA. Calcutta, W. B. S. Book Depot (1953).
- Firminger's Manual of Gardening. Revised, Corrected and amplified. By H. Sr. JOHN JACKSON, Calcutta—1890.
- (The) Foote collection of Indian Prehistoric and Protohistoric Antiquities. Notes on their ages and distribution. By ROBERT BRUCE FOOTE, Madras: 1914.
- Francois Bernier, ses voyages dans l'Inde By H. CASTONNET DES FOSSES, Angers: 1888, pp. 41-51. On Bengal.
- Geographic d'Aboulfé da Traduite de l'Arabe en Français et accompagnée de notes et d'éclaircissements. By M. REINAUD. Vol. I. Paris: 1883.
- Vol. 1. Introduction P. CDXIX. P. CCCXXXII; p. CD XXXVII.
- The author quotes Maury's note on Mohit (Mohyth) at length. (Also see JASOB, Vol. III, No. 35, Nov. 1834 in respect of this Turkish work on navigation entitled "Mohit".
- Do. Tome II, second part translated. By S. GUYARD, Pp. 233-302. General Index Pp. 303-320. Index of authors and works mentioned in the footnotes. Paris: 1883.
- Glossary of Terms relating to Hand-made Cotton Fabrics. Published from the Department of Commercial Intelligence and Statistics, India. Calcutta: 1930, Pp. 1-12.
- Glossary of Jute Trade Terms (Department of Commercial Intelligence and Statistics), Delhi: 1938.
- Geographie d'Aboulfeda. Translated. by STANISLAS GUYARD. Vol. 2, 2nd part, p. 126, Footnote 9.
- Gli Scritti del Padre Marco Della Tomba. By ANGELO DE GUBERNATIS, p. 59. Ragh-matti (Rangamati?). (179 A 323)
- Geography of India, comprising a descriptive outline of all India, and a detailed Geographical, Commercial, Social and Political account of its Divisions, with Historical Notes. By GEORGE DUNCAN, Fifth Edition, Higginbotham and Co., 1870.
- Grow More Food. Published by Government of Bengal. (W. B. S. Library)
- Guide to the Commerce of Bengal, A. Containing a view of the shipping and External Commerce of Bengal, in three parts: I Port Rules and Regulations. II Shipping. III Commercial Statements, etc., etc., with a copious appendix, comprehending various details and statements, relative to the shipping and commerce of countries connected with British India and China. The whole compiled from authentic sources. By JOHN PHIPPS, 1823.
- Historiadores Primitivos de las Indias Occidentales. 3 Vols. 4to. Madris 1749.
- Hand-book of the Management of Animals in Captivity in Lower Bengal. By RAM BRAMHA SANYAL, Calcutta—1892.
- Hand-book of the Collection Illustrative of the wild silks of India, in the Indian Section of the South Kensington Museum, with a Catalogue of the collection and numerous Illustrations. By THOMAS WARDLE. (W. B. S. Library)
- Hand-book of Tanning. Calcutta: B. S. Press, 1921.
- (A) History of British India. By W. W. HUNTER. In two volumes. Vol. 1 published in London, 1899 and Vol. 2 in 1900.
- Vol. I. A magnificent review of Indian trade with the Mediterranean countries from the earliest period (around 700 B.C.) to 1623.
- Vol. II. From 1623 to the union of the Companies around 1698-1708, pp. 385-419. Index.
- Improvements on the country process of making Sugar from Gur. By R. L. DATTA and T. BASU. B. S. Book-Depot: 1930.
- Indo-Portuguese Embroideries of Bengal, pp. 1-9 with 16 illustrations. By JOHN IRWIN. Reprinted from Art and Letters: Journal of the Royal India, Pakistan and Ceylon Society, Vol. XXVI, No. 2, 1952, pp. 8-9. Some important references. Among Indo-Portuguese embroideries preserved in museums and private collections in Europe and America there is a well-known and distinctive group of sixteenth- and-seventeenth Century quilts usually labelled Goanese. The purpose of the above article is to show that they were made not in Goa but in Bengal.
- Indian Companion, The, being a manual of Universal Statistics of all the provinces in and the countries adjacent to India

BIBLIOGRAPHY

- with a Map, Routes' Directory, Appendix and Index. By G. H. KHANDEKAR, Poona, September, 1894.
- P. 66. Bengal Presidency.
- P. 68. Bakarganj.
- P. 74. Bankura.
- P. 76. Bay of Bengal.
- P. 84. Birbhum.
- P. 89. Burdwan.
- P. 94. Chittagong.
- P. 117. Dacca.
- Dhaka, derived from the dhak tree (Palash?) or from Dhakeswari the, conceived goddess.
- P. 123. Darjeeling.
- P. 127. Dinajpur.
- P. 134. Faridpur.
- P. 147. Howrah.
- P. 150. Hugli.
- P. 159. Jessore.
- P. 164. Khulna.
- P. 169. Kuch-Bihar.
- P. 175. Maimensing.
- P. 180. Maldah.
- P. 188. Midnapore.
- P. 208. Murshidabad.
- P. 214. Nuddea.
- P. 279. 24-Parganas.
- Initial coinage of Bengal, The, under the early Muhammadan conquerors. By EDWARD THOMAS, London: 1873, pp. 3-40, Pt. 2.
- Investigation of the oil of Punnal (calophyllum Inophyllum). By R. L. DATTA and T. BASU. B. S. Press: 1930.
- Investigation of the oil of Karanja seed (Pongamia Glabra) with reference to its application in soap-making, specially of the Bengal type of moulded soap. By R. L. DATTA, Calcutta: B. S. Book Depot, 1930.
- Investigation into the application of Rayna (Amoora Rohituka) oil in soap-making. By R. L. DATTA and TINKARI BASU. B. S. Book Depot, 1930.
- India Directory, or Directions for sailing to and from the East Indies, China, New Holland, Cape of Good Hope, Brazil, and the interjacent ports; compiled chiefly from Original journals at the East India House, and from observations and remarks, made during twenty-one years' experience navigating in those seas. By JAMES HORSBURGH. In two volumes: Vol. I, 3rd Edn., London, 1826. Vol II, 3rd Edn., 1827, p. 450.
- Entrance of the Hooghly River, or Calcutta River.
- Description of the channels, sea reefs and sands.
- Pp. 455-462. Directions to approach the River Hooghly, winds, currents or tides.
- Pp. 462-469. Directions for sailing from False point Palmiras to the Sand Heads and up the Eastern channel to Saugor Road. By CAPTAIN WILLIAM MAXFIELD, First Assistant to the Marine Surveyor General, with remarks on thorhill's channel, the old channel, Lacam's channel, etc.
- India in the 15th Century, Ed. By R. H. MAJOR for the Hakluyt Society.
- The sources are from Latin, Persian, Russian and Italian texts.
- Index to Books and Papers on the Physical Geography, Antiquities, and Statistics of India. By GEORGE BUIST. Bombay—1852.
- Inde Francaise, L, Ou collection de dessins lithographies representant les Divinites, Temples, Costumes, Physionomies, Menbles, Armes, et ustensiles, des Peuples Hindous qui habitent les Possessions Francaises de l'Inde, et eh general la cote de coromandel et le Malabar. Avec un texte explicatif par E. Burnouf and E. Jacquet. 2 vols. Fol. Paris, 1827-35. By J. J. CHABRELIE.
- (A. S. O. B. Library)
- Indigenous Drugs of India, 8 vols., Calcutta, 1867. By KANNYLOL DEY.
- (A. S. O. B. Library)
- Indian Industrial and Agricultural Exhibition—1906/7.
- (W. B. S. Library)
- Journey from India to England, A, through Persia, Georgia, Russia, Poland and Prussia. Illustrated with Engravings. 4to. London, 1818. By Lt. COL. JOHN JOHNSON.
- (A. S. O. B. Library)
- JEAN—BAPTISTE TAVERNIER. Par Charles Joret. Paris: 1886, pp. 196-201, p. 201 n. 4.
- (A) Journal of the First voyage of Vasco de Gama (1497-1499). Translated and edited with notes and Introduction and appendices. By E. G. RAVENSTEIN. Published by the Hakluyt Society, No. XCIX, London: M. DCCCXCVIII. pp. 100, 101, 220 (place names on the maps). Also see p. 209—"At Catiguam (Chittagong) we read "esta em XI pulgados a o norte," but these pulgados or inches are clearly the "isbas" of the "Mohit", a mode of Expressing the latitude which is peculiar to the Indian Ocean and has explained by, me on p. 26, note 4'.
- Journal d'un voyage fait anx Indes Orientales, par une escadre de six vaisseaux commandez par Mr. Du Quesne, depuis le 24 Février 1690, Jusqu'au 20 Août 1691, par ordre de la compagnie des Indes Orientales.
- Ouvrage rempli de Remarques curieuses sur quantité de sujets, et particulièrement sur la Navigation et sur la Politique de divers peuples et de differentes sociétés.

BIBLIOGRAPHY

- In three volumes. Published both at Rouen and at La Haye in MDCCXXI. Vol. II, p. 239 (Rouen edition).
- Journey over-land to India, A, in a series of letters. By DONALD CAMPBELL, London: 1796, p. 149. Passage to Bengal.
- Kavi Kankan Chandi (Bangabasi Edition), pp. 221-222. The construction of Boats. The same, p. 191. A few names of boats. Also note the barter system, p. 196. Janga Dinga. This probably refers to Chinese junks. (Cf. La Route des Indes et ses Navires. By JEAN POUJADE. Paris, 1946, pp. 254-261.)
- Lac. By J. E. O'CONNOR (1876).
(W. B. S. Library)
- Letters received by the East India Company from its servants in the East. Vol. VI, 1617 (July to December). Edited by WILLIAM FOSTER, London, 1902, p. 150; p. 186; p. 303n; firman for Bengal; pp. 134; 155; 215; 225.
(W. B. S. Library)
- Letters received by the East India Company from its servants in the East. Transcribed from the 'Original Correspondence' series of the India Office records. Vol. I (1602-1613). With an Introduction by FREDERICK CHARLES DANVERS, London: 1896, p. 9, Bengal ship; pp. 69, 70, 72, 74, 75, 76, 255, Names, types and varieties of cloths.
- Letters received by the East India Company from its servants in the East. Transcribed from the 'Original Correspondence' series of the India Office records. Vol. 2 (1613-1615). Introduction by WILLIAM FOSTER, London: 1897, pp. 59, 117, Bengal cloth; p. 178, Letter No. 186, Thomas Keridge to Captain Downton. Received by the Hope.
- Aymier, November 22nd, 1614.
- Quicksilver is worth 280 rupees the great maund, the seer being 30 pisas in weight; vermilion at 290 rupees; at present no great quantity here, but oftentimes it is brought from Bengala, and then to be had reasonable.....
- Weights and Measures Eastern and English, See pp. 2, 35, 287, 288, 289, 308, 59, 86, 337, 1, 13, 69, 288, 32, 45, 58, 86, 120, 283, 311, 312, 97, 180, 181, 214, 220, 225, 229, 241, 263, 305, 34, 46, 77, 127, 256, 7, 25, 26, 198, 202, 140, 181, 193, 215, 238, 248, 260, 281, 282, 20, 22, 181, 250, Seer 123, 127, 231, 250, 253, etc.
- Letters received by the East India Company from its servants in the East. Transcribed from the "Original Correspondence" series of the India Office records, Vol. 3, 1615, edited by WILLIAM FOSTER, London: 1899, P. 66. For Coins, see Index, P. 345.
- Manners and customs of the Ancient Egyptians. By GARDNER WILKINSON, Vol. 3, London: MDCCCXLII, P. 122. The Muslin of India, p. 201, A striking resemblance between the boats of the ancient Egyptians and those of India, p. 214, Egypt's intercourse with India.
- Map of Bengal TASSIN.
(Cal. Review, Vol. IX, p. 1, Jan.-June 1848):
- Manual of Ancient History, A, particularly with regard to the constitutions, the commerce and the Colonies of the states of Antiquity. Translated from the German, 3rd Edition, 8 vol., Oxford, 1840. By ARNOLD HERMAN L. HEEREN.
(A. S. O. B. Library)
- Mani-Mala or a treatise on gems, in two volumes. By S. M. TAGORE.
- Monograph on Paper and Papier-Mache in Bengal. By D. N. MOOKERJI (1908).
- Manasha Mangal. By BIJAY GUPTA. The following names of Boat may be noted: Madhukar, Bijusiju, Guarekhi, Varapatua, Sankhachur, Ajoyshellpat, Udaytara, Tiatputi, etc.
- Manasha Mangal. By BANSHIDAS (Edition, D. Chokraborty), p. 288. A beautiful description of Chand's vessel called Madhukar. The cost of this vessel is said to be 14 lakhs.
- Manasha Mangal. By BANSHIDAS. (Edition, D. Chokraborty), p. 319. Another description. The following names are worth noted. Sakhachur, Chhotighati (the ship which is filled in with Wares probably earthen).
- Kajalrekhi (literally—drawn with collyrium), Manikyamerua (curonné de diamants)—this ship had 1600 oarsmen to row, over the sea, etc., etc.
- Manasha Mangal. By BANSHIDAS. (D. Chokraborty's edition), pp. 380-390 and 392-393. A list of Bengali Merchandise. Also note the barter system.
- The Manufacture of Shellac. By R. L. DATTA and T. BASU. B. S. Book Depot: 1928.
- The Manufacture of writing Ink. By R. L. DATTA and others.
B. G. Press: 1939.
- Manufacture of Coir. Calcutta: B. S. Press, 1922.
- Navigation and voyages, The, of Lewis Vertomanus, a gentleman of the citie of Rome, in the year of our Lord 1503. Translated out of Latine into Englyshe. By RICHARDE EDEN, in 1576. Edinburgh: 1884.
- P. 188—He (i.e., the King of Tarnassarie) Keepeth continuall warre with the kyngs of Narsinga and Bangella.
- P. 199—Bangella a great and riche citie of India and the great power of the Kyng.
- P. 201—Of certayne Christian merchants which exercise merchandies there.

BIBLIOGRAPHY

- (See John W. Jones' the Travels of Ludovico di Varthema—Hakluyt Society, London 1863.)
- Navigation de Vasque de Gamme. Publiée par CHARLES SCHEFER, Paris: 1898. Introduction by HENRI CORDIER.
- Neem Oil and its Treatment for application in making washing soap. By R. L. DATTA and others.
- (A) New Account of the East Indies. By ALEXANDER HAMILTON. In two volumes. With many maps.
- Vol. II. London M. D. CCXLIV.
- Chap. XXXIII. Treats of the Towns, Cities, Country, and Customs of Bengal, particularly on those near the famous Ganges, with some historical accounts, ancient and modern, of Fort William.
- Chap. XXXIV. In continuation of the Description of Bengal.
- Chap. XXXV. Gives an account of Xatigam (Chittaganj).
- Chap. XLI. P. 100—"Atcheen, for many ages, has been a noted Port for trade from Surat, Malabar, Coromondel, Bengal, Pegu' and China. It lies at the North-West end of the famous Sumatra" (Cf. Luillier, p. 242.)
- P. 309—A table of Weights, Measures and Coins, used in several parts of the East Indies.
- News from the East Indies: Or a Voyage to Bengalla, one of the greatest kingdoms under the High and Mighty prince Padesha shaffallem usually called the Great Mogull. With the state and magnificence of the Court of Malcandy, kept by the Nabob viceroy, or vice-king under the aforesaid Monarch: Also their detestable religion, mad and foppish rites, and Ceremonies, and wicked sacrifices and impious customs used in those parts. Written by WILLIAM BRUTON, now resident in the Parish of S. Saviours southwark, who was an eye and care witness of these following Descriptions; and published as he collected them being resident there diverse years; and now lately came home in the Good ship called the Hopewel of London, with divers Merchants of good account which are able to testify the same for truth. London: 1638, p. 9. The court of Malcandi in Bengalla (Orissa?).
- Pp. 19-21—Trade licence given to the English merchants custom free. Also the permission to ship-building to the English merchants.
- P. 32—A description of the city of Bengalla. Note on Hides, Skins and Leather. By J. C. NIXON. (Supplement to the Indian Trade Journal, Nov. 3, 1921, pp. 1-22; pp. 13-19. Tables.)

BIBLIOGRAPHY

- Nouvelle relation d'un voyage fait aux Indes orientales. With plates 12 mo. Amsterdam 1699. By DELLOR.
(A. S. O. B. Library.)
- Navigantium atque Itinerantium Bibliotheca; or a complete collection of voyages and Travels, containing whatever has been observed worthy of notice in Europe, Asia, Africa, and America. Illustrated with Charts, Maps and Cuts. 2 Vols. Fol. London 1764. By JOHN D. D. HARRIS.
(A. S. O. B. Library.)
- Oxford History of India, The. From the Earliest Times to the end of 1911. By VINCENT A. SMITH, Oxford. 1919.
- P. 8: Bihar and Bengal long continued to be reckoned as non-Aryan countries.
- P. 28: The Kaurava cause was upheld by the forces of Eastern Bihar, Bengal, the Himalay, and the Punjab.
- PP. 184-6: Early History of Bengal.
- P. 221: Muhammadan conquest of Bengal.
- P. 229, P. 258, P. 263: The Independent Muhammadan Kings of Bengal.
- P. 354: Akbar's conquest of Bengal.
- P. 358: P. 380 Rebellions in Bengal.
- P. 418: Barnier praises Bengal.
- P. 507: Famine of 1770.
- P. 646: The first Indian newspaper printed in English. Hickey's Bengal Gazette.
- Oriental Commerce, containing a Geographical description of the principal places in the East Indies, China, and Japan, with their produce, manufactures, and trade, including the coasting or country trade from port to port; also the rise and progress of the trade of the various European nations with the Eastern world, particularly that of the English East India Company from the discovery of the passage round the Cape of Good Hope to the present period; with an account of the Company; establishments, Revenues, Debts, Assets, etc., at home and abroad. Deduced from authentic documents, and founded upon practical experience obtained in the course of seven voyages to India and China. By WILLIAM MILBURN.
- Vol. I, P. 207: Commerce with Bengal. A statement of the merchandise and treasure imported into Bombay and Surat from Bengal in the years 1802 to 1806 inclusive, likewise of the merchandise and treasure exported from Bombay and Surat to Bengal during the same period, together with a list of the articles of which the imports and exports consisted in 1805. London: 1813.
- Vol. 2, Chapter XX, pp. 83 to 96, coasts of Madras to Bengal.
- Chapter XXI. PP. 98 to 277, Calcutta.
- Chapter XXII. PP. 278 to 294. Bengal to the Malay Peninsula.
- Original sanskrit texts on the origin and progress of the Religion and Institutions of India, collected, translated into English, and illustrated by notes. By J. MUIR. Pt. I. The Mythical and Legendary account of Caste, London, 1858.
(National Library.)
- Pilgrimage of FA-HIAN, The. From the French edition of Foe-Koue-Ki of MM Remusat, Klaforth and Landresse, with additional notes and illustrations 8vo. Calcutta. 1848.
(A. S. O. B. Library.)
- (The) Possibilities of the Coir Industry in Bengal. By S. N. CHAKRAVARTY. B. G. Press. 1936.
- Possibilities of manufacture of furniture and other articles of sheet steel as a small scale cottage or bazar Industry. By A. T. WESTON and S. C. MITTER.
- Printing on Fabrics. By C. C. GHOSH. Calcutta. B. S. Book-Depot. 1933.
- Prachin Silpa Parichaya. Compiled by GIRISH CHANDRA BEDANTA THIRTHA. Calcutta 1329 (B.S.). Introduction By AKSHOY KUMAR MAITREYA.
PP. 1—33. Cloth.
PP. 34—43. Shoes.
PP. 43—54. Umbrella.
PP. 115—121. Leather.
- Pre-Buddhist India. A political, administrative, Economic, Social and Geographical survey of Ancient India based mainly on the Jataka Stores. By RATILAL N. MEHTA. Bombay. 1939.
- Ragionamenti Di Francesco Carletti Fiorentino sopra le cose da lui vedute ne' suoi viaggi si dell' Indie occidentali, e Orientali come d'altri paesi. 1701. P. 236. Ed è questa seconda piena di molti luoghi, e Regni sino a Bengala, del qual nome si chiama quel Golfo di mare.
- P. 248. Il Regno del pegir confinante con quel di Bengala, mandava una volta grandissima quantita d'oro, e di Rulini, siccome molte altre gioje; ma ora questo Regno è affatto deserto, onde si sono perdute tutte le miniere, conciossia cosa che efi fosse disfatto e spianato dal Re di Siam, come accennai a V. A. nel secondo Regionamento.
- Ralph Fitch. England's pioneer to India and Burma. His companions and Contemporaries, with his remarkable narrative told in his own words. By J. HORTON RYLEY. London. 1899.
- For an account of Bengal see pp. 100, 110, (Tauda in Gouren) 113 (Hugely), 114

BIBLIOGRAPHY

- (Satagam), p. 115 (Tippara or porto Grando) Chatigan, p. 118 Bacola (Barisal) p. 118. Serrepore (Serampore), p. 119, Sinnergan (Sonargaon) p. 120n.
- Relation due voyage et retour des Indes Orientales pendant les années 1660 et 1691. Paris: MDC LXXXVII. P. 256.
How MR. DESLANDERS, Director General arrived at Hooghly.
- Relation ou Journal d'un voyage fait aux Indes orientales. Paris. 1677.
PP. 188—197. Embouchure du Gange. Description de la ville de Bengala. Moeurs et coutumes des Indiens de Bengala et Habitants du Gange, etc., etc. The description of the city called Bengala corroborates with that of D' Innigo.
- (A) Relation of an unfortunate Voyage to the Kingdom of Bengala. By GLANTUS. London. 1682. P. 183.
- Report on the Investigations on Sole Leather Tannage. B. S. Book-Depot. 1925.
- Report of the Investigations on the Manufacture of Picking Bands. By B. M. DAS and U. N. DUTT. B. S. Book Depot. 1930.
- Picking bands are leather straps of 1½" width, 3/16" to ¼" in thickness and 2' to 3' in length according to requirement, attached to looms in their contrivance to throw the shuttle while weaving textile fabrics.
- Report on the Investigation on the Indian Tannery Waters. Calcutta. B. S. Press. 1921.
- Researches on Modern Electroplating, Pt. I, a review of the available literature. By A. KARIM and J. SANYAL. B. G. Press. 1940 (for official use only) contains a good bibliography on the subject.
- (La) Route des Indes et ses Navires. By JEAN POUJADE; Paris: 1946. With 90 drawings by the author.
- Introduction:
- Chap. I. Organisation des voies de communications maritimes en Méditerranée.
- Chap. II. Création, ouverture développement et fermeture de la Porte Sude de la Méditerranée sur l'Extrême-Orient.
- Chap. III. Organisation de la Porte Nord de la Méditerranée Sur l'Extrême-Orient.
- Chap. IV. Recherche et organisation de la route du cap pour échapper au contrôle de la porte.
- Chap. V. Existence d'aires de navigation nettement caractérisés dans l'antiquité. Leur survivance jusqu'à nos jours. Essai d'une théorie ethnographique.
- Chap. VI. Les navires occidentaux de la route des Indes (Méditerranée, Mer Erythrie).
- Chap. VII. Les navires Orientaux de la route des Indes (Extrême-Orient).
- Chap. VIII. Le problème de l'inter-pénétration des formes de bateaux et des techniques de construction navale entre les trois régions de la Mer Méditerranée de la Mer Erythrie et de l'Extrême-Orient qui communique entre elles; ce qu'on a convenu d'appeler: "La routes des Indes."
- Recueil des voyages qui ont servi à l'établissement, et aux progrès de la compagnie des Indes orientales. 2nd Edition. 5 Vols. 12 mo. Amsterdam 1710-16. LE SIEUR DE CONSTANTIN.
- Silk Production and Weaving. By C. C. GHOSH. 1949.
- Southern India and China. By V. R. RAMACHANDRA DIKSHITAR. Madras. 1945.
- P. 3. Tamluk as an active trade centre so far the Far East was concerned.
- P. 4. Trade relations with China and India according to Pan Kon (2nd century, B.C.)
- P. 12. "At this time (10th century?) according to the history of Tibet, the Tibetans got a firm control over the whole of Bengal and wielded their power for nearly two hundred years, when the Bay of Bengal was virtually named the Sea of Tibet."
- Sri Krishna Kirtan by Chandidas, (Bangiya Sahitya Parisad Edition) p. 140. The manufacturing of Boats.
- (A) Statistical Account of Bengal. By W. W. HUNTER. Vol. XX, pp. 1—120.
- The Fish and Fisheries of Bengal. By DR. F. BUCHANAN-HAMILTON.
- Introductory Note By FRANCIS DEY.
PP. 123—227. List of Plants found in Bengal and Assam. By G. KING.
PP. 231—425. General Index to Statistical Account of Bengal.
- Storia de Cambanau, Di Taid e D'altri Luoghi Dell' India, Narrata dal beato odorico del Friuli anno MCCCXXX. Bologna. 1866.
- Sketch of the Topography and Statistics of Dacca, A. BY JAMES TAYLOR. Calcutta. P. 122, Chapter V.
P. 161, Chapter VI.
- Sources for the History of British India in the Seventeenth Century. By SHAFIAT AHMAD—KHAN. PP. 1-366. Index O.U.P. The work is chiefly occupied with the manuscript materials for the study of seventeenth century British India.

BIBLIOGRAPHY

- and deals mainly with the records preserved in the British archives.
- P. 49. 1661—80. Reports on the E. I. Co.'s affairs in Bengal. Add. MS. 34123, fols. 42-50.
- The MS. deals with the trade of that province, its currency and weights and measures. It contains a list of the chiefs of the Company's factories, a copy of the agreement made between the agent and council of Fort St. George and 'Chim Cham and chindamundsaw' a firm of merchants' 3 September, 1679, also a copy of the regulations drawn up by Streysham Master for conducting the Company's affairs in the Bay of Bengal, 12 December, 1679.
- P. 76. Voyage to Madras and Bengal.
- P. 103. Map of Bengal. Add. MS 5414 No. 9. The map shows coast and islands, but gives very few place-names.
- Souvenirs d'un voyage dans l'Inde execute de 1834 a 1839. With Plates and a chart. 4to Paris 1843. A. DELESSERT. (A. S. O. B. Library.)
- Statement of Public Ferries in Bengal. 1864. (W. B. S. Library.)
- Sankhya-Pariman or Indian weights and Measures. By GOPALBHATTA.
- Selections from the Records of the Bengal Government No. XLI. On Publications in the Bengali Language.
- Silk in India. Compiled by J. GEOGHEGAN. (W. B. S. Library.)
- Travels of Ludovico di Varthema, The. A. D. 1503 to 1058. London, 1863. 8° LUDOVICO DI VARTHEMA. (National Library 17. B. 6.)
- Travels of Fah-Hian and Sung-Yun, Buddhist Pilgrims, from China to India. Translated from the Chinese. With a Map. 12mo. London 1869. By SAMUEL BEAL. (Asiatic Society of Bengal Library.)
- Tanstuffs of the Sundarbans Forest Division. By J. A. PILGRIM. Calcutta. 1920. (W. B. S. Library.)
- Tussur-Silk, Bengal. (W. B. S. Library.)
- Tabakat-i-Nasiri: A General History of the Muhammadan Dynasties of Asia, including Hindustan, from A. H. 194 (810 A. D.) to A. H. 658 (1260 A. D.) By THE MAULANA, MINHAJUD-DIN, ABU-'UMAR-I-'USMAN. Translated from Original Persian Manuscripts. By H. G. RAVERTY. London. 1881.
- P. 93n. 9.
- P. 203n. 1.
- P. 511n. p. 553n. 5.
- P. 559n. p. 562n.
- P. 570n. 9. "From this point are roads leading into Bhutan and Bengal." The point refers to Tishu Lambu or Digarchah, the seat of a lama in Lat. 29° 7' N., Long. 89° 2' E., a great monastery only 180 miles from Rangpur of Bengal.
- P. 586n. 9 the name of the province. Bengal: Bang-al, i.e., causeway.
- P. 589n. p. 595n.
- P. 610n. 7. p. 666n. p. 762n. 9.
- P. 765n. 8 p. 771n. 772n. 773n. 774n. 777n. p. 878n.
- Textile Dyeing. By C. C. GHOSH. Calcutta. 1933.
- (The) Three voyages of Vasco da Gama and his viceroyalty. From the Lendas Da India of Gaspar Correa. Accompanied by Original Documents. Translated from the Portuguese, with notes and an introduction. By HENRY E. J. STANLEY. London. 1869.
- Travels in India in the seventeenth century. By SIR THOMAS ROE and DR. JOHN FRYER. London. 1873. Chapter VII, p. 458. Collections of the coins, weights and precious stones. Unusual in those places of trade within the Charter of the Honourable East India Company.
- Travels in the Mogul Empire. By FRANCIS BERNER. Translated from the French by Irving Brock. In two volumes. London. 1826.
- PP. 181—200. Articles of trade mentioned are: Rice, Sugar, Sweetmeats, Fruits, Wheat, Meat, Fish, Cotton, Silks, Saltpetre (Patna), Gum-lac, opium, Wax, civet, Long pepper and various drugs, Butter (sent by sea to numberless places), Salt.
- PP. 186—191. A description of Bengal.
- PP. 186. On irrigation.
- (A) True and almost incredible Report of an Englishman that (being cast away in the good ship called the Assention in Cambaya, the farthest part of the East Indies) travelled by Land thorow many unknowne kingdomes, and great cities. With a particular description of all those Kingdoms, cities, and people. By CAPTAIN ROBERT COUERT. London. 1631. Pp. 36—37.
- "Merchandize from a farre country: as from Chyna, Bengalla....."
- Text-Book of Inorganic Chemistry, A. By J. R. PARTINGTON. London. 1944, 5th Edition.
- P. 957. On Iron.

BIBLIOGRAPHY

- Travels of Ludovico di Varthema in Egypt, Syria, Arabia deserta and Arabia Felix, in Persia, India and Ethiopia.
AD 1503 to 1508. Translated from the original Italian edition of 1519, with a Preface, By JOHN WINTER JONES and edited, with notes and an Introduction, By GEORGE PERCY BADGER with a map.
London: Printed for the Hakluyt Society, 1863.
Introduction. P.lxiii; P. lxxx—lxxxii—
P. 210.—The chapter concerning the city of Banghella, and of its distance from Tarnassari.
Also see foot note No 3—
quotations from Ramusio, Greene, Pinkerton, Mandelslo, etc., P. 212. Cotton, Sugar, names of Cotton-stuffs.
P. 212.—The Chapter concerning some Christian merchants in Banghella.
Useful Plants of India, The.
Alphabetically arranged, with botanical descriptions, vernacular synonyms, and notices of their economical value in Commerce, Medicine, and the Arts. Compiled from various sources, By HEBER DRURY.
P. 539.—Index of Hindustani and Bengali synonyms. Madras, 1858.
Viaggi o di M. Cesare de i Fedrici, nell' India orientale et oltra l'India.
Venice: 1587.
Fedrici visited India around 1567 and probably came to Bengal in the same year.
See pp. 90-93.—Bengala-Satagan.
P. 143, pp. 147-50.—Bengala-Chitigan. (See the Dutch translation above.)
P. 91.—Nel porto di Satagan si Carcaro ogrianno trenta et trentacinque vascelli, tra nane et nanilij, di risi, di panni di varie forti di bombaso, Lacca, grandissima quantita de Zuechari, Zeuzari et Mirabolani secchi et conditi, penere longo, buttiro assai & ogliodi Zerzelin et molte altre mercantia. La citta 'di satagan e honestamente bella per citta di Mori & è molto abandante.
Viaggio dell Indie Orietali, di GASPARO BALBI (1579-1588). Venice, MDXC. P. 147.
View of the Rise, Progress and Present State of the English Government in Bengal Including a Reply to the Misrepresentations of Mr. Bolts, and other writers. By HARRY VERELST, London: 1772.
P. 84. Chapter III.—The Money and Coinage of Bengal.
P. 105. Chapter IV.—The Society established in the year 1765, for conducting the Trade in Salt, Beetle-nut, and Tobacco.
Voyages and Travels to India, Ceylon, the Red Sea, Abyssinia, and Egypt. 4 Vols. London, 1811. 8°. By. VISCOUNT VALENTIA.
(National Library, 61. B. 121.)
Voyages; contenant la description des etats du Grand Hogol. With Map and Plate. 2 Vols. 12 mo. Aamsterdam, 1724, Br. FRANCIS BERNIER.
(A. S. O. B. Library)
Voyages des Indes Orientales mêlé de plusieurs histoires curieuses. 2 Vols. in one. 32mo Paris 1699. By LEON CARRE.
(A. S. O. B. Library)
Voyages de N. de Graaf aux Indes Orientales et en d'autres lieux de l'Asie. With Plates. 12mo. Aamsterdam, 1719. N. DE GRAAF.
(A. S. O. B. Library)
Voyages en Asie, Les, au xive siecle du brienheureux Frere Odoric de Pordenone, Religieux de Saint-Francois. By HENRI CORDIER...Paris: M. D. CCCXCI. With a map.
P. 104, 105, 108, 180, 189. On ancient Kingdom of Champa.
Voyage from England to India, A. in the year 1754, and an Historical Narrative of the operations of the squadron and Army in India, under the command of Vice-Admiral Watson and Colonel Clive, in the years 1755-57, including a correspondence between the Admiral and the Nabob Serajah-Dowlah. Also a journey from Persia to England by an unusual route. With an appendix. With a chart, Maps and Plates, 4to. London: 1773. By E. IVES.
Voyage dans l'Inde, pendant les auneés 1828 a 1832. 4 Vols. of Text and 2 Vols. of Plates 4to. Paris, 1841.
Voyage on Bengale. By CHARPENTIER COSSIGNY. In two volumes. Maps.
T. 1. Avertisement: l-viii, pp. 1-311.
T. 11. pp. 1-311. Observations sur.
Le Voyage par le cap de Bonne-Espérance, à Batavia, à Bantum et au Bengale, en 1768, 1769, 1770 et 1771 par. J. S. STAVORINUS, Traduit par. H. J. JANSEN.
Voyage du Bengale à Petersbourg, Par feu Georges Forster. Traduit de l'Anglais, avec des additions considerables et une Notice Chronologique des Khans de crimée, d'après les écrivains turks, Persans, etc., par, L. LANGLES. In three volumes. Paris. Vol. pp. 5-14. Importance of Bengal commerce.
P. 20.—The Ganges.
P. 12.—The revenue income. Also see note 1.
(A) Voyage to the East Indies: Containing an account of the manners, customs, etc., of the Natives, with a Geographical Description of the country. Collected from observations made during a Resid-

BIBLIOGRAPHY

- ence of thirteen years, between 1776 and 1789, in districts little frequented by the Europeans. BY FRA PAOLINO DA SAN BARTOLOMEO with notes and illustrations. BY JOHN REINHOLD FORSTER translated from the German. BY WILLIAM JOHNSTON, London: M. DCCC.
- P. 39—"The province of Bengal alone brings them an annual income of above three millions sterling"
- P. 39—"This immense sum was exported (referring to Bengal goods on board of English ships to the value of above three million sterling) too at a time when the English were involved in a war with the Indian princes
- Their great revenues will and must infallibly decrease hereafter; for in the first place, the natives are too much oppressed; secondly: In a State of continual warfare and plundering agriculture is neglected; thirdly: Trade and manufactures decline; fourthly: the country is ruined by monopolies; fifthly: An immense quantity of specie has been drawn from it of late years; and at present much fewer rupees and pagodas are seen in circulation than formerly" (also see the French translation from the Italian of the same work with the observations of Anquetil du Perron, J. R. FORSTER et Silvestre de Sacy, published from Paris in 1808).
- Voyage du Sieur Lullier aux Grandes Indes, avec une Instruction pour le commerce des Indes Orientales.
Paris: MDCCV.
- Pp. 64-126—On Bengal's history, geography and Commerce. At the end of the book there are two tables—one is "Table des Matieres du Voyage" and the other "Table des Matieres de l'Instruction du Commerce des Indes Orientales"—the latter contains a good information of Commerce as carried on in India and particularly in West Bengal during 17/18th century. Also see p. 242—"Comme c'est de Bengale d'où l'on tire le plus de marchandises, et où le ris vient en plus grande abondance à cause des pluies continuelles qu'il y fait pendant quatre mois, c'est de ce lieu d'où partent les Vaisseaux pour aller à Achen et il y peu qui partent d'autres endroits."
- P. 244—"On negocie aussi de Bengale à Surat, qui est presentement la Ville la plus florissante, la plus riche et la plus marchande de toutes celles des Indes: on porte en cette Ville de la soye cruë, torse, on autrement qu'on tire de cassembasard; on y porte aussi du sucre, des gonis, qu'il y ont des grosses toiles qui servent ordinairement à faire des emballages, du miel et de la cire, desquelles marchandises on en fait le retour en poivre, en canelle et en café, que les Vaisseaux Maures apportent de Môca." Thus the commercial goods of Bengal came to Surat for export to Arab and other Medeterrean countries. Note the barter system.
- P. 210 and 255.—Coins. Also about the bankers.
- P. 232.—The Armenian merchants.
- P. 234.—Names of cotton and silk stuffs of Cassimbazar.
- P. 245.—Cauris.
- P. 247.—"De Bengale on peut encore aller trafiquer à la Cote Coromandelle, où on y porte des armoisins; les rouges y font plus de vente" cf. aussi the voyages of Verthema.
- P. 256.—Encore—"des pieces d'or qu'on appelle coupans, qui valent dix-neuf roupies et il y a aussi des demi-coupans, qui ne valent que neuf et demi-roupies; ces pieces s'appellent coupans, parce qu'elles font longues et si plates qu'on pourroit couper et c'est par allusion à notre langue qu'on les appelle ainsi."
- P. 217.—Exchange. Charged by the local bankers.
- P. 238.—Interest at the rate of 12 per cent.
- P. 264.—Muslims of Bengal. Different names. Voyage dans l'Inde et au Bengale, fait dans les années 1789 et 1790; contenant la description des îles Séchelles et de Trinquemalay, des détails sur le caractère et les arts industriels des peuples de l'Inde, la description de quelques pratiques religieuses des habitans du Bengale. Par L. DE GRANDPRE, Paris. (See the English translation below.)
- Voyages de NICOLAS De GRAAF aux Indes Orientales, et en d'autres lieux de l'Asie depuis 1639 jusqu'en 1687. Avec une Relation curieuse de la ville de Batavia, et des Moeurs, et du Commerce des Hollandois établis dans les Indes. Aamsterdam: 1719, pp. 145, 209, 347.
- (A) Voyage in the Indian Ocean and to Bengal, undertaken in the years 1789 and 1790. By L. DE GRANDPRE.
London: 1803. In two volumes. Vol. II, pp. 81-91. Calcutta and its neighbouring towns.
- P. 130.—"With the exception of a few Moorish ships, and one or two from Bengal, which come every year as far as Jedda, the navigation of the Red Sea is confined to vessels, which they call daons. (Cf. John Phipps on the ship building on the river Hooghly.)

BIBLIOGRAPHY

- Voyage d'Innigo de Biervillas, Portugais, à la côte de Malabar, Goa, Batavia et autres lieux des Indes Orientales, contenant une description des Moeures, Coutumes et Religion des Indiens; les différens établissement de plusieurs Nations de l'Europe et un détail exact du commerce du Batavia, avec plusieurs aventures et singularité curieuses. In two parts. Paris: M.DCC.XXXVI.
- Pt. I. Pp. 169-179.—These pages contain, among other things a beautiful description of the rich cities of Bengal, the monetary system then prevailing, manners and customs of the race, etc., etc.
- Pt. II. P. 11.—“On apporte de Bengale a Batavia, de toutes sortes de bleds, du ris, des bestiaux, du salpêtre, des algears d'or et d'argent, et autres Marchandises avec quantité d'esclaves.
- Pt. II. P. 14.—Bengali Merchants are seen in Batavia. (Also see voyage au Bengale en 1789 by Charpentier Cossigny p. 213 about the position of trade in rice in Bengal.)
- Voyages de Pietro della Valle, genti homme remain, dans la Turquie, l'Egypte, la Palestine, la Perse, les Indes Orientales, et autres lieux. Tome Septieme. (Nouvelle Edition.) Paris: M. DCCXLV. P. 237.
- “Les Princes de l'Inde affectent quelque couleur particuliere, dela meme facon que le rouge a celui de Banghel.”
- Voyages de dudovico di Varthema ou Le Viateur en la plus grande partie d'Orient. Traduits de l'Italien en Francais par J. Balarin de Raconis Paris, M.D. CCCLXXXVIII. Introduction V-LXXI.
- P. 217.—Chappitre de la cite de Banghella es Indes.
- P. 218.—Foot note No. 1.—The city Benghella.
- P. 220.—Chappitre d'aulcuns marchans crestiens en ladicte de Benghella.
- Voyages D'Ibn Batoutah. Texte Arabe, accompagne' d'une traduction par C. DEFREMERY ET LEOR B. R. SANGUINETTI. In four volumes. Published by the Société Asiatique. Vol. 4, pp. 210-226.
- Voyage dans les Mers de l'Inde, fait par ordre du Roi, à l'occasion du Passage de Venus, sur le Disque du soleil, le 6 Juin 1761, et le 3 du même mois 1769. Par LE GENTIL with plates and several maps showing the route of Le Gentil. 1st Volume, Paris: M.DCCLXXIX.
- P. 547.—“Les Européens, à Pondichery, mangent du pain beau et excellent, la farine s'en tire de Bengal. (?) (Cf. D'Inningo and other travellers of the 16th and 17th century) et de Surat, deux endroits renomme's pour le beau blé.
- De waterwereld, beschonwd, en de byzonderheden langs de Kusten aangewezen, ten nutte der Koopvaardye en Zeevaart; Byzonderlyk voor de coast en Westindise Handel: Beginnende met de Rheë Van Texel. Waar achter gevoegd zyn eenige Aanmerkingen over de Mistellingen in de kaarten de Evenredigheid in de Miswyzing van het compas; de bekwaamste tyd voor de Oost Indise schepen, om uit het Vaterland te Reizen, enz., als mede ecue nankeurige beschryving en Afbeelding van de Baay Fals.
- Veelal uit eigen bevinding opgemaakt, ten dienste eenes Jongelings welke zich tot den koophandel schikte, door. By JACOB DE BUCQUOY. Haerlem: 1752, p. 50.
- (The) Wonders of the East. By FRIAR JORDANUS. (Circa 1330). Translated from the Latin original, as published at Paris in 1839, in the Recueil de Voyages et de Memoirs, of the society of Geography, with the addition of a commentary. By HENRY YULE, London: 1863.
- P. 18n. 3.—“Quod Vocatux rinocerunta”.
- P. 41n.—Chopa (Champa?).

BIBLIOGRAPHY

XXX

Bibliography of Journals and Memoirs

- Adventures in Siam in the Seventeenth century. By E. W. HUTCHINSON. London: 1940. (The Royal Asiatic Society.)
- Agricultural Labourers in Modern India and Pakistan. By SURENDRA J. PATEL. Bombay: 1952.
- Alaka, Kartick, 1345 B.S. Banglar Bhougalik Rup. By PROBODH CHANDRA SEN.
- Artibus Asiae. Switzerland. Vol. XIV, 3. P. 226. Tamralipti (Tamluk). By T. N. RAMCHANDRAN.
- Asiatick Researches, Vol. II. P. 345. An Article entitled. The Design of a Treatise on the Plants of India. By SIR WILLIAM JONES. (A. S. O. B. Library.)
- Asiatick Researches, Vol. III. P. 229.
- An Account of the Method of Catching Wild Elephant at Tripura. By JOHN CORSE.
- Asiatick Researches, Vol. III. P. 295.
- On Egypt and other countries adjacent to the Cali River, or Nile of Ethiopia, from the Ancient Books of the Hindus. By LIEUT. FRANCIS WILFORD.
- Asiatick Researches, Vol. V, P. 53.
- Enumeration of Indian Classes. By H. T. COLEBROOKE—an article on Caste.
- Asiatick Researches, Vol. V. P. 91.
- On Indian Weights and Measures. By H. T. COLEBROOKE.
- Asiatick Researches, Vol. VII, MDCCCI, Pp. 1-31. On the course of the Ganges, through Bengal. By R. H. COLEBROOKE.
- Asiatick Researches, Vol. 10, 1808, Pp. 1-26.
- Remarks on the State of Agriculture, in the district of Dinajpur. By W. CAREY. (A. S. O. B. Library.)
- Asiatick Researches, Vol. 11, 1810, Pp. 153-196.
- A Catalogue of Indian Medicinal Plants and Drugs, with their Names in the Hindusthani and Sanskrit Languages. By JOHN FLEMING, M.D.
- Asiatick Researches, Vol. 12, 1816, Pp. 547-565.
- Statistical View of the Population of Burdwan, etc. By W. B. BAYLEY.
- Asiatick Researches, Vol. 16, 1828, Pp. 1-136.
- A Sketch of the Religious Sects of the Hindus. By HORACE HAYMAN WILSON.
- Do. Vol. 17. Pp. 169-313.
- Asiatick Researches, Vol. 17, 1832, Pp. 535-558.
- Census of the City of Dacca. By HENRY WALTERS. The statements drawn much after the plan of W. B. BAYLEY's Burdwan Asiatick Researches, Vol. 18, 1833, Pp. 171-177.
- Examination and Analysis of some specimens of Iron Ore from Burdwan. By H. PIDDINGTON.
- Banglar Arthanaitik Itihaser Adi Parva. By NRIPENDRA BHATTACHARJI. A discourse on the economic history of Bengal from the 4th century B.C. to 1202 A.D.
- Bengal: Past and Present. Vol. XXXII (32) July-December, 1926. P. 14.
- Notes on the early history of the English Factory at Dacca. By A. F. M. ABDUL ALI.
- Bengal: Past and Present. Vol. XXXII. July-December, 1926. (Vol. 32.)
- A Forgotten Island of the Bay of Bengal. By BASANTA KUMAR BASU.
- Bengal: Past and Present. Vol. XXXIII. January-June 1927. (Vol. 33.)
- The English Factory at Dacca. By N. K. BHATTESALI.
- Bengal: Past and Present. Vol. 33. January-June, 1927. P. 52.
- Hindoos in Armenia—150 years before Christ. By MESROUB J. SETH.
- Do. Do. P. 123.
- The Company's Trade in Bengal in the days of Cornwallis. By J. C. SINHA.
- Bengal: Past and Present. Vol. 34. July-December. P. 20.
- Alexander Grant's account of the loss of Calcutta in 1756 with a reproduction from a painting in monochrome of Fort William at Bengal 1730, and a plan of the same and part of the city of Calcutta, 1753.
- Bengal: Past and Present. Vol. 34. July-December 1927. P. 38.
- An adventurer in Bengal in 1712. From the Orme collection of manuscripts at the Indian office. (Vol. IX, Pp. 2159-2174.)
- Bengal: Past and Present. Vol. 35, Pt. I. January-March 1928. Pp. 25-39.
- Bengal chiefs' struggle for independence in the reign of Akbar and Jehangir. By NALINI KANTA BHATTASALI (appeared serially).
- Bengal: Past and Present. Vol. 35. January-March 1928. P. 143.
- A description of North Bengal in 1609 A.D. By JADUNATH SARKAR.
- Bengal: Past and Present. Vol. 25. January-June 1823. P. 114.

BIBLIOGRAPHY

- Dutch Memorials at Chinsurah. By H. E. A. CORRON. With an appendix. By FATHER J. TIEFFENTHALER'S plan of Chinsurah (1765).
Bengal: Past and Present. Vol. 26. P. 113.
- An adventurer in Bengal in 1712. The earlier portion of the narrative contains many interesting details regarding the navigation of the Hooghly.
Bengal: Past and Present. Vol. 17. July-December, 1918. P. 1.
- Notes on Old Calcutta. By W. K. FIRMINER, (appeared serially).
Bengal: Past and Present. Vol. 17. July-December, 1918. Pp. 121-239.
- The Correspondence of Richard Edwards. 1669-79. By RICHARD CAMAC TEMPLE, (appeared serially).
Bengal: Past and Present. Vol. 37, January-June 1929. P. 43.
- An abandoned Port of the Sunderbans. (Based on the records of the Imperial Record Department.)
Bengal: Past and Present. Vol. 31. January-June 1926. P. 66.
- Causerie Sur L'histoire de Chandernagore. By VALENTIN CHAMPION.
Do. Do. P. 99.
- Armenians and the East India Company.
Bengal: Past and Present. Vol. 30. July-December 1925. P. 18.
- Routes, Old and New, from Lower Bengal "up the country". Pt. II.
Bengal: Past and Present. Vol. 28, 1924. P. 21.
- Routes, Old and New, from Lower Bengal "up the country". Pt. I with a map.
Bengal: Past and Present. Vol. 30. July-December 1925. Pp. 52-76.
- Jesuit Letters from Bengal, Arakan and Burma. (1597-1600). By H. HOSTEN.
Bengal: Past and Present. Vol. 29. January-June 1925. Pp. 30-43.
- The Silk Industry in Bengal. By A. F. M. ABDUL ALLI.
Bengal: Past and Present. Vol. 29. P. 164.
- The adventure of Captain William Heath. "Wherein he transported the Right worshipfull Job Charnock, Esq., Agent, and Council at Suttanuttee to Ballasore and thence to Chittagaum and Arrackar, and finally landed them at Madras, during the months of November, December, 1688 and January, February, and March, 1689". From the EGERTON manuscripts in the British Museum.
Bengal: Past and Present. Vol. LXIX, 1950. P. 1.
- East Bengal in 1728-29. (Translated from the Persian Naubar-i-Murshid Quli Khan.) By JADUNATH SARKAR.
Bengal: Past and Present. Vol. 55. January-December 1938. P. 67.
- Studies in the early Governmental system of the Company in Bengal (1765-74). By D. N. BANERJEE (appeared serially).
Bengal: Past and Present. Vol. 49. January-June 1935. P. 55.
- Some old unpublished documents of the French India Company from the Pondichery Archives. By HARI HAR SETT (appeared serially).
Bengal: Past and Present. Vol. 48. July-December 1934. P. 38.
- Early relations of the Company with Assam. (From the records of the Imperial Record Department.) By BASANTA KUMAR BASU.
Bengal: Past and Present. Vol. LIV. July-December 1937. P. 53.
- Activities of the "Old Company" in India (1620-1661). Several Aspects. By J. C. DE.
Bengal: Past and Present. Vol. LXI. July-December 1941. P. 20.
- The trade in elephants and ivory (1600-1661) and the old Company. By J. C. DE.
Bengal: Past and Present. Vol. XIV. Pt. II. April-June 1917. Pp. 147-158.
- A Missionary Tour in Bengal in 1598. Translated from the French and annotated by the Rev. A. Sanliere, S.J. This is a translation of Père du Jarric's rare work: History of the more memorable events which occurred in the East Indies and other countries discovered by the Portuguese, in the establishment and progress of the Christian and Catholic Faith, and specially of what the Religious of the Society of Jesus achieved there for the same end, from the time of their going thither, to the year 1600, the whole collected from previously written letters and other Histories, and put in order by Father Pierre du Jarric S. J., of Toulouse.
Bengal: Past and Present. Vol. XIV. January-June 1917. P. I.
- Materials for the History of Calcutta Streets and Houses, 1780-1834. By WALTER K. FIRMINER with maps and sketches. (appeared serially).
Bengal: Past and Present. Vol. 15, 1917: P. 42.
- Materials for a History of the Great Trunk Road. By WALTER K. FIRMINER (appeared serially).
Bengal: Past and Present. Vol. 20. P. 111.
- The House of Jagatseth. Compiled by J. H. LITTLE (appeared serially).
Bengal: Past and Present. Vol. XLI. January-June 1931. P. 119.
- Some Notes on the Intercourse of Bengal with the Northern countries in the Second Half of the eighteenth Century. By S. C. SARKAR.
Bengal: Past and Present. Vol. XLIV. July-December 1932.

BIBLIOGRAPHY

- Situation of the Dutch in Bengal. By KALI KINKAR DUTTA. Part II. Do. Do. Vol. XLIII. January-June 1932. P. 76.
- Situation of the Dutch in Bengal. By KALI-KINKAR DUTTA. Part I (appeared serially). Bengal and Agra Gazetteer, The. 1840-41. On the plains of the Lower Ganges.
- Birds of India, The, being a Natural History of all the Birds known to inhabit continental India. 2 Vols. 8 Vo. Calcutta 1862-64. By T. C. JERDON.
(A. S. O. B. Library)
- Do. Reprinted under supervision of MAJOR H. H. GODWIN AUSTEN. 2 Vols. 8 Vo. Calcutta 1877.
- Bichitra, Chaitra, 1339 B.S. Banglar Itihaser Kayekti Gorar Katha. By PROBODH CHANDRA SEN.
- Bichitra, Jaistha, 1340 B.S. Banglar Adi Dharma. By PROBODH CHANDRA SEN.
- Bulletin de l'école française d'extrême-Orient—Tome xxxi—1931, Nos. 1-2. January-June—1931.
- Pp. 229-232.—a review of B. R. Chatterji's book entitled, Indian cultural influence in Cambodia. By G. COEDES.
- Bulletin No. 85 of the Department of Industries, West Bengal. An article on the Present Position and future of the Silk Industry of Bengal. By C. C. GHOSH.
- Bulletin No. 16.—Department of Industries, Bengal. Report on the Investigation into the Possibilities of Match Industry in Bengal. By A. P. GHOSE—The Bengal Secretariat Book Depot, Calcutta 1923.
(W. B. S. Library.)
- Contribution to a Bibliography of Indian Art and Aesthetics. By HARIDAS MITRA. Viswa-Bharati. Santiniketan 1951.
- Calcutta Review, The. Vol. CXI—1900. P. 116. Article entitled The Bara Bhuyas of Bengal. By SHUMBHOO CHANDER DEY.
- Calcutta Review. Vol. CXV—1902. P. 19—Article entitled Brahmabaibartta Puran on Diseases. By NAKUR CHANDRA BISWAS.
- Calcutta Review, The. Vol. LIX 1874. P. 67. Article entitled The Pal Kings of Bengal. By E. VESEY WESTMACOTT.
- Calcutta Review, The. Vol. LIX 1874. P. 180. Article entitled Rustic Bengal. By J. B. P. On village and village economy.
- Calcutta Review, The. Vol. XXIV, article. By J. GRANT on the Salt Monopoly.
- Calcutta Review, The. Vol. V, 1846. Pp. 243-292. Review of the following 14 books.
1. Faria Y. Sousa, Asia Portuguese, 3 Vols. 12 mo.
 2. Historical account of Discoveries and Travels in Asia. By H. MURRAY. 3 Vols. 1820.
 3. Os Lusíadas, poema epico de Luis de Camoens. Paris 1823.
 4. India Orientalis Christiana, anctore Paumlivo Bartholomaeo. Romae 1794.
 5. Histoire Générale de Voyages Par T. de Houdt, 25 tomes 1753.
 6. History of christianity in India, The. By the REV. J. HOUGH, 4 vols. 1846.
 7. Lettres édifiantes et curieuses, écrites des Missions Etrangères, 26 tomes, Paris 1780.
 8. The Principal Navigations, Voyages and Discoveries of the English Nation. By R. HAKLUYT 1598, 4 vols. fol.
 9. History of Bengal: By C. STEWART 1813.
 10. Di Barros, Decadas, 15 tomes, 12 mo. Lesboa 1777.
 11. Description Historique et Geographique de l'Inde par M. Bernouilli, Berlin 1786, 3 tomes.
 12. Buchanan Rev. C. Christian, Researches in Asia 1811.
 13. Histoire des Decouvertes et Conquestes des Portugais, par J. Laftan, Paris 1733.
 14. Maffaei Historiarum Indicarum Libri 1593.
- Calcutta Review, The. Vol. LIX 1874. P. 404. The following books are reviewed by E. VESEY WESTMACOTT.
- I. Contributions to Geography and History of Bengal, Muhammadan period, A.D. 1203 to 1538. By H. BLOCHMANN, M.A., Calcutta Madrasah House, Calcutta 1873.
 - II. An Easy Introduction to the History and Geography of Bengal. For the Junior classes of Schools. By E. LETHBRIDGE, M.A., late scholar of Exeter College, Oxford; officiating Principal of Krishnagar College, Bengal. Thacker Spink & Co. Calcutta 1874.
 - III. The History of Bengal from the first Mahomedan Invasion until virtual conquest of the country by the English, A.D. 1757. By CHARLES STEWART. London 1813.
 - IV. The chronicles of the Pathan Kings of Delhi, illustrated by Coins, Inscriptions, and other Antiquarian Remains. By EDWARD THOMAS. Trubner & Co. London 1871.
 - V. The Initial Coinage of Bengal under the early Muhammadan conquerors. Pt. II. By EDWARD THOMAS, London 1873.
- Calcutta Review, The. Vol. CVII 1898. P. 149. Vasco Da Gama's Voyage Translation of the "Roteiro" of Vasco Da Gama, published serially. The translator has ventured to bring the notes of the Portuguese Edition of 1861 down to date, and has chiefly

BIBLIOGRAPHY

- availed himself of correia, the Lusiad, and Oscar Peschel's "History of Geography". He has also received invaluable assistance from SIR W. W. HUNTER's "Imperial Gazetteer of India", the correctness of which is fully corroborated by these Portuguese materials, which were apparently unknown to SIR W. W. HUNTER at the time when he compiled it. Besides the translation the article contains a good introduction, valuable notes and occasional comments, and particulars collected from the accounts of the voyages of *Conti*; *Abd-er-Razzak*; *Nikitin*; *Hieronymo Di Santo Stefano*; etc., etc.
- Calcutta Review, The. Vol. LVIII, 1874 P. 171. Article By H. J. S. CORRON on the Rice Trade in Bengal.
- Calcutta Review, The. Vol. CIX, 1899. Article By JULIAN JAMES COTTON, Madras Civil Service on Chandernagore.
- Calcutta Review, The. Vol. LVIII, 1874. P. 19. The following books are reviewed.
- I. Histoire de la Soie. Par Ernest Parisit, fabricant de soieries, Paris 1865.
 - II. Yo—San—Sin—Sets. Traité de l'éducation des vers a soie au Japan, par Sira—Kawa de Sendai (Osyon): Traduit pour la premiere fois par Leon de Rasny, Professeur a l'école imperiale des langues orientales. Paris 1868.
 - III. Silk in India. Some account of Silk in India, especially of the various attempts to encourage and extend sericulture in that Country. Compiled By J. GEOGHEGAN.
- Calcutta Review, The. Vol. XXXI, 1858. P. 385. A good article on the Sunderbans—their commercial importance.
- Calcutta Review, The. Vol. XCI, 1890. P. 81. Article entitled The Beginnings of Dutch Commerce in India. By E. REHATSEK (appeared serially).
- Calcutta Review, The. Vol. LXXXIX, 1889. Article entitled Cameos of Indian Districts—The Sunderbans. Pp. 280-301. By F. E. PARGITER.
- Calcutta Review, The. Vol. VII, 1847. Pp. 524-570.
- A review of the pamphlet entitled A Pamphlet on the Salt Trade of India. By D. C. AYLWIN of Calcutta.
- London, Printed by MADDEN AND MALCOLM. Leadenhall Street, 1846.
- Calcutta Review, The. Vol. VII, 1847. Pp. 220-282.
- An Article on the origin and progress of English Connection with India.
- Calcutta Review, The. Vol. XXX, 1858. Pp. 189-230. The following books are reviewed.
- I. A series of Treatises on the Principal Products of Bengal—Indigo. By JOHN PHIPPS, 1832.
 - II. Reports and Documents connected with the proceedings of the East India Company in regard to the culture and manufacture of Cotton, Wool, Raw Silk, and Indigo in India, 1836.
 - III. Proceedings of a General Conference of Bengal Protestant Missionaries at Calcutta. Sept. 4-7, 1855.
 - IV. Remarks on a paper, etc., read by the Rev. F. Schurr, at the Missionary Conference. By ALEXANDER FORBES.
- Calcutta Review, The. Vol. XXXII 1859. Pp. 1-25. An article on the Gangetic Delta.
- Calcutta Review, The. Vol. XXIV, 1855. Pp. 331-345. The following are reviewed.
- I. The Hooghly Committee Report 1854.
 - II. On some method of clearing and deepening the Shoals and Sandbanks of the Hooghly River, by its own current. By HENRY PIDDINGTON.
 - III. On the Cyclone Wave in the Soonderbans—a letter to the Most Noble the Governor-General of India. By HENRY PIDDINGTON.
 - IV. Memoir by Messrs. Andrew Henderson and Charles Greaves, illustrating the necessity of forming Wet Docks for the Port of Calcutta, etc., etc., etc., 1854.
- Calcutta Review, The. Vol. XXXIX, 1863, P. 125.
- An article on the Selections from the Calcutta Gazettes of the years 1784, 1785, 1786, 1787, and 1788, shewing the political and social condition of the English in India eighty years ago. By W. S. SETTON-KARR, C.S. Calcutta. Military Orphan Press 1864.
- Calcutta Review, The. Vol. XVII, 1852. Pp. 114-177.
- A review of the three Parliamentary Returns dated respectively August 9 1845; August 1 1849 and May 7 1851 on Government connection with idolatory in India.
- Calcutta Review, The. Vols. LV and LVI. An article entitled our Commercial Exploitation of the Indian Populations (serialised). By JAMES GEDDES.
- Calcutta Review, The. Vol. XCII, 1891. Pp. 305-327.
- On Kalighat and Calcutta. By GAUR DAS BYSACK.
- Calcutta Review, The. Vol. XCII, 1891. Pp. 57-83.
- Article entitled The Plantain: Its History, Cultivation and Folk-Lore. By T. N. M.

BIBLIOGRAPHY

- Calcutta Review, The. Vol. CV, 1897. P. 253. An article on the Indian Bamboos. By C. W. HOPE.
- Calcutta Review, The. Vol. XXVIII. Pp. 364-461.
An article on the Commerce, Resources and Prospects of India.
- Calcutta Review, The Vol. IX. Jan.-June 1848. P. 1.
Review of "The Bengal and Agra Gazetteer, 1840-41" and "Tassin's Map of Bengal".
- Calcutta Review, The. Vol. IV, 1845. July-Dec. 1845. Pp. 242-281.
- On Indian Buddhism—its origin and diffusion. Twenty two books on the subject have been reviewed including *Fa Hian's Foe-Koue-Ki*.
- Calcutta Review, The. July 1922. P. 12. (New Series.)
- The Jatras in Bengal. By MOHINIMOHAN MOOKERJEE.
- Calcutta Review, The. February 1824. Pp. 331-386. (New Series.)
- The Vishnudharmottaram. By STELLA KRAMRISH.
- Calcutta Review, The. October 1924. Vol. 13. P. 129. (New Series.)
- Bengal in olden Times (1707-1757). By J. C. SINHA.
- Calcutta Review, The. July 1930. Vol. 36. (New Series). P. 29.
- History of Taxation of Salt under The Rule of the East India Company. Pt. IV (from 1836 to 1853). By PARIMAL ROY.
- Calcutta Review, The. August 1931. Vol. 40. (New Series). Pp. 199-225.
- History of the British East India Company's Trade in Bengal in the time of Alivardi. (1740-1756.) By KALIKINKAR DATTA.
- Calcutta Review, The. Vol. 46. (New Series.) July 1931. P. 13.
- A Picture of the Salt Industry in Bengal during the days of the prosperity in the nineteenth Century. By BINAYBHUSAN DASGUPTA.
- Calcutta Review, The. Vol. 46 (New Series) January 1933. Pp. 71-110.
- History of the East India Company's Trade in Bengal (1757-1765). By KALIKINKAR DATTA.
- Catalogue of the Birds of the Peninsula of India, arranged according to the modern system of classification with brief notes on their habits and geographical distribution; and description of new, doubtful, and imperfectly described species. 8 vo. Madras 1839. By T. C. JERDDON.
(A. S. O. B. Library.)
- Colonial and Indian Exhibition 1886. Empire of India: Special Catalogue of Exhibits by the Government of India and Private Exhibitors. London: William Clowes & Sons, Limited 1886.
- Calcutta International Exhibition (1883-1884). (W. B. S. Library)
- Calcutta Exhibition of Indian Art—Manufactures (1882).
- Condition of the Ryots of part of Chanditala Thanna, in Hooghly District and a description of the various crops and methods of cultivation in use among them. By R. CARSTAIRS Calcutta (1883).
- Catalogue of Agricultural Implements collected for the Calcutta International Exhibition 1883-84. Compiled by T. N. MUKHARJ. Calcutta: 1884.
Pp. 1-5. Agricultural Implements of Bengal.
- Desh (Saradiya)—Aswin 1352 B.S. Bangla San. By PROBODH CHANDRA SEN.
- Desh—9th Kartick 1358 B. S. (Sat. 27th Oct. 1951).
- Sultani Amaley Banglar Arthaniti. By NRIPENDRA BHATTACHARJ. Desh—5th Paus 1359 B.S.
- Nishidhha Samudrajatrar Itikatha. By NRIPENDRA BHATTACHARJ. Desh—Saradiya (1359 B.S.).
- Arthanatik Dristitey Durgotsav. By NRIPENDRA BHATTACHARJ.
- East and West. Quarterly Review published by the *Istituto Italiano Per Il Medio Ed Estremo Oriente*. Director: Prof. GIUSEPPE TUCCI, Year I. No. 2. P. 82.
- Article entitled, Cultural Relations Between Italy and India during the Middle Ages and the Renaissance. By CARLO FORMICHI.
- East and West. Year II, No. 4. P. 205. Pietro Della Valle's Letters on India. By GIUSEPPE DE LORENZO.
- East and West. Year III, No. 1. P. 45. Italian Travellers in Mediaeval Asia. By LUIGI VILLAR.
- English Factories in India, The. (1670-1677). Vol. II (New Series).
- The Eastern Coast and Bengal. By SIR CHARLES FAWCETT, I.C.S. (Retd.). Oxford at the Clarendon Press 1952. Pp. 325-442: On Bengal.
- Gleanings in Science. June 1830. Vol. II. P. 183. Hindustani Synonyms of Plants, arranged alphabetically.
- Gleanings in Science. Vol. III. No. 25. January 1831. P. 1. On the Mineral of the Rajmahal Cluster of Hills. By DR. F. BUCHANAN.
- Gleanings. in Science. Vol. III. January 1831. P. 18. On the Method of making Ice at Hooghly.
- Gleanings in Science. Vol. III. May 1831. P. 151. Analysis of a book entitled, An account of steam vessels and of Proceedings connected with steam navigation in British India. By G. A. PRINSEP.

BIBLIOGRAPHY

- Calcutta Government Press. 1830. With illustrations of country boats, and a table giving the general description of steamers in British India.
- Geographical and Statistical Report of the District Beerbhoom. By Capt. W. S. SHERWILL.
- Great International Fisheries Exhibition. London. 1883. Catalogue of the Exhibits in the Indian Section. By FRANCIS DAY. London. 1883.
- Grow more food. A pamphlet published by Government of Bengal. (W. B. S. Library.)
- Gleanings in Science. No. 10. October 1829. P. 281. Some particulars regarding the Mineral Productions of Bengal. By Mr. JONES.
(A.S.O.B. Library)
- Gleanings in Science. Vol. I. October 1829. P. 295. Examination and Analysis of some specimens of Iron Ores, from Burdwan. By H. PIDDINGTON.
- Gleanings in Science. Vol. I. October 1829. P. 298. Machines for Irrigation.
- Gleanings in Science. Vol. I. October 1829. P. 301. On the Manufacture of Writing Paper.
- Gleanings in Science. Vol. II. January 1830. P. 36. Analysis of a pamphlet entitled, Memoir on a Plan for the Formation of an easy and permanent communications by water between the upper and Eastern Provinces of India and Calcutta during the dry season. By Lt. J. A. SCHALCH.
- With a Map showing the line of the proposed canals for improving the navigation between the Ganges and Hooghly.
- Gleanings in Science. No. 18. June 1830. Vol. II. P. 171. On the Respiratory Organs and Air Bladder of certain Fishes of the Ganges. By J. TAYLOR.
- Historia de Varietate Fortunae. Written in Latin between 1441 and 1448 by POGGIO BRACCIOLINI (4 Volumes) Contains the account of Niccolo dei Conti's (a compatriot of the Marco Polo family) travels.
- Hand-Book of the collection Illustrative of the wild-silks of India, in the Indian Section of the South Kensington Museum, with a catalogue of the collection and numerous illustrations. By THOMAS WARDLE.
- Indian Historical Quarterly, 1932. September. Some Janapadas of Ancient Rastras. By PROBODH CHANDRA SEN.
- Indian Antiquary, The. Vol. IV. May 1875. Glimpses of old India as seen through the pages of Manu. By J. B. PHEAR.
- Indian Antiquary, The. Vol. V. 1876. March. P. 85. Translation of the Indica of Arrian. By J. W. McCRINDLE.
- Indian Antiquary The. Vol. V. December 1876. Notes to Arrian's Indica. By J. W. McCRINDLE.
See the translation of the Indica in the Indian Antiquary, March 1876. Pp. 85-108. The main objects of the Notes is to show how the localities, etc., mentioned in the text have been identified.
- Indian Antiquary, The. Vol. V. April 1877. Pp. 113-135. The Fragments of the Indika of Magasthenes. Collected by E. A. SCHWANBECK: Bonn 1846. Translated by J. W. McCRINDLE.
- Indian Antiquary, The. Vol. VI. August 1877. Pp. 236-250.
- Indian Antiquary, The. Vol. VI. November 1877. Pp. 333-349.
- Indian Antiquary, The. Vol. VIII. April 1879. Pp. 107-151. Anonymi (Arriani ut Fertur) Periplus Maris Erythraei. A translation of the Periplus of the Erythraean sea. By J. W. McCRINDLE.
- Indian Antiquary, The. Vol. VIII. December 1879. Pp. 330-338. On the Periplus of the Erythraean Sea. By the late M. Reinaud Translated from the Memoirs de l'Academie des Inscriptions, tom. XXIV, pt. ii.
- Indian Antiquary, The. Vol. IX. January 1880. Pp. 14-24. Thien - chu - India (Chinese account of India). Translated from the French of M. Stanislas Julien.
- Indian Antiquary, The. Vol. X. October 1881. Pp. 296-323. Ancient India as described by Ktesias. Being a translation of the abridgement of his Indika by PHOTIO'S and of the fragments of the work preserved in other writers. By J. W. McCRINDLE.
- Indian Antiquary, The. Vol. XIII. August 1884. Pp. 228-248. A geologist's contribution to the History of Ancient India. By V. BALL.
- Indian Antiquary, The. Vol. XIII. October 1884. Pp. 313-411. Ptolemy's Geography of India and Southern Asia. With a commentary. By J. W. McCRINDLE.
- Indian Antiquary, The. Vol. XXX. August 1901. P. 347. From "Extracts from the log of a voyage along the coast of India in 1746".
- This spelling is not in Yule's Glossary, but I call the following examples from his Diary (*italics*) of Sir William Hedges: 1677—[We] have caused three draughts of the same [River Ganges] to be delivered, vizt., one unto Captain John Goldsborough in the Bengal Merchant—Vol. III. P. cc.
1682—Being arrived in the Bay of Bengalla, you are to sail up the river Ganges as high as Hughly. Vol. III. P. cc.

BIBLIOGRAPHY

- Indo-Colonial Exhibition. London. 1886. (W. B. S. Library.)
- Ivory—Carving in Bengal. A Monograph. By G. C. DURR (1901).
- Journal of the Asiatic Society of Bengal. Edited by JAMES PRINSEP: Vol. III. P. 137.
- Journal of the Asiatic Society of Bengal, The. Vol. III. No. 35. November 1834. P. 545 and Vol. VI. P. 805.
Extracts from the "Mohit", that is the Ocean, a Turkish work on Navigation in the Indian Seas. Translated by the BARON JOSEPH VON HAMMER.
- Journal of the Asiatic Society of Bengal, The. Vol. IV. December 1835. P. 668. An article on Ancient Hindu coins. By JAMES PRINSEP.
- Journal of the Asiatic Society of Bengal, The. Vol. II. March 1833. P. 158.
- Journal of the Asiatic Society of Bengal, The. Vol. II. February 1833. P. 80.
An Experimental Inquiry into the Means employed by the Natives of Bengal for making ice. B. T. A. WISE.
- Journal of the Asiatic Society of Bengal, The. Vol. II. April 1833. P. 167. List of Indian Woods Collected. By N. WALLICH.
- Journal of the Asiatic Society of Bengal, The. Vol. VI. January 1837. On the indigenous Silkworms of India. By T. W. HELFER.
- Journal of the Asiatic Society of Bengal, The. Vol. VI. P. 61. Chinese Account of India. Translated from the Wan-heen-t'hung-Kaou or "Deep Researches into Ancient Monuments". By Ma-twan-linn, book 338, fol. 14.
- Journal of the Asiatic Society of Bengal, The. Vol. XII. Pt. II. P. 542. Memoranda relative to the working of Iron in Bengal.
- Journal of the Asiatic Society of Bengal, The. Vol. XVI. Pt. I. Jan. to June 1847. Pp. 1-78. Remarks on the sequel to the Periplus of the Erythrean Sea, and on the country of the Seres, as described by Ammianus Marcellinus. By JAMES TAYLOR.
- Journal of the Asiatic Society of Bengal, The. Vol. XVII. July 1848. Pp. 13-62. With a Chinese Map of India (showing the route of Hiouanthsang). Verification of the Itinerary of the Chinese Pilgrim, Hwan Tshang, through Afghanistan and India, during the first half of the seventh Century of the Christian Era. By ALEX CUNNINGHAM. (National Library.)
- Journal of the Asiatic Society of Bengal, The. Vol. I. P. 8. (1832.) On the Native Method of making the Paper, denominated in Hindustan, Nepalese. By B. H. HODGSON.
- Journal of the Asiatic Society of Bengal, The. Vol. I. P. 104 (March 1832). On the Temperature and Saltness of the River Hugli, from Calcutta to the Sea. By G. A. PRINSEP.
- Journal of the Asiatic Society of Bengal, The. Vol. I. August 1832. P. 358. Oriental Accounts of Precious Minerals. Translated by Raja Kalikishen; with remarks, By JAMES PRINSEP.
- Journal of the Asiatic Society of Bengal, The. Vol. XIX. No. 7. 1850. Analysis of the Bengali poem RAJ MALA, or chronicles of Tripura. By the REV. JAMES LONG.
- Journal of the Asiatic Society of Bengal, The. Vol. XX. 1851. No. 3. P. 227 and No. 6. 1851. P. 470. Essay on the Ancient Geography of India.
- Journal of the Asiatic Society of Bengal, The. Vol. XXII. No. 3. 1853. P. 281. Kansorapuri, now called Rungamutty. By CAPT. F. P. LAYARD.
- Journal of the Asiatic Society of Bengal, The. Vol. XXII. 1851. P. 387. Contribution to the Statistics of Bengal, Income, Expenditure and Food. By J. R. BEDFORD.
- Journal of the Asiatic Society of Bengal, The. Vol. XXIX. No. 1. 1860. The cartilaginous Fishes of Lower Bengal. By EDWARD BLYTH.
- Journal of the Asiatic Society of Bengal, The. Vol. XXVIII. No. 2. 1859. P. 136. On the Introduction of Writing into India. By MAX. MULLER.
- Journal of the Asiatic Society of Bengal, The. Vol. XXXIII. P. 266 Ancient Indian Weights. By E. THOMAS.
- Journal of the Asiatic Society of Bengal, The. Vol. XXXIV. No. 1. 1865. P. 14. Ancient Indian Weights. By E. THOMAS.
- Journal of the Asiatic Society of Bengal, The. Vol. XXXIV. No. II. 1865. P. 51. Ancient Indian Weights No. III. By E. THOMAS.
- Journal of the Asiatic Society of Bengal, The. Vol. XXXIV. No. 1. 1865. P. 128. On Sena Rajas of Bengal as commemorated in an Inscription from Rajshahi, decyphered and translated by C. T. METCALFE, C. S. . By RAJENDRALALA MITRA.
- Journal of the Asiatic Society of Bengal, The. Vol. XXXVI. Pt. I. No. 1. 1867. P. 1 and No. 4. 1873. P. 343. The Initial COINAGE OF BENGAL. By EDWARD THOMAS.
- Journal of the Asiatic Society of Bengal, The. Vol. XXXVI. Pt. I. No. II. 1867. P. 85. Notes on Sirajuddaula and the town of Murshidabad, taken from a Persian Manuscript of the Tarikh-i-Muncuri. By H. BLOCHMANN.

BIBLIOGRAPHY

- Journal of the Asiatic Society of Bengal, The. Vol. XXXVI. Pt. I. No. 2. 1867. P. 126. On the Antiquities of Bagerhat. By GOURDASS BYSACK.
- Journal of the Asiatic Society of Bengal, The. Vol. XXXVI. No. II. 1867. P. 73. On the Jungle products used as articles of food by the Inhabitants of the districts of Manbhoom and Hazaribagh. By V. BALL.
- Journal of the Asiatic Society of Bengal, The. No. 1. 1872. P. 49. Koch Bihar, Koch Hajo and Assam, in the 16th and 17th Centuries, according to the Akbarnamah, the Padrihnama, and the Fathiyah-IBRIYAH By H. BLOCHMANN.
- Journal of the Asiatic Society of Bengal, The. No. 2. 1872. P. 120. Essays in aid of a Comparative Grammar of the Gaurian Languages. By REV. A. F. RUDOLF HOERNLE.
- Journal of the Asiatic Society of Bengal, The. No. 2. 1872. P. 174. Beef in Ancient India. By RAJENDRALALA MITRA.
- Journal of the Asiatic Society of Bengal, The. No. 2. 1872. P. 201. Note on an Arakanese Coin. By G. E. BRAYER.
- Journal of the Asiatic Society of Bengal, The. No. III. 1872. P. 209. The Buddhistic Remains of Bihar. By A. M. BROADLEY.
- Journal of the Asiatic Society of Bengal, The. No. 4. 1872. P. 331. On a new King of Bengal (Alauddin Firuz Shah), and notes on the Husaini Kings of Bengal and their conquest of Chatgaon. By H. BLOCHMANN.
- Journal of the Asiatic Society of Bengal, The. No. I. 1874. P. 82. Notes on Sunargaon, Eastern Bengal. By J. WISE.
- Journal of the Asiatic Society of Bengal, The. No. III. 1874. P. 197. On the Barah Bhuyas of Eastern Bengal (with a plate). By JAMES WISE.
- Journal of the Asiatic Society of Bengal, The. No. III. 1873. P. 193. Authorities for the History of the Portuguese in India. By T. W. H. HOLBORT.
- Journal of the Asiatic Society of Bengal, The. No. 3. 1873. P. 209 and No. 3. 1874. Contributions to the Geography and History of Bengal (Muhammadan Period), Part I., Geographical Part II, Historical, based on Inscriptions received from General A. Cunningham, C.S.I., Dr. J. Wise, E. V. Westmacott, Esq., W.L. Heeley, Esq., Walter M. Bourke, Esq., etc., and on unpublished coins, with notes by E. V. WESTMACOTT, Esq., and Dr. J. WISE. By H. BLOCHMANN.
- Journal of the Asiatic Society of Bengal, The. No. 3. 1874. P. 22. Essays in aid of a Comparative Grammar of the Gaurian Languages. By REV. A. F. RUDOLF HOERNLE.
- Journal of the Asiatic Society of Bengal, The. No. 3. 1876. P. 325. A reply to several passages in Mr. Blochmann's "Contributions to the History and Geography of Bengal". No. III. By the Translator of the Tabakti-i-Nasiri, MAJOR H. G. RAVERTY.
- Journal of the Asiatic Society of Bengal, The. No. 3. 1875. P. 275. Contributions to the History and Geography of Bengal.
- Journal of the Asiatic Society of Bengal, The. No. 173. 1846. P. 323. On the Coins of the Independent Muhammadan Sovereigns of Bengal. By J. W. LAIDLAY.
- Journal of the Asiatic Society of Bengal, The. September 1847. P. 953. Notes on Places in the Province of Behar, supposed to be those described by Chy-Fahian, the Chinese Buddhist Priest, who made a pilgrimage to India, at the close of the 4th Century A. D. By CAPTAIN M. KITTOE.
- Journal of the Asiatic Society of Bengal, The. December 1847. P. 1183. An attempt to identify some of the places mentioned in the Itinerary of Hiun Tshang. By WILLIAM ANDERSON.
- Journal of the Asiatic Society of Bengal, The. July 1848. P. 13. Verification of the Itinerary of the Chinese Pilgrim, Hwan Tshang, through Afghanistan and India, during the first half of the seventh Century of the Christian Era. By ALEX CUNNINGHAM.
- Journal of the Asiatic Society of Bengal, The. Vol. LV. Pt. I. 1886. P. 66. Notes on the Chittagong District. By F. E. PARGITER.
- Journal of the Asiatic Society of Bengal, The. Vol. LV. No. I. 1886. P. 83. The Hive-Bees indigenous to India and the Introduction of the Italian Bee. By J. C. DOUGLAS.
- Journal of the Asiatic Society of Bengal, The. Vol. LXV. No. I. 1896. P. 16. Chronology of the Sena Kings of Bengal. By NAGENDRANATH VASU.
- Journal of the Asiatic Society of Bengal, The. Vol. LXV. No. I. 1896. P. 38. The Jesuit Missions to the Emperor Akbar from notes recorded by the late General R. MACLAGAN. By E. D. MACLAGAN.
- Journal of the Asiatic Society of Bengal, The. Notes on the Rungpur Dialect. By G. A. GRIERSON.
- Journal of the Asiatic Society of Bengal, The. Vol. XLVI. No. 4. 1877. P. 329. Catalogue of the recorded cyclones in the Bay of Bengal, up to the end of 1876, compiled by HENRY F. BLANDORD.
- Journal of the Asiatic Society of Bengal, The. Vol. XLVII. No. III. 1878. P. 135. The Song of Manik Chandra. By G. A. GRIERSON.

BIBLIOGRAPHY

- Journal of the Asiatic Society of Bengal, The. Vol. XLVII. No. 4. 1878. P. 384. On the Pala and the Sena Rajas of Bengal. By RAJENDRALALA MITRA.
- Journal of the Asiatic Society of Bengal, The. Vol. LIX. No. I. 1890. P. 50. Notes on a Buddhist Monastery at Bhot Bagan (Howrah), on two rare and valuable Tibetan Manuscript discovered there, and on Purvana Gir Gosaim, the celebrated Indian Acharya and Government Emissary at the Court of the Tashi Lama, Tibet, in the last Century. By GOUR DAS BYSACK.
- Journal of the Asiatic Society of Bengal, The. Vol. LX. No. 2. 1891. P. 53. Place and River—Names in the Darjiling District and Sikkim. By L. A. WADDELL.
- Journal of the Asiatic Society of Bengal, The. Vol. LXII. P. 52. Notes on the History of the East India Company Coinage from 1753—1835. By EDGAR THURSTON.
- Journal of the Asiatic Society of Bengal, The. Vol. LXII. No. 4. 1893. P. 315. The Site of Karna Suvarna. By H. BEVERIDGE.
- Journal of the Asiatic Society of Bengal, The. Vol. LXIII. No. I. 1894. P. 39. On a new Copper-Plate Grant of Dharmapala. By UMES CHANDRA BATAUYAL.
- Journal of the Asiatic Society of Bengal, The. Vol. LXIII. No. 2. 1894. P. 85. Note on a Major Francklin's Manuscript description of Gour. By H. BEVERIDGE.
- Journal of the Asiatic Society of Bengal, The. Vol. LXXI. No. 2. 1902. P. 149. The Vratya and Samkara Theories of Caste. By SATISH CHANDRA VIDYA BHUSAN.
- Journal of the Asiatic Society of Bengal, The. Vol. LXVI. 1897. P. 85. Ancient Countries in Eastern India with a Map. By F. E. PARGITER.
- Journal of the Asiatic Society of Bengal, The. Vol. LXXIII. No. I. 1904. P. 49. Observations on General Maclagan's paper on the Jesuit Missions to the Emperor Akbar. JASB for 1896. P. 38. By H. BEVERIDGE.
- Journal of the Asiatic Society of Bengal, The. Vol. LXXII. No. 1904. P. 57. On Isa Khan, ruler of Bhati, in the time of Akbar. By H. BEVERIDGE.
- Journal of the Asiatic Society of Bengal, The. Vol. IV. (New Series), May 1908. P. 267. Notes on the Geography of old Bengal. By MONMOHINI CHAKRAVORTY.
- Journal of the Asiatic Society of Bengal, The. Vol. V. (New Series) October 1909. P. 367. Note on Seven Sixteenth Century cannon recently discovered in the Dacca District. By H. E. STAPLETON.
- Journal of the Asiatic Society of Bengal, The. Vol. VII. (New Series) January 1911. P. 9. Note Sur les denominations a danner aux sabres hindous. Remise par M. P. HOLSTEIN de Lyon.
- Journal of the Asiatic Society of Bengal, The. Vol. VII. (New Series) January 1911. P. 15. List of Portuguese Jesuit Missionaries in Bengal and Burma (1576—1742). By RES. L. BESSE & H. HOSTEN.
- Journal of the Asiatic Society of Bengal, The. Vol. XIV. (New Series). 1918. Pp. 1—241. The Malda Diary and Consultations (1680-1682): Edited By WALTER K. FIRMINER.
- Journal of the Asiatic Society of Bengal, The. Vol. XI. (New Series). May & June 1915. P. 175.
- Dakshindar, a godling of the Sunderbuns, with plates. By BIMALA CHARAN BATALYAL.
- Journal of the Asiatic Society of Bengal, The. Vol. XI. July & August 1915. P. 187.
- Notes on Father Monserrate's Mongolicae Legationis Commentarius. By H. BEVERIDGE.
- And the Surat Incident. Translated from the Portuguese by R. G. WHITEWAY. Edited and Annotated by the REV. H. HOSTEN.
- Journal of the Asiatic Society of Bengal, The. Vol. XVI. (New Series) 1920. P. 91. Dacca Diaries. By J. T. RANKIN.
- Journal of the Asiatic Society of Bengal, The. Vol. 23. (New Series). P. 57.
- Fr. N. Pimenta's Annual Letter on Mogor (Goa Dec. 21 1599). From the Latin by the REV. HOSTEN, S. J.
- Journal of the Asiatic Society of Bengal, The. Goa. 1 Dec. 1600. P. 67.
- Journal of the Asiatic Society of Bengal, The. Dec. 1. 1601. P. 83.
- Journal of the Asiatic Society of Bengal, The. P. 109.
- Eulogy of Father Jerome Xavier, S. J., a missionary in Mogor. (1549-1617). Translated from the Spanish by the REV. H. HOSTEN, S. J.
- Eulogy of Father Jerome Xavier, S. J. P. 131.
- Some letters of Fr. Jerome Xavier, S. J., to his family (1593-1612). Compiled by the REV. H. HOSTEN, S. J.
- Journal of the Asiatic Society of Bengal, The. Vol. 23. 1927. P. 139.
- Some notes on Bro. Bento de Goes. S. J. (1583-1607).
- Journal of the Asiatic Society of Bengal, The. Pp. 141-166.
- Three Letters of Fr. Joseph de Castro S. J. and the last year of Jahangir. (Aug. 24, 1626—Aug. 15, 1627). Translated and edited by the REV. H. HOSTEN, S. J.
- Journal of the Asiatic Society of Bengal, The. (New Series). Vol. 23 1927. Pp. 301-333.
- Analysis of Race—Mixture in Bengal. By P. C. MAHALANOBIS.

BIBLIOGRAPHY

- Journal of the Asiatic Society of Bengal, The. Vol. 25 (New Series) 1929. P. 201.
- Indo-American Trade Past and Present. By J. C. SINHA.
- Journal of the Asiatic Society of Bengal, The. Vol. XXVIII (New Series) 1932. P. 151.
- Notes on the Historical and Archaeological results of a Tour in the Districts of Maldah and Dinajpur. December 24th-31st 1932 with Maps. By H. E. STAPLETON.
- Journal and proceedings of the Asiatic Society of Bengal (New Series). Vol. XXVIII 1932. P. 173.
- Notes on Two Tours in the Districts of Maldah and Dinajpur. By S. K. SARASWATI.
- Journal Asiatique. October-December 1921. Pp. 303-321. Paris.
- A Scholarly review of The Book of Durate Barbosa (1st volume, 2nd series, No. XLIV of the Hakluyt Society, London, 1918. LXXXV—238 pages: Editor Mansel Longworth Dames). By GABRIEL FERRAND.
- Journal Asiatique. July-September 1922. Paris. Pp. 1-104 and Pp. 161-246.
- L'Empire Sumatranais de Crivijaya. By GABRIEL FERRAND.
- Journal Asiatique. July-September 1923. Paris. Pp. 1-57. Pre'-Aryen et Pre'-Dravidien Dans L'Inde. By SYLVAIN LEVY.
- Journal Asiatique. January-March 1925. Paris. P. 46.
- Notes Sur la Geographic Ancienne de l'Inde. I. Paloura-Dantapura. By SYLVAIN LEVY.
- Journal Asiatique. January-March 1926. Paris. P. 177.
- An excellent treatise on cauries (Italics).
- Journal Asiatique. March-April 1863. Paris. Pp. 93-234 and Pp. 297-441 (May and June) 1863.
- Relations Politiques et Commerciales de L'Empire Romain avec l'Asie Orientale. (L'Hyreanie, L'Inde, a Bactriane et la chine), d'apres les temoignages Latins, Grecs, Arabes, Persans, Indiens et Chinois. With 3 Maps. By M. RAINAUD.
- Journal of the Assam Research Society 1933 April. Prāgyōtisha, Kamrupa Dāvaka, By PROBODH CH. SEN.
- Journal Asiatique. Mai-Juin 1863. P. 442.
- Mémoire sur la propagation des chiffres Indiens. By M. F. WOEPCKE.
- List of the Principal Economic Plants Grown in Bengal. Dept. of Agriculture, Bengal (1907).
(W. B. S. Library)
- Memoirs of the Asiatic Society of Bengal. Vol. II. 1911. Pp. 25-41.
- The Exact Determination of the Fastness of the more common Indigenous Dyes of Bengal, and comparison with typical synthetic Dye-Substances. Pt. I, Dyeing on Cotton. By E. R. WATSON.
- Memoirs of the Asiatic Society of Bengal. Vol. VIII. No. 3. Pp. 173-198. Hornell's two famous articles on Boats.
- Memorandum on the Timber of Bengal suited for Railway carriages and other work. 12-mo. Calcutta 1862.
(A. S. O. B. Library)
- Memoranda of Midnapore Calcutta—1902.
- Memorandum on Silk in India. By L. LIOTARD.
- Monograph on The Cotton Fabrics of Bengal. By N. N. BANERJEE, 1898.
- Monograph on Carpet—Weaving in Bengal, A. By N. G. MUKERJEE 1907.
- Monograph on the coconut Palm (Cocos Nucifera). By JOHN SHORTT.
- Monograph on Paper and papier—Mache in Bengal. By D. N. MOOKERJEE, 1908.
- Monograph on the Silk Fabrics of Bengal, A. By N. G. MUKERJEE.
- Monograph on Wire and Tinsel Industry in Bengal, A. By MALLINATH RAY, Calcutta 1918.
- Memoirs of the Asiatic Society of Bengal. Vol. III. No. 7. Pp. 407-448 on The Chank Bangle Industry.
(W. B. S. Library.)
- Memoirs of Gaur and Pandua. By KHAN SAHIB M. ABID ALI KHAN of Maldah. Edited and revised by H. E. STAPLETON, Calcutta MCM XXX.
- Modern Review. March 1937. P. 267.
- Economic Activity in Ancient India. By P. BANERJEE.
- Note on Sericulture in Bengal (1908-09).
(W. B. S. Library.)
- Panchapuspa, Agrahayan 1337 B.S. Banglar Itihashey Hindurajatter Sesh Jug. By PROBODH CHANDRA SEN.
- Purvasa—Baishak 1358 B.S. to Aswin 1358. Banglar Purabritta charcha. By PROBODH CH. SEN.
- An important work on the subject. Contains a good descriptive bibliography.
- Purvasa—Magh and Phalgun 1358 B.S.
- Pravasi—Sravan 1327 B.S. P. 388.
- Gangarahr Nagarer Nam O Abasthan.
- Pravasi—Phalgun 1326 B.S. P. 450.
- Kadalir Upakarita.
- Pravasi—Pous 1326 B.S. P. 247.
- Bikrampur Pous Sankrantir Chhara.
- Pravasi—Pous 1328 B.S. P. 337.
- Prachin Bharater Bastralankar. By JITENDRALAL BASU.
- Pravasi—Pous B.S. P. 339.
- Prachin Bharate Agneyastra.
- Pravasi—Magh 1328 B.S. P. 451.
- Bangali O Dravir. By AMULYA CHARAN BIDYABHUSAN.
- Pravasi—Magh 1328 B.S. P. 463.
- Jalad Briksha Jajna Dumur. By RAMDULAL BIDYANIDHI.
- Pravasi—Asarh 1328 B.S. P. 321. By JADUNATH SARKAR.

BIBLIOGRAPHY.

- A short treatise on Du Jarric's famous book entitled 'L'Histoire des choses plus memorablas', etc.
- Pravasi Sravan 1328 B.S. P. 525.
- Sekaler Bazar Dar. By KALIPRASANNA BANDYAPADHAYA.
- Pravasi Sravan 1328 B.S. P. 528.
- Bauri a short essay on the Bauris.
- Pravasi Bhadra 1328 B.S. P. 631.
- Bangalir Itihash. By AMULYA CHARAN BDIYABHUSAN.
- Proceedings of the Asiatic Society May 1868. P. 129.
- Remarks on elephants. By V. BALL.
- Proceedings of the Asiatic Society. December 1868. P. 264.
- What was the Sundarban originally, and when, and wherefore did it assume its existing state of utter desolation. By H. J. RAINEY.
- Proceedings of the Asiatic Society. March 1868. P. 86.
- Mr. Carnegy's Queries regarding races of India.
- Proceedings of the Asiatic Society of Bengal. March 1868. P. 79.
- Iron cage found in Faridpur.
- Paris Universal Exhibition of 1878.
- Hand-Book to the British Indian Section. By GEORGE C. M. BIRWOOD (second edition). Pp. 20-35—The Antiquity of the Indian Trade.
- Pp. 36-54—The Routes of Indian Commerce.
- Pp. 93-108—Cottons and silks.
- Pamphlet on Indigo. By GEORGE WATT. (W. B. S. Library)
- Pravasi Chaitra 1318 B. S. Pp. 600-602.
- Pous Sankranti.
- Pravasi Magh 1318 B.S. P. 390.
- Banger Pous-Sankranti.
- Pravasi Kartick 1318 B. S. P: 94.
- Dadhi.
- Pravasi Phalgun 1318 B.S. P. 493.
- Pous-Sankranti.
- Pravasi Agrahayan 1318 B.S. P. 137.
- Karanja Briskha O Karanja Taila. By SARAT CHANDRA SANYAL.
- Pravasi Aswin 1318 B.S. P. 668.
- Khejurer chash. By SARAT CHANDRA SANYAL.
- Pravasi Bhadra 1318 B.S. P. 486.
- Matsya Raskhar Bivinna Padhati. By G. N. ROY.
- Pravasi Aswin 1318 B.S. P. 665.
- Mahanabik Budhagupta. By RAKHALDAS BANERJEE.
- Pravasi Magh 1317 B.S. P. 431.
- Ikshu Chash. By GIRINDRA MOHAN MUKHERJEE.
- Pravasi Phalgun 1317 B.S. P. 547.
- Khedda ba Banyahasti Dharibar Pranali. By PRIYA RANJAN SENGUPTA.
- Pravasi Aswin 1317 B.S. P. 557.
- I-tshing. By RAMPRAN GUPTA.
- Pravasi Baishaka 1317 B.S. P. 77.
- Prachin Bharatiya Silpey Arnabapot. By RADHA KUMUD MUKHERJEE.
- Pravasi Asarh 1317 B.S. P. 211.
- Bangadeshiya Katipoy Udvider Bicharan Kahini. By NIBARAN CHANDRA BHATTACHARJEE.
- Pravasi Sravan 1317 B.S. P. 380.
- Sandwiper Punnal-Briskha O Punnal-Taila. By MAUZAFFAR AHMED.
- Pravasi Baishak 1315 B.S. P. 20.
- Panduar Kirtichinha. By ASKHOY KUMAR MAITRAYA.
- Pravasi Bhadra 1314 B.S. Pp. 271-278.
- Dhakar Bastrabyabasay.
- Pravasi Phalgun 1313. B.S. P. 611.
- Silpa-Samitir Prabandhabali (appeared serially).
- Pravasi Sravan 1313 B.S. P. 216.
- Deshiya Charka O Tahar Unnati. By JOGESH CH. RAY.
- Pravasi Jaistha 1316. P. 86.
- Khejur Gur.
- Pravasi Baishak 1324 B.S. P. 56.
- (Gur Byabasay). By JOGESH CH. RAY.
- Pravasi Chaitra 1325 B.S. P. 532.
- Bishnupur with illustrations.
- Pravasi Sravan 1322 B.S. P. 537.
- Bangalar Itihas. By JADUNATH SARKAR. A review of Rakhaldas Banerjee's book entitled Bangalar Itihash.
- Report on the Internal Trade of Bengal for the year 1881-82.
- Published by the Government of Bengal: Calcutta 1882.
- P. 84. Goor or unrefined sugar from date juice.
- P. 88. Tobacco (Dhala [the damaged or torn leaves] Pulo [ordinary tobacco]; Magai).
- Appendix A.P. iii.—List showing the valuation of all articles of trade adopted in registering traffic on trade routes.
- Appendix P. iv (Concluded).—Statement showing the average retail prices of food-grains in Bengal during the year 1881, as compared with those of the three previous years.
- Appendix B.P. v.—Traffic carried by country boats and carts.
- Also see the statement Nos. IIA; III; IV.
- Reports and Documents connected with the Proceedings of the East India Co. in regard to the culture and manufacture of Cotton—Wool, Raw Silk and Indigo in India.
- (W. B. S. Library)
- Report on the Statistics of the Beerbhoom District. By J. GEOGHEGAN. Calcutta 1874.
- Report on the Alcoholic strength and Acidity of Fresh Tari and Fermented Tari in Bengal, Eastern Bengal and Assam in January and April—May 1909. By R. L. JENKS. Calcutta 1910.

BIBLIOGRAPHY

- Report on an enquiry into the Silk Industry in India. Vol. I. By H. MAXWELL-LEFROY.
- The Same. Vol. II. By E. C. ANSORGE, I.C.S. Calcutta 1917.
- Report of the Existing Arts and Industries in Bengal. By E. W. COLLIN. Calcutta 1890.
- Appendix I contains a list of minor industries. P. 33.
- Report on the Fish and Fisheries of the Fresh waters of India. By FRANCIS DAY. Simla: 1871.
- Report on the Sea Fish and Fisheries of India and Burmah. By FRANCIS DAY. Calcutta 1873.
- Sahitya Parisat Patrika: 1347 B.S. No. 4. P. 233.
- Madhyajuger Banglar Itihaser Mashla. By SIR JADUNATH SARKAR.
- Sahitya Parisat Patrika 1341 B.S. P. 19.
- Paundrabardhan O Burdhaman Vukti.
- Sahitya Parisat Patrika 1340 B.S. No. 2. P. 55.
- Banger Prachin Bivag.
- Sahitya Parisat Patrika 1343 B.S. No. I. P. 49.
- Pavanaduta Barnita Bangla Desh.
- Sahitya Parisat Patrika 1341 B.S. No. 2. P. 55.
- Uttarrareh Sen-Rajdhani.
- Sahitya Parisat Patrika No. I. 1315 B.S. P. 15.
- Saptagram. By RAKHALDAS BANERJEE.
- Sahitya Parisat Patrika 1304 B.S. P. 159.
- Banglar Prachin Bhutatwa. By PRAFULLA CHANDRA BANERJEE.
- Sahitya Parisat Patrika 1304 B.S. P. 47.
- Banglar Pratnatatwa. By PRAFULLA CHANDRA BANDYOPADHYA.
- Sahitya Parishat Patrika 1907. No. 4. P. 193.
- Rangamati Ba Karnasubarna. By NIKHIL-NATH ROY.
- Sahitya Parishat Patrika 1345 B.S.
- "Kalikata" Namer Utpatti. By SUNITI KUMAR, CHATTERJEE.
- Sahitya Parishat Patrika 1322 B.S. P. 1.
- Burdhamaner Katha.
- Sahitya Parishat Patrika 1322 B.S. Burdhamaner Purakatha. P. 3. By NAGENDRANATH VASU.
- Sahitya Parishat Patrika 1322 B.S. P. 12.
- Bartaman Burdhaman. By RAKHALRAJ ROY.
- Sahitya Parishat Patrika 1322 B.S. P. 22.
- Shtan Parichaya. By NAGENDRANATH VASU.
- Sahitya Parishat Patrika 1339. No. 2. P. 73.
- On Saktipur Sashan. By NALINIKANTA BHATTASALI.
- Sahitya Parishat Patrika 1338 B.S. No. 2. P. 65.
- Sunnapura. By JOGESH CHANDRA ROY.
- Sahitya Parishat Patrika 1327 B.S. No. 4. P. 157.
- Chand Sadagar O Raja Gopichandra. By SIVA CHANDRA SIL.
- Sahitya Parishat Patrika 1327 B.S. P. 94-127.
- On some aspects of Bengali Life. By PRAVASH CHANDRA SEN.
- Sahitya Parishat Patrika. No. 1. 1330. B.S. P. 19.
- Pavan Duter Bejoypur Kothay? By NIKHIL NATH ROY.
- Sahitya Parishat Patrika 1323 B.S. No. 3. P. 179.
- Uropiya Sikhita Prachinatama Bangla Pustak. By SUSHIL KUMAR DEY.
- Sahitya Parishat Patrika 1341 B.S. PP. 139-192.
- Rarh Bhraman. By PANCHANAN BANERJEE.
- Sahitya Parishat Patrika 1314 B.S. P. 35.
- Gram-Debata. By (ANON).
- Sahitya Parishat Patrika 1314 B.S. P. 44.
- Champa. By NARESH CHANDRA SINHA.
- Statistical and Geographical Report of the District of Ban Coorah. By JAMES E. GASTRELL.
- Statistical Report on Thanna Labpore. By JANOKINATH MOZOOMDAR. Calcutta 1879.
- Statistical and Geographical Report of the 24 Pergannahs. By MAJOR RALPH SMYTH. (1857).
- Selections from the Records of the Bengal Government No. XXXII. Returns relating to Publications in the Bengali Language in 1857. Silk in India. Compiled by J. GEOGHEGAN.
- Sacred Shank of India, The: a Monograph of the Indian Conch (Turbinella Pyrum). By JAMES HORNELL.
- Madras 1914. Illustrated with 18 Plates.
- Sahitya Patra Sravan 1357 B.S. Pp. 32-39:
- Bangalir Itihash. By HIRENDRA NATH MUKHOPADHYAY a review of Nihar Ranjan Ray's Bangalir Itihash, Adi Parva.
- Udayan, Jaistha 1339 B.S.
- Banglay Aryya Savyata Bistar. By PROBODH CHANDRA SEN.
- Visva-Bharati Annals—1945. Vol. I. Edited by P. C. BAGCHI, pp. 96-134.
- Political Relations between Bengal and China. By P. C. BAGCHI.
- Visva-Bharati Annals. Vol. IV. Edited by P. C. BAGCHI, pp. 65-106.
- Studies in Islamic History. By N. B. ROY.
- Visva-Bharati Patrika, Baishak 1353 B.S.
- Banglar Janapada Parichaya (with two maps). By PROBODH CH. SEN.
- Visva-Bharati Patrika. Kartick 1353 B.S.
- Banglar Janapada Parichaya (conclusion). By PROBODH CH. SEN.
- Visva-Bharati quarterly, August 1946, p. 116.
- Geography of Ancient Bengal I. By PROBODH CH. SEN.
- Visva-Bharati Quarterly, November 1947.
- Geography of Ancient Bengal II. By PROBODH CHANDRA SEN.

BIBLIOGRAPHY

POSTSCRIPT TO BIBLIOGRAPHY OF BOOKS, ETC.

(The following additional information was collected since the book went to press)

- (The) Ancient Khmer Empire. By LAWRENCE PALMER BRIGGS. Published by the American Philosophical Society: 1951, p. 66.
- P. 106.—The influence of the Mahajana school of thought over the Maharajas of Sailendra Dynasty (Sumatra).
- P. 228.—Exodus of Buddhist Monks from Bengal to S. E. Asia in the 8th century.
- Bangla Desher Gachpala. By Kabiraj INDU BHUSAN SEN.
- Banglar Mati. By JAMINI RANJAN MAJUMDAR.
- (A) Chinese Biographical Dictionary. By HERBERT GILES: London: 1898.
- Correspondance du conseil superieur de Pondichery, et de la Compagnie publiée avec introduction par. By ALFRED MARTINEAU. Tome 1 (1726-1730). Pp. 1-42—Introduction.
- (A) Collection of papers, relative to Ship Building in India, with descriptions of the various Indian woods employed therein, their qualities, uses and value; also a Register comprehending all the ships and vessels built in India to the present time; with many other particulars respecting Indian shipping, and the External Commerce of Bengal. Compiled by JOHN PHIPPS: Calcutta: 1840.
- (The) Cyclopaedia of India and of Eastern and Southern Asia. By EDWARD BALFOUR in three volumes. Vol. I.—A—GYROCARPUS, 3rd edition, London: 1885. Pp. 392-401—Boats and Ships. Pp. 827-28—Cotton. Vol. II, P. 374—Bengal Iron. P. 1022—Muslin.
- Drugs in Commerce. By JOHN HUMPHREY, London: p. 19—Butea seeds and Gum. Palas is also known as Dhak. Hence Dhaka or Dacca. (See Indian Companion —p. 117.) Butea gum is also known as "Bengal Kino". Also see p. 72.
- (A) Few Words on the Present state and Future Prospects of Sericulture in Bengal. By J. A. H. LOUIS, Calcutta: 1882. Pp. 30-33—Appendix. Contains a good list of books on silk mostly written in French.
- (A) Geographical Account of Countries round the Bay of Bengal (1669 to 1679). By THOMAS BOWREY. Pp. 131-220. Bengala. Pp. 216-17—Coins, Pp. 217-18—Weights.
- (The) Geographical Dictionary of Ancient and Mediaeval India. By NUNDOLAL DEY. 2nd Edition. Luzac & Co., London: 1927.
- Indian Tariff Board. Match Industry, Vol. I. Govt. of India: 1928.
- Indigenous Drugs of India. By J. C. GHOSH, Calcutta: 1940.
- (The) Invasion of India. By Alexander the Great as described by Arrian, Q. Curtius, Diodoros, Plutarch and Justin. By J. W. M'CRINDLE, Westminster: 1898, p. 310. The Gandaritaj and the Praisial.
- Karpass. By SATYA RANJAN SEN.
- MUNTAKHABH-T-TAWARIKH. By ABDU-L-QADIR IBN-I-MULUK SHAH, known as AL-BADAONI, Vol. I. Translated from the original Persian and edited by George S. A. RANKIN, Calcutta: 1818.
- P. 81 n. 2.—Invasion of Bengal in 596 A.H. By BAKHTYAR KHLIJI.
- P. 82. n.n. 3 & 4.—Lakshmanawati and Nudiya.
- P. 300.—How with the tramp of the Bengal elephants a new palace fell. Also see n. 3 of the same page which gives a different version attributing to the fall of the palace.
- (The) Nabobs—a study of the social life of the English in eighteenth century in India. By T. G. P. SPEAR. O. U. P., 1932. Pp. 1-22—The Early settlements to 1750. Pp. 149-174—Notes in details on each chapter. Contain a good bibliography. Pp. 175-177.—Appendix A—Sketch of the Political History of India in the eighteenth century.
- Pp. 198-204.—Appendix E—European and Indian mutual opinions.
- Pp. 205-210.—Appendix F—List of records, manuscripts and printed books consulted.
- On Yuan Chwang's Travels in India. By THOMAS WATTERS. Vol. II: London: 1905.
- P. 189.—Tan-mo-lip-ti (Tamralipti).
- P. 191.—Karnasuvarna.
- Op-en ondergang van Cormandel. By DANIEL HARVART: Aamsterdam: 1693.
- P. 121.—"Tot in het Jaar 1658 of daar outrent heeft Bengala onder de bestiering van Cormandel gestaan, en naderhand, om dringende rendenen eeu eppen Directem gekregen, zo dat de heer cit de laatste geweest is, die Cormandel, en Bengala te gelijk bestierd heeft."
- Physical Feature of Ancient Bengal. By R. C. MAJUMDAR, and D. R. BHANDARKAR, Volume, pp. 341-364.
- (The) Portuguese in India: By FREDERICK CHARLES DANVERS: Vol. 1. London: 1894.
- P. 341.—1518 A.D. João Silveira proceed to Bengal where he was joined by João Coelho.
- Silveira failed to accomplish his object of effecting a trade with Bengal.
- P. 358.—1524 A. D. Camphor was imported into Bengal from Borneo.

BIBLIOGRAPHY

- P. 422.—1537-38 A. D. About this time attempts were made to extend Portuguese influence in Bengal.
- (The) *Prakritibada*, or an illustrated Etymological Dictionary of the Sanskrit and Bengali Languages. By RAMKAMAL BIDYALANKAR: 6th Edition, Calcutta: 1911. See Parishistha—Drabyagnna-bhidhan.
- (The) *Rise of Portuguese Power in India, (1497-1550)*. By R. S. WHITEWAY, Westminster: 1899.
- Tant O Rang. By TRAILOKYA NATH BASU. Published from Rautbhog, Dacca in 1939.
- Textile Dyeing. By C. C. GHOSH. Bulletin No. 56. Industries Department. B. S. Book Depot, 1933.
- (A) *Treatise on Mango*. By PROBODH CHUNDRAN DE: Calcutta: 1897.
- Tular Chas. By JAMINI RANJAN MAJUMDAR: Pp. 1-44.
- Voyage de François Pyrad de Laval*. In two Volumes. Vol. I. Paris: 1619. PP. 348-358—Du Royaume de Bengale et des remarques d'iceluy.
- Voyages de JEAN BAPTISTE TAVERNIER* Second patrie, ou il est parlé es Indes et des Isles voisines. Paris: 1676.
- P. 259.—Weights and measures.
- P. 260.—Silk.
- P. 262.—Cotton.
- P. 266.—Saltpetre.
- P. 272.—“Les habitants de Pegu ne s'en servent point aux teintures, parce qu'on leur apporte les toiles toutes de Bengala et de Maslipatam”
- P. 272.—La Gomme Laque.
- P. 273.—Les Sucres.
- P. 308.—The Diamond mine and the river GOUEL near Soumelpour (Sambalpour).
- P. 309.—The Route from Agra to the Diamond mine.
- P. 320.—Le GOUEL.
The river GOUEL merges in the Ganges(?).
- P. 320.—How diamonds are found.
- Chapitre XVIII.—“Des diverses sortes de poids pour peser les diamans aux Mines; des espèces d'or et d'argent qui y ont cours; des chemins par lesquels on s'y peut rendre; et de la regle que l'on fait pour savoir le prix des diamans.”
- P. 424.—Tipra (Tipperah).
- P. 425.—The Gold mine in Tipperah. (Also see *Travels in India* by JEAN BAPTISTE TAVERNIER. By V. BALL, 2nd volume, p. 458—A Map showing the position of the Diamond Rivers of Bengal).
- Voyages de C. P. Thunberg au Japaon, par le cap de Bonne-espérance, les Isles de la Sonde, etc.*
- Translated by L. LANGLES: Paris: 1796.
- P. 513.—A short notice of the “Grammar of the Bengali Language” by HALHED. “Cette langue (i.e., Bengali) est même aussi né cessaire que le persan pour traiter avec les officiers et magistrats du Gouvernement moghol, lequel ne promulgue presqu'aucune acte en persan, sans y joindre une traduction bengale”. This is said to be the opinion of Halhed.
- (A) *Voyage from England to India in the year 1754*. By EDWARD IVES. Chaps. VIII, IX, X, XI.—An historical account of the Period.
- Chaps. XII.—Description of Argill, and of the Arica, Chulta, Mango, Tatoon and Russa trees. Account of coins at Bengal.
- P. 186.—Cowry. “4000 to 4800 Cowries to the Rupee”.
- Voyage en Moscovie, Tartarie, et Perse*. Avec celui de I. A. De MANDELSLO aux Indes Orientales. Contenant une description particulière de l'Indosthan, de l'Empire du Mogul, des Isles de l'Orient, du Japon, de la Chine, etc., et des resolutions qui y sont arrivées depuis quelques années. Le tout traduit de l'Allemand et augmenté par A de Wicquefort, résident de Brandebourg. Tome II: Paris: 1659.
- P. 292—1639. “Aupres d'Oriza, en tirant vers le Nort, est le Royaume de Bengala, qui donne le nom au Golfe, que les anciens nommoient Sinus Gangeticus. Il s'y fait un grand trafic de ris, de sucre et de coton, mais principalement de soyes, que l'on estime les meilleures de toutes les Indes. Les plus belles cannes, que l'on nous apporte, viennent de Bengala, où il croist aussi une auté forte de cannes, qui sont bien plus fines que l'osier; de sorte que l'on en fait des vases, qui estans enduits de acqûe par dedans contiennent l'humidité, aussi bien et aussi long-temps, qu'un verre, ou qu'une gondole d'argent. Il y croist aussi une certaine herbe, laquelle poussant au bout de sa tige, qui a un bon doigt d'espois, un gros bouton, fait comme une houpe, que l'on file et l'on en fait de forte belles estoffes. Les Portugais l'appellent Herba de Bengala, et l'on en fait des tapis et des couvertures, ou ils representent toutes sortes de figures.”
- P. 80.—a Man.
- Akaranga Sutra (Sacred Books of the East, series vol. XXII)*. Translated by HERMANN JACOBI.
- p. 84. The pathless country of the Ladhas (Rahr).

BIBLIOGRAPHY

- Bengal Nawabs. Containing Āzād-āl Husaini's Naubahāri-i-Murshid Quli Khāni, Karam 'Ali's Muzaffarnāmah, and Yusuf 'Ali's Āhwāl-i-Mahabat Jang. Translated into English by JADU NATH SARKAR. [Asiatic Society: Calcutta 1952.]
- p. 3. "The Chowk (Market square) of Dacca had not been constructed in Azam Shah's time. Nawab Murshid Quli Khan II has now (1729) made the Chowk so nicely as to delight the heart. Azam Shah, by abolishing the octroi duty (mahsul) made all things cheap in the town. Betel leaf and tobacco, which were comparatively dear, were reduced in price (by him) and the reduction still continues. Grain was so cheapened that for one-eight of a *jital* a pucca seer of rice and other kinds of grain could be bought (at that time)". Also see the foot note.
- p. 5. "a convoy of artisans such as stone-cutters, carpenters, miners, battery-builders, fire-workers, water-carriers, (hut) builders, farriers, surgeons (bina dozan); barbers, and tailors, and provisions of grain, sheep, goats, ghee, etc., as well as cooked bread (nan, chapati), bread of fine flour (kalicha) and whey (ponir)".
- Bengal in the sixteenth century A.D. By J. N. DAS GUPTA. University of Calcutta, 1914. Lectures V and VI. European Travellers in the 16th century A.D.
- Book of the Knowledge*.—Of all Kingdoms, lands, and lordships that are in the world, and the arms and devices of each land and lordship's, or of the Kings and lords who possess them. Written by a Spanish Franciscan in the middle of the 14th century. Published for the first time with notes by Marces Jiménez de la Espada in 1877. Translated and edited by CLEMENTS MARKHAM. London: Printed for the Hakluyt Society, 1912.
- p. 43. The empire of Armalec (Armalec—Bengal (?)). "Afterwards I departed from the Kingdom of Viguy (i.e., Bijaya-nar or Narshing) and passed over a gulf of the Indian Sea which they call the Gulf of Bengala of the empire of Armalec, and it is the capital of the Kingdom".
- p. 44. "On leaving Java I returned to the Kingdom of Oxanap (Burma?) and took the way of the Kingdom of Armalec (Bengal) which has extensive provinces and many cities.
- Banglar Sangit (Prachin Yug). By RAJESWAR MITRA, Calcutta.
- Dashakumar Charita (7th A.D.). Translated by A. W. RYDER, University of Chicago.
- p. 62. Champa, the Anga capital.
- p. 122. Pundra.
- p. 157. The city Damalipta in the Suhma country.
- p. 185. Kalinga.
- Fan Fan Yu*—being a Chinese Dictionary of Indian Geographical names compiled in 517 A.D. from literature and accounts of travellers. The Chinese text transcribed into Deva nagari and rendered into Sanskrit for the first time by RAGHU VIRA, together with restoration of Indian names both Geographical and literary. Lahore, 1943. p. 30. Tamralipti.
- (A) History of Hindu Chemistry. From the earliest times to the middle of the 16th century A.D. with Sanskrit texts, variants, translation and illustrations. By P. C. RAY.
- (A) History of Hindu Chemistry. Vol. I, Calcutta, 1902.
- (A) History of Hindu Chemistry. Vol. II. 2nd Edition, Calcutta 1925.
- (A) History of Persian Navigation. By HADI HASAN. London.
- p. 145. "The maritime activity of Persia, however, was not confined merely to the Western coast of the Indian peninsula: there was an important colony of Persian merchants in Bengala, the hononymous capital of the Province of Bengal."
- (also see Duarte Barbosa, and Ludovico Varthema.)
- Also see, India in the 15th century (Haklyut Society: R. H. Major).
- p. 143. "..... and many stuffs from the Kingdom of Cambay, Chaul, Dabul, and Bengala, which are called Sivabases, Chantars, Mamonas, Dugasas, Soranatis, which are kinds of stuffs of cotton very much valued which are made use of by the Arabs and Persians, and people of Cairo, Aden and Alexandri".
- p. 146. Bengal as one of the cosmopolitan ports.
- p. 146. n. 4. a reference to Varthema.
- The History of the Great and Mighty Kingdom of China and the situation thereof (16th century). Compiled by the Padre JUAN GONZALEZ DE MENDOZA. London. The Hakluyt Society; MDCCCLIV.
- p. 322. "From this Kingdom (i.e., Arakan) amongst the same coast, you came unto the Kingdom of Vangala.....".
- List of Europeans and others in the English Factories in Bengal at the time of the siege of Calcutta in the year 1756. By S. CHARLES HILL; Calcutta, 1902.
- Lac and the Lac-insect in the Atharva-Veda. By K. N. DAVE; Nagpur, 1950.
- Major James Rennell. By C. R. MARKHAM. London, 1895.
- p. 91. The section entitled, D'Anville and Rennell. The disagreement between

BIBLIOGRAPHY

- the two was in respect of the position of Palibothra.
- p. 96. Judgment on the Map of Hindustan, (also see Journal and Proceedings of the Asiatic Society of Bengal, vol. VI, 1910 (new series) p. 543. An essay entitled, The Rivers of the Delta by F. D. Ascoli).
- Mahabharata. Edited by Kaliprasanna Singha, vol. I: Calcutta, 1331 B.S.
- p. 222. Bhima takes a hurricane campaign in the land we call Bengal. Having killed the king of Modagir (Mongher) he fell on mighty King of the Pundras.
- p. 222. Tamralipti.
- Milinda Panha (Sacred Book of the East series, vol. XXXVI, pt. II). Oxford, 1894.
- p. 269. Bengal in a list of maritime countries.
- Muhit. By SIDI ALI CELEBI (1554). (See Gabriel Ferrand's Relation de Voyages et Textes Geographiques Arabes, Persans et Turks relatif a l'Extreme-Orient du VIII^e au XVII^e siècles) vol. 2 Paris; 1914, pp. 484-541. This important work on navigation is well annotated by Gabriel Ferrand).
- Nukhbat Ad-Dhar Fi Adjaib Al-Barr Wa Al-Bahr. By SAMS AD-DIN ABU ABDULLAH SUFI AD-DIMASKI.
- p. 124. On the river of Tipperah (Tripura). (From G. Ferrand's Relation de Voyages et Textes Geographiques Arabas, Persans et Turks relatifs a l'Extrême-Orient du VIII^e au XVIII^e siècles, vol. II, Paris 1914, p. 367).
- On the original Inhabitants of Bharatvarsa or India. By GUSTAV OPPERT.
- (Lex) Privilèges du Commerce Français dans l'Inde.
- Les Paravanas du Grand Mogol.
- Les Traités avec l'Angleterre, etc. Par Edmund Gaudart. Pondichery, 1935.
- (The) Portuguese Expedition to Abyssinia in 1541-1543, as narrated by CASTANHOSO. London: The Hakluyt Society. MDCCCIII.
- p. 151. "..... a woman's coif from Bengal and a scarlet cap, and a burnoose with its veil.....".
- Peter Floris. His voyage to the East Indies in the globe (1611-1615). Edited by W. H. MORELAND. London: The Hakluyt Society.
- p. 132. Hans de Hase intended to plant a factory in Bengal.
- Relation de voyages et Textes Geographiques Arabes, Persans et Turks relatifs a l'Extrême-Orient du VIII^e au XVIII^e siècles Traduits, revus et annotés par Gabriel Ferrand Tome deuxième. Paris, 1914.
- Ramacharitam Sandhyakarananan Birachitam. Edited with Sanskrit Commentaries and English translation. By Messrs. R. C. MAJUMDAR, RADHAGOVINDA BASAK and NANIGOPAL BANERJI; Varendra Research Museum; Rajshahi.
- Studies in Indian Antiquities. By HEM-CHANDRA ROY CHOUDHURY, Calcutta University Press, 1932.
- p. 184-192—Banga Kon Desh. The essay deals with (i) the extent and Position of Bengal, (ii) the Greater Vanga and lesser Vanga, (iii) the so called city "Bengal", etc.
- Sadik Isfahani, died 1860 (?). (See Gabriel Ferrand's Relation de voyages et Textes Geographiques Arabes, Persans et Turks relatifs a l'extrême-Orient du VIII^e au XVIII^e siècles pp. 559-561.)
- (The) Suma Oriental of Tome Pires. An account of the East, from the Red Sea to Japan, written in Malacca and India in 1512-1515 and the Book of Francisco Rodrigues. Rutter of a voyage in the Red sea, nautical rules, almanack and maps, written and drawn in the East before 1515. Translated from the Portuguese Ms. in the Bibliothèque de la Chambre des Députés, Paris, and edited by Armando Corsesao.
- In two volumes.
- London: The Hakluyt Society, 1944.
- Pp. XXIX; XXX; IXIV. (The Lisbon Ms. No. 229).
- pp. 88-95. Bengal to Indo-China.
- (Bengal-Arakan-Pegu-Siam-Burma-Cambodia-Champa-Cochin-China.)
- pp. 17; 42; 45.
- pp. 63-64. Narsinga. p. 84.—Ceylon.
- Studies in Indo-Muslim History. A critical commentary on Elliot and Dowson's History of India as told by its own historians. By SHAHPURSHAH MORMASJI HODIUALA. Bombay, 1929.
- pp. 4-6. About the Kingdom of Ruhmi as described by the arab travellers Sulaiman and Masudi.
- (The) Travels of Pedro Teixeira (1586). London: Hakluyt Society. MDCCCII.
- See also Biographic Universelle T. XLI, p. 206 for the life of Pedro Teixeira. Pedro Teixeira probably came to India in 1586. See p. IV.
- p. XLVI. "..... The English are coming into the south sea..... have captured on this coast (i.e., Goa) two of our ships that were going to Bengalla.....".
- p. LXXXVIII. "..... three or four ships that were going with money to Bengala.....".
- p. 165. "Nevertheless, some ships, and specially those from Cochin take it in as ballast, and carry it to Bengal, where scarcity gives it a value. For all lands thereabouts is no salt made, but in the Isle of Sundiva alone". (See also Hunter's Imperial Gazetteer of India.)

BIBLIOGRAPHY

- A letter, dated 29th Dec., 1610, from the Viceroy of India replying to one from the king of Spain, refers to the revenue from salt in Sundiva, which Philippe de Brito reported, "was of importance, and might become considerable. Note by Donald Ferguson.
- (The) Travels of the Abbé Carré in India and the Near East (1672 to 1674). In three volumes. London: The Hakluyt Society. p. 156. How English Factories preserved their good management.
p. 440 French trade with Bengal, also see p. 792.
- Travels of Fray Sebastien Manrique (1629-1643). A translation of the *Itinerario de Las Misiones Orientales* with introduction and notes by C. ECKFORD LWARD assisted by H. HOSTEN S. J.
In two volumes.
Vol. I. Oxford: MCMXXVII. pp. XIX-LXVI. General map of Manrique's voyages. From Rome to Manila, etc., through Damascus, Ispahan, Delhi, Harshapur, etc., etc.
Section I—Journey to Arakan, May 1628 to April 1637. Very well annotated.
Do. Vol. II: China, India, etc. Oxford: MCMXXVII. (These two volumes are published from the Hakluyt Society—New series.)
- (The) Voyages of Captain Don Felipe Gonzalez to Easter Island. (1770-71): London: The Hakluyt Society, 1903.
p. Lii. "It was just at this time (i.e., around 1768) that an extraordinary report reached the ears of certain officials of the French Government in Bengal, who were fitting out a vessel, for the Indonesian trade.....".
See also n. 1.
- (The) Voyages and Works of John Davies, the navigator. Edited by A. H. MARKHAM. London: MDCCCLXXX. The Hakluyt Society.
p. 130. Porto Grande in Bengala. Probably Chittagong.
- (The) Voyages of Sir James Lancaster to the East Indies. (17th century). Edited by C. R. MARKHAM. London: The Hakluyt Society, MDCCCLXXVII.
p. 9. Bengal on the route to cape Comorin.
p. 85. A portuguese merchant from Bengala.
pp. 263-277. A Calendar of the Ships' journals preserved in the India office. (Written within the 17th Century).
- (The) Voyage of Francois Leguat. London: The Hakluyt Society. MDCCCXCI. Vol. II, p. 213. The ship "Heureux" which was going to Bengal lost near the Isle of Palms.
- Vaidyakasabdasindhu or a Comprehensive Lexicon of Hindu Medical Terms and names of Drugs. With their synonyms in Latin, Sanskrit, Hindi, Talegu, Bengali, etc., with copious references to, and quotations from standard works. Compiled by UMESHCHANDRA GUPTA. Calcutta, 1894.
- Catalogue of the Globe Nursery. For information re: varieties of fruits, flowers seeds, vegetables, etc.
- Report on the Button Industry in Bengal. By D. N. GHOSE. B. G. Press, 1941.
- Report on an enquiry into conditions of labour in the Bidi, Cigar and Cigarette industries. By D. V. REGE. New Delhi, 1946.
- Report on the Results obtained in the experiments for improving Sericulture in Bengal. By F. D. LAFONT. B. S. Press, 1914.
- Science and Culture VII. Pp. 233-39. Antiquity of the Lower Ganges and its courses.

BIBLIOGRAPHY

POSTSCRIPT TO BIBLIOGRAPHY OF JOURNALS, MEMOIRS, ETC.

(The following additional information has been collected since the main bibliography went to press)

- Istak silpa prasar, by Nirmal Datta, Jugantar 20th April, 1953, p. 8, a short note on the brick industry.
- Journal Asiatique. Tome cxxxvi, 1948, p. 11. Sur d'anciennes instructions nautiques arabes pour les mehs de l'Inde. By Par J. SAUVAGET.
- Journal Asiatique. Tome cciv. MDCCCCXIV Avril—Juin—1924, p. 193, L'éyément persan dans les textes nautiques arabes des XVe et XVIe siècles. By Par GABRIEL FERRAND.
- An exhaustive critical study of the two arabic mss. 2292 and 2559 lying in the Bibliothèque Nationale.
- (The) Journal of the Royal Asiatic Society of Great Britain and Ireland (1913), London: 1913. P. 127. A passage in Periplus. By J. KENNEDY.
- Journal Asiatique. Dixième Série. Tome XX Paris: MDGGGGXII. Juillet—Août—1912, p. 547. Les sources Arabes du Muhit Turc. (Also see JASOB, vol. III, 1834, p. 546. "Sidi Ali Capudon's (captain) work, according to the announcement in its preface, has been compiled out of no less than ten Arabic works on the Geography and Navigation of India, three ancient, and seven modern ones").
- Journal Asiatique. 11e Série Tome XI. No. 3. Mai—Juin—1918. P. 391. Malaka, le Malayu et Malayur. Par GABRIEL FERRAND. P. 400. Un autre ouvrage du même auteur (c-à-d Ibn Madjid):
- "Livres des renseignements utiles sur les bases et les principes de la science nautique," ouvrage en prose, qui est daté en toutes lettres de 895 de l'hégire=1489-1490, contient au folio 74 Vo, l.1 et suiv., des renseignements sur "le voyage au Bengale et dans les pays voisins.
- The complete name of Ibn Madjid is: SIHĀB AD-DĪN AHMAD IBN MĀDJID. He was a muallam or captain. About the definition of "muallam" see Ayn-i-Akbari, p. 406. Vasce de Gama on Bengal. P. 415. Lancharas. Also see Jal's Glossaire Nautique, Paris 1848, second volume, p. 908. Nom d'un navire indien. P. 420—Comme le roi Parimiçura avait bon caractère et traitait bien les gens qui venaient dans ce port (de Malaca), les gens de Pacé' (=Pase) et du Bengale commencèrent à venir faire du commerce avec ceux de Malaca. Cf. Commentaries d' Albuquerque. T. III. Chap. XVII. P. 428—Il y a quatre Xabandar (exactement Sah-bandar, litt. "le roi du port". Cette expression persane est passée en arabe et dans presque toutes les langues maritimes de l'océan indien. Cf. Hobson—Jobson.) de chacune des nations suivantes: Chine, Jaoa, Cambaya et Bengale. cf. *op. cit.*
- Journal Asiatique, vol. 9, 1826, p. 27. Juillet, 1826.
- Miroir des pays, ou relation des voyages de Sidi Aly fils d' Housain, nommé ordinairement Katibi Roumi, amiral de Soliman II, traduite sur la version allemande de M. de Diez, par M. Morris (appeared serially).
- Journal of the China Branch of the Royal Asiatic Society—vol. XX (new series), 1885. P. 209—Article No. IX. The sea-ports of India and Ceylon, described by Chinese voyagers of the Fifteenth century, together with an account of Chinese navigation. By GEORGE PHILLIPS.
- Journal of the China Branch of the Royal Asiatic Society—vol. XXI, Nos. 1 and 2. (New series) 1886, p. 30. Article No. III. The conclusion of the above article. Both the articles contain maps with key to the names of places on the map.
- Journal Asiatique N. Série. Tome XV. Pp. 297-341; pp. 401-468.
- Les Missious de Wang Hiuen—TS'e dans l'Inde. Par SYLVAIN LEVY.
- Journal of the Indian Society of Oriental Art, Vol. XVII. Calcutta: 1949. An Early Pak Ivory. By SHERMAN, E. LEE.
- Journal of the Indian Society of Oriental Art, Vol. XVII. Calcutta: 1949. P. 51—The Commercial Embroidery of Gujarat in the seventeenth century. By JOHN IRWIN.
- Memoirs of the Asiatic Society of Bengal, Vol. VIII (1922-1929), pp. 201-237. The fishing methods of the Ganges. By JAMES HORNELL.
- Amrita Bazar Patrika, May 15, 1953. Mangoes of Malda. By MUKUL GUPTA.

ACKNOWLEDGEMENTS

The following gentlemen of the Census Office, West Bengal, have been of great assistance in the preparation of this volume. I desire to express my obligation to them :

Sri Binaybhushan Sengupta
Sri Satyajiban Pathak
Sri Prabirchandra Sengupta
Sri Bimalkumar Mitra
Sri Sachindranath Mukherjee
Sri Bhudeb Banerjee
Sri Himangshusekhar Sen
Sri Manindranath Sarkar
Sri Jitendranath Bose
Sri Ramchandra Bhar
Sri Birendrakumar Chakravarty
Sri Guruprasad Datta

I wish to express my appreciation of the work of Sri Raj Birendra Mitra and Sri Provat Kumar Banerjee of the Government of India Press for their dispatch and willingness to listen to a layman's suggestion.

ASOK MITRA

**List of Agents in India from whom
Government of India Publications are available.**

AGRA—

English Book Depôt, Taj Road.
National Book House, Jeumandi.
Wadhwa & Co., Raja Mandi.

AHMEDABAD—

Chandra Kant Chiman Lal Vora, Gandhi Road.
Indradhanu Book House Ltd., Mission Road, Bhadra.
New Order Book Co., Ellis Bridge.

AJMER—

Banthyia & Co., Ltd., Station Road.

AKOLA—

Bakshi, Mr. M. G.

ALLAHABAD—

Central Book Depôt, 44, Johnston Ganj.
Kitabistan, 17-A, City Road.
Law Book Co., Post Box No. 4, Allert Road.
Ram Narain Lal, 1, Bank Road.
Supdt., Ptg. & Stationery, U. P.
University Book Agency (of Lahore), Post Box No. 63.
Wheeler & Co., Messrs. A. H.

ALWAR—

Jaina General Stores, Bazaza Bazar.

AMBALA CANTT.—

English Book Depôt.

AMRITSAR—

Peoples' Book Shop, Court Road.
Sikh Publishing House Ltd., Court Road.

BANARAS—

Banaras Book Corporation, University Road, P. O. Lanka.
Students Friends, University Gate.
*Hindi Pustak Agency.

BANGALORE—

Book Emporium, Messrs. S. S., 118, G. H. Extension
Basavangudi P. O.
Vichara Sahitya Ltd., Balepet.

BAREILLY—

Agarwal Bros., Bara Bazar.
Sahitya Niketan, Pulkazi.

BARODA—

Good Companions.

BIKANER—

Goyal & Co.

BOMBAY—

Clifton & Co., P. O. Box No. 6753, Sion, Bombay-22.
Co-operators' Book Depôt, 9, Bakehouse Lane, Fort.
Current Book House, Hornby Road.
Dutt & Co., P. O. Box No. 6014, Parel.
Lakhani Book Depôt, Bombay-4.
National Information & Publications Ltd., National House.
New Book Co., Kitab Mahal, 188-90, Hornby Road.
Popular Book Depôt, Grant Road.
Supdt., Government Printing & Stationery, Queens Road.
Sydenham College Co-operative Stores, Ltd., 90, Hornby
Road.
Taraporevala Sons & Co., Messrs. D. B.
Thacker & Co., Ltd.
Tripathi & Co., Messrs. N. M., Princess Street, Kalvadebi
Road.
Wheeler & Co., Messrs. A. H.

CALCUTTA—

Chatterjee & Co., 3, Baha Ram Chatterjee Lane.
*Hindi Pustak Agency, 203, Harrison Road.
Hindu Library, 69-A, Bala Ram De Street.
Lahiri & Co., Ltd., Messrs. S. K.
Newman & Co., Ltd., Messrs. W.
R. Cambray & Co., Ltd., Kent House, P-33, Mission Row
Extension.
Roy Chowdhury & Co., Messrs. N. M., 72, Harrison Road.
Sarkar & Sons Ltd., Messrs. S. C. 1/1/1C, College Square.
Standard Law Book Society, 41, Beltala Road, Bhowanipur
P. O.
Thacker, Spink & Co. (1933) Ltd.

CHAMBA—

Chamba Stationery Mart.

CHANDAUSI—

Mr. Madan Mohan.

CUTTACK—

Press Officer, Orissa Secretariat.

DEHRA DUN—

Jugal Kishore & Co.

DELHI—

Atma Ram & Sons, Publishers, etc., Kashmere Gate.
Bahri Brothers, 188, Lajpat Rai Market.
Federal Law Depôt, Kashmere Gate.
*Hindi Pustak Agency.
Imperial Publishing Co., 3, Faiz Bazar, Darya Ganj.
Indian Army Book Depôt, 3, Darya Ganj.
Jaina & Bros., Messrs. J. M., Mori Gate.
M. Gulab Singh & Sons.
Metropolitan Book Co., Delhi Gate.
N. C. Kansil & Co., Model Basti, Lane No. 3.
New Stationery House, Subzimandi.
Technical & Commercial Book Depôt, Students Park,
Kashmere Gate.
Youngman & Co. (Regd.), Egerton Road.

FEROZEPUR—

English Book Depôt.

GORAKHPUR—

Halchal Sahitya Mandir.

GWALIOR—

Jain & Bros., Messrs. M. B., Sarafa Road.
Mr. P. T. Sathe, Law Book Dealer

HYDERABAD (DECCAN)—

Hyderabad Book Depôt.

INDORE—

Students and Studies, Sanyogitaganj.

JAIPUR CITY—

Garg Book Co., Tripola Bazar.
Vani Mandir, Sawai Mansingh Highway.

JAMMU (TAWI)—

Krishna General Stores, Raghunath Bazar.

JHANSI—

Bhatia Book Depôt, Sadar Bazar.
English Book Depôt.

JODHPUR—

Kitab Ghar, Sojati Gate.
Mr. Dwarkadas Rathi.

List of Agents—contd.

JULLUNDUR CITY—

Excelsior Book Depôt, Baz Baharwala.

KANPUR—

Advani & Co., The Mall.
Sahitya Niketan.
Universal Book Stall, The Mall.

KOLHAPUR—

Maharashtra Grantha Bhandar.

LUCKNOW—

J. Ray & Sons (India), Ltd., Hazarat Ganj.
Law Book Agency, 29-A, Kachery Road.
New Oxford Book Co., Jehangirabad Palace.
Universal Publisher Ltd., Plaza Building, Hazarat Ganj.
Upper India Publishing House, Ltd., Literature Palace,
Aminuddaula Park.

LUDHIANA—

Lyall Book Depôt.
Mr. Dharam Prakash, B.Sc., Banjiman Road.

MADRAS—

Divine Trading Co., 22, Namashivaya Mudali Street,
Triplicane.
Higginbothams.
K. Krishnamurthi, Mount Road.
Presidency Book Supplies, 8-C, Pycrofts Road, Opposite
Victoria Hostel, Triplicane.
Supdt., Government Press, Mount Road.
Varadachary & Co., Messrs. P.

MANGALORE—

U. R. Shenoy & Sons, Car Street.

MEERUT CANTT.—

Mr. Dharam Prakash, B.Sc.

MEERUT CITY—

Prakash Educations Stores, Near Tehsil.
University Book Depôt, Near Tehsil.

MYSORE—

J. Nanumal & Sons, Lansdowne Building.

NAGPUR—

Supdt., Government Printing, Central Provinces.

NEW DELHI—

Amrit Book Co., Connaught Circus.
Bhavnani & Sons, Connaught Place.
Bodh Raj Marwah, Shop No. 65, Pussa Road Market,
Karol Bagh.
Chifton & Co., Original Road, Karol Bagh.
Empire Book Depôt, 278, Aliganj, Lodi Road.
English Book Store, G-Block, Connaught Circus.
Faqir Chand Marwah & Sons, No. 1-A, Regal Building,
Connaught Circus.
Harikishan Das Bedi, R.S. 22, Annexe Feroze Shah Road.
J. Ray & Sons (India), Ltd., 2, Regal Building.
Jain Book Agency, Connaught Place.
Jayna Book Depôt, Chapparwala Kuan, Karol Bagh.

Oxford Book & Stationery Coy., Scindia House.
Ram Krishna & Sons (of Lahore), 13/13, Connaught Place.
Saraswati Book Depôt, 15, Lady Hardinge Road.
Sikh Publishing House, Ltd., 7-C, Connaught Place.

PATIALA—

Jainco, Booksellers, etc., Bazar Shaha Nashin.

PATNA—

Sohan Singh & Sons, Pirmohani, P. O. Kadam Kuan.
Supdt., Government Printing, Bihar, P. O. Gulzar Bagh.

PATNA CIVIL—

*Hindi Pustak Agency.
Lakshmi Trading Co., Padri-ki-Haveli.
Raghunath Parshad & Sons.

POONA—

Deccan Book Stall, Fergusson College Road.
Express Book Service, East Street.
International Book Service, Deccan Gymkhana.

PUDUKKOTTAI—

P. N. Swaminathan Sivam & Co., Perumal Vilas, Bazar
Street.

RAJKOT—

Mohan Lal Dosabhai Shah.

RANCHI—

Ideal Book Store, Near Paristhan Theatre, Main Road.

ROORKEE—

Cambridge Book Depôt.

SHILLONG—

Supdt., Assam Secretariat Press.

SIMLA—

J. Ray & Sons (India), Ltd.
Azad Kitab Mahal, Stall No. 13.
Minerva Book Shop, Regal Cinema Building.
Sunder Das & Sons, 141, Lower Bazar.

SIROHI—

National Trading Co.

SURAT—

Sree Gajan Pustakalaya, Tower Road.

TRICHINOPOLY FORT—

Krishna Swami & Co., Messrs. S., Teppakulam.

TRIVANDRUM—

International Book House, 33, Valia Chalai.

UDAIPUR—

Mewar Book Depôt.

UJJAIN—

Manakchand Book Depôt, Patni Bazar.

VELLORE—

Venkatasubban, Mr. S., Law Bookseller.

*For Hindi Publications only.