

*H. C. Rawal*

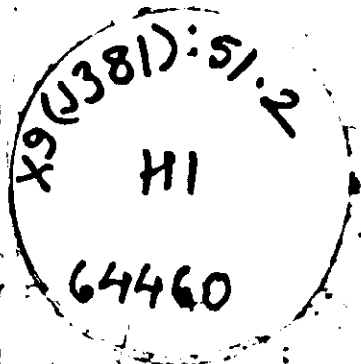
Marketing Series No. 27.

AMA. 20.  
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**AGRICULTURAL MARKETING IN INDIA**

**Report on the  
MARKETING OF RICE  
IN  
INDIA  
AND  
BURMA**



**PUBLISHED BY THE MANAGER OF PUBLICATIONS, DELHI.  
PRINTED BY THE MANAGER, GOVERNMENT OF INDIA PRESS, SIMLA.  
1921.**

*Price : Rs. 1-4-0 or 2s.*

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## INTRODUCTION.

In point of acreage as well as total value of production, the rice crop ranks foremost in Indian agriculture, and since about two-fifths of the total crop are put on the market its importance as a cash crop is obvious. This survey has revealed that under the present system of marketing the producer gets a poor return amounting on an average only to eight and a quarter annas of the rupee paid by the consumer in India in respect of the major part of the marketable surplus. The main object of this report is to show how the growers' returns can be enhanced.

The chief factors responsible for the growers' low share margin as brought out by this survey are the use of seed having an admixture of inferior types, inefficient handling at the harvesting stage, wastage in hulling, disproportionate margins earned by intermediaries in the process of assembling and distribution, malpractices and excessive deductions in the markets, non-existence of recognised standards of quality, lack of uniformity in weights and measures and exorbitant interest charges paid on loans incurred for seed and financing the cultivation of the crop. Even the town dweller is responsible for reducing the cultivator's price through municipal octroi, etc.

The difficulties attending the compilation of this report were enormous owing to the large number of varieties, the confusing multiplicity of trade descriptions and the absence of recognised standards of quality. Attempts have, however, been made to present all the essential details as concisely as possible, and so as to indicate the scope that exists for improving the marketing of rice.

The objective cannot, however, be attained merely by writing a report. To bring about improvement in the existing system, many aspects have to be tackled. If the agriculture and co-operative departments, the marketing staff, the government and the municipal organisations in the various provinces and States, and above all the trade and the producers co-ordinate their efforts, a substantial measure of success can be expected. The Central Marketing Staff have already covered a good deal of ground especially in regard to standardisation of qualities and the results achieved so far have been encouraging.

Thanks and acknowledgments are due to the many producers, traders, exporters, manufacturers and others for their kind and friendly co-operation with the marketing staff in getting this report out.

NOTE.—The Government of India should not be regarded as assuming responsibility for all or any of the material contained in this report.

**FOR THE SAKE OF CONVENIENCE  
READ THE INTER-CHAPTERS AT  
PAGES 99, 133, 202, 243, 284, 316, 348,  
378, 409, 432, 451, 468 AND " CONCLU-  
SIONS AND RECOMMENDATIONS "   
ON PAGE 472.**

**OFFICE OF THE AGRICULTURAL MARKETING ADVISER  
TO THE GOVERNMENT OF INDIA,**

**DELHI :**

*January, 1941.*



## CHAPTER I.—SUPPLY.

### INDIA.

#### A.—Introduction and historical.

Rice (*Oryza sativa*) is the principal food crop of the plains in the tropical and sub-tropical parts of South-eastern Asia and one of the oldest cultivated food grains. It thrives best in high temperatures and abundant moisture and the crop is generally grown in fields susceptible of being flooded at certain stages of its growth. Hence the greatest areas under rice are located in river deltas, in low-lying coastal districts and in tracts subject to inundation during the summer rains. Where the water supply is abundant and the summers sufficiently warm, rice may also be grown in hill tracts at high elevations as, for example, in Kashmir where comparatively large areas are put under this food grain in the wide gently sloping valley of the river Jhelum at an average height of some 5,000 feet. Rice culture also exists in the Kangra Valley of the Punjab and along many of the lower slopes of the Himalayas in the United Provinces, Bihar and Bengal. For the purposes of cultivation, the hill sides are cut into terraces which are levelled off and embanked by means of *bunds*\* in order to retain the moisture obtained from nearby streams or from rainfall.

It may be interesting to draw attention to a significant difference between rice and wheat culture. Rice, as already noted, is the main food crop of the densely inhabited tropical and sub-tropical regions. It is raised wholly by manual labour and is in fact the only useful food grain that can be grown under swampy conditions. Wheat, on the other hand, is a crop of the relatively sparsely populated temperate zones. Its cultivation is highly mechanised in all the main exporting countries and is associated with communities whose standards of living are much higher than is the case in the great majority of the rice growing areas.

In its cultivated form, rice has evolved from a wild plant of which some 25 species are distributed over India, Africa, the Phillipine islands, Java and South and Central America. One of these species (*O. sativa L. spontanea*), which occurs in Asia, Indo-China and North Australia, is regarded by certain authorities as being the progenitor of many of the cultivated rice in India and Indo-China, countries to which this cereal is known to have been grown intensively from the most ancient times.

An early reference to rice is considered by some to have been made in the Bible. The keeping qualities of unhusked rice, or as it is more generally called paddy†, has given rise to the supposition that this cereal

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\*A Persian word meaning dam.

†Derived from the *Malay-padi*. The term "paddy" is in general use throughout the great producing countries in the East but in some of the Western countries, e.g., the United States, rice in the husk is referred to as "rough rice".

In this report the word "rice" is taken to mean the product from which the husk has been removed. In certain cases, however, the term is applied in a general sense to the rice crop as a whole. The context will always indicate the interpretation. The use of the word "paddy" is strictly confined to the unhusked product, the form in which the crop is harvested.

may possibly have constituted part of the stores laid up by Joseph during the seven years of plenty when, as the Old Testament states, "he gathered corn like the sands of the sea". Whatever may be the truth underlying this interesting speculation, it is definitely known that the spread of rice to the Western countries had its beginning in early Grecian times and later developed considerably as the result of increasing economic intercourse between the Greeks and the Persians. During the Roman period, rice had become a well-known article of food in the countries bordering the Mediterranean Sea and its cultivation, although comparatively restricted, was by no means uncommon throughout Syria, Palestine, Egypt and the then fertile coastal areas of North Africa. The actual introduction of rice culture into Europe dates from the conquest of Spain in the 8th Century by the Arabs or Moors by whom this cereal was grown in the south eastern parts of their newly subjugated territories.

As regards India, it is impossible to state even approximately when the cultivation of rice first assumed importance in this country but it is curious to note that the first mention of rice in the literature of the period occurs in the last of the Vedic literature—the *Atharva Veda*—as late as 800—1000 B. C., while barley and other food grains were mentioned in earlier works. Indeed barley appears to have been the first cultivated grain in India although in its wild form rice must have formed part of the food of the inhabitants of the eastern and southern parts of the country from the remotest times. The time-honoured religious customs obtaining in many parts of India which entail the use of rice in the form of offerings give some indication as to the great antiquity of this cereal.

#### B.—World production and trade.

World statistics of area and production of rice are somewhat less complete than for certain other crops such as wheat, since the former include large tracts in Asia, concerning which information is either unobtainable or defective in other respects. It will be clear, however, from Appendix I that the world production of rice has increased substantially in the past thirty years as compared with the quinquennium 1909-1913, the average world production (excluding China) between 1909 and 1937 having risen from about 50·4 to 64·4 million tons or by nearly 28 per cent. The countries mainly responsible for this expansion are India, Burma, Siam, Japan, Korea and, to a less extent, Indo-China and the Phillipines.

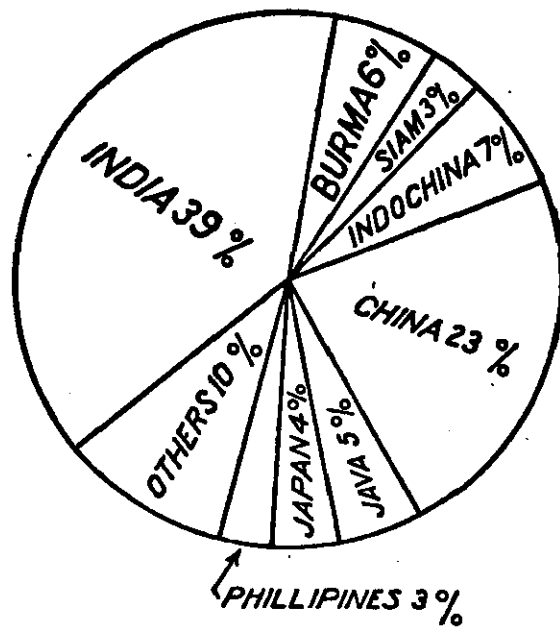
During 1936 and 1937—the latest years for which comparable data are available—the total world output of rice (including China) amounted to 89·9 and 95·9 million tons respectively, of which India's share was 25·7 and 30·9 million tons, representing an average of about 31 per cent of the world's crop. During the same period China's production averaged 31·5 million tons or about 34 per cent of the total world production.

The respective positions of all the chief rice growing countries are illustrated in the diagram opposite page 2. This shows that next

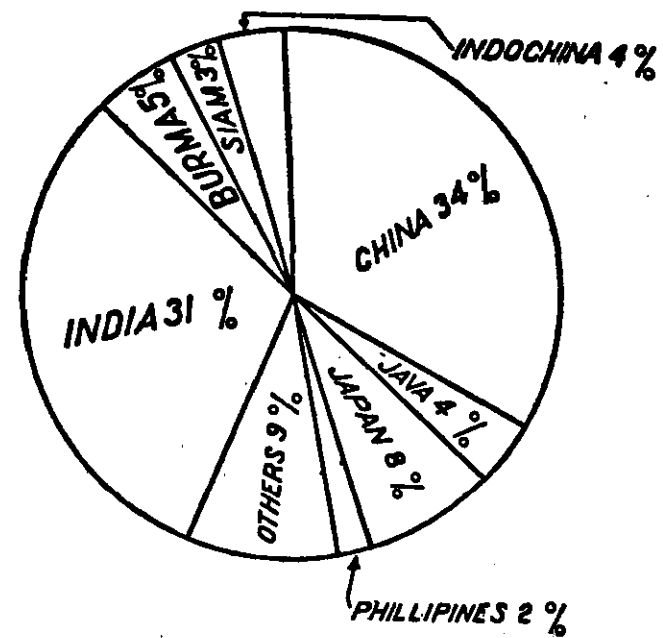
# AREA AND PRODUCTION OF RICE IN THE CHIEF PRODUCING COUNTRIES OF THE WORLD.

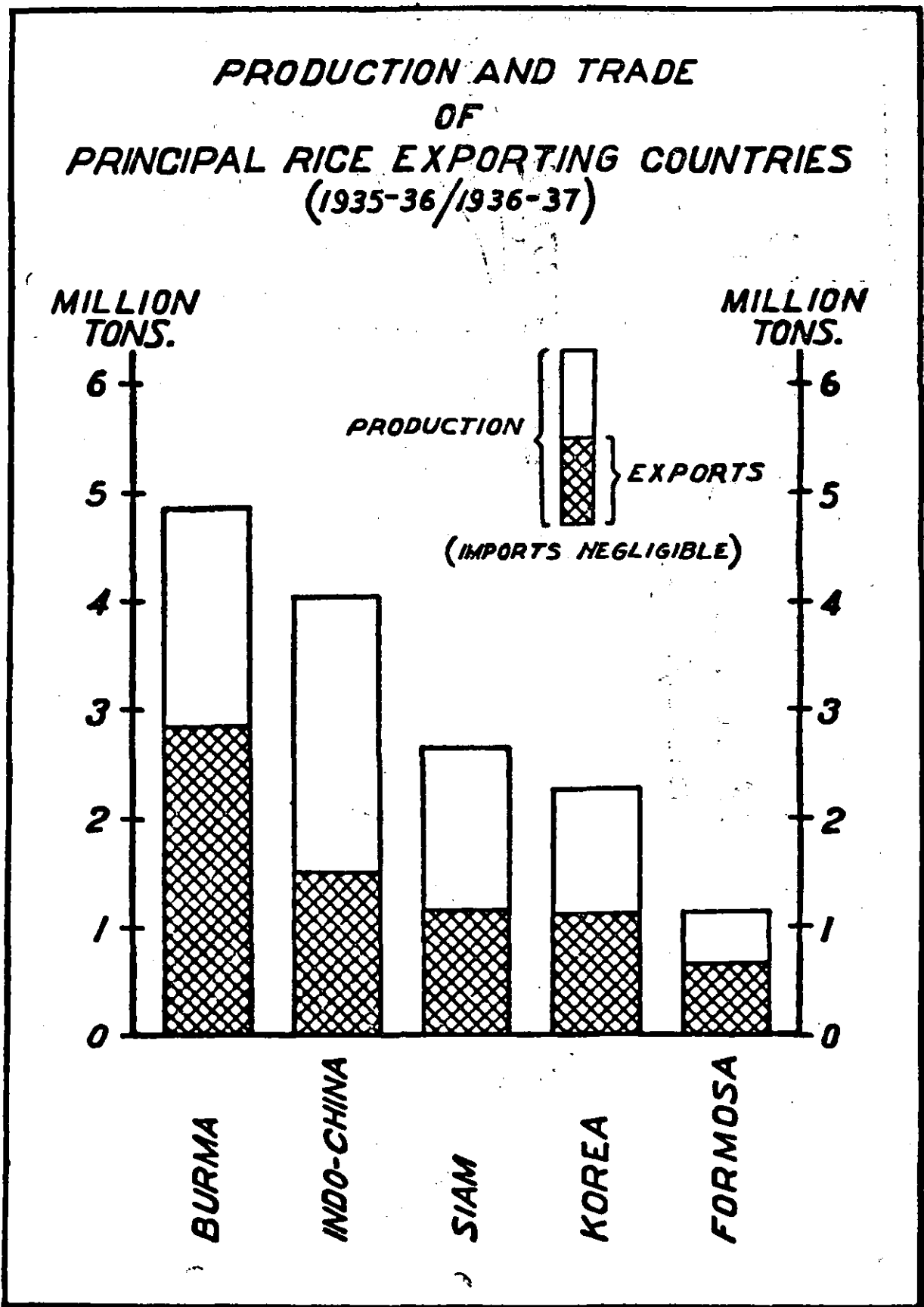
1935-36/1936-37

## AREA



## PRODUCTION





to China and India the other main rice producing areas are in Japan, Burma, Indo-China and Siam. The average crops of these countries in 1936 and 1937 amounted to 7.6, 4.9, 4.1 and 2.7 million tons, representing 8, 5, 4 and 3 per cent of the world's production respectively.

In recent years rice has become the third most important food grain in international commerce and ranks next to wheat and maize. As compared with an average trade of some 6.4 million tons in the five years immediately preceding the War of 1914-18, the average annual volume of international trade in rice had by 1936-38 expanded to about 9 million tons.

Appendix II shows the imports and exports of rice (including paddy) relating to the important countries of the world.

Whereas the European countries are the largest importers of wheat, the chief importers of rice are the densely populated Asiatic countries growing insufficient quantities of this food grain to feed their inhabitants. It is significant, therefore, that while China and India account for practically two-thirds of the entire world production of rice, both these countries are obliged to import on a large scale to supplement their domestic supply even in a year of bumper harvest. It is, for instance, not unusual for India to import 1.5 million tons of rice in a year while in 1934-35 her total imports by sea amounted to nearly 2.6 million tons.

Japan is also an important producer of rice but in spite of a considerable expansion in her domestic production in recent years this has failed to keep pace with the requirements of a steadily growing population. Consequently, Japan draws heavily upon her dependencies, Korea and Formosa, where rice culture has been assiduously fostered and whose export trade has, as a result, developed enormously. Korea and Formosa have, in fact, now become respectively the fourth and fifth largest exporting countries in the world.

Two other countries which have been consistently large importers for many years are Ceylon and British Malaya. Both depend to a great extent for their prosperity upon the plantation industry which finds employment for a large immigrant labouring class from the adjacent countries—notably India—where rice is the staple food of the majority.

In Europe, France is the chief importing country, her supplies being mostly obtained from Indo-China.

The three principal exporters of rice are Burma, Siam and Indo-China. Of these, Burma is by far the most important, with average annual exports amounting to some 3 million tons, equivalent to about 30 per cent of the total world trade, of which roughly half normally goes to India. On an average at least two-thirds of Burma's production of rice is shipped abroad, and the great importance of the rice trade in the economic life of Burma may be gauged from the fact that the value of Burma's rice exports constitutes some 40 per cent of the total

value of her exports and that the greater part of the population is directly concerned in the cultivation, transport and milling of this cereal.

The rice export trade is of equal importance to Siam and Indo-China for, although exports of rice from each of these countries are only about one-third those of Burma, the relative values of such exports normally represent well over 50 and 40 per cent of the total export trade of Siam and Indo-China respectively.

Italy, Spain\* and the United States may not figure largely in the international rice trade from a quantitative view point but their importance lies in the fact that these countries have developed valuable export outlets both in Europe and in America on account of the special quality of their produce. A not inconsiderable proportion of the rice, grown in the above-mentioned countries, consists of large hard-structured translucent kernels capable of taking a high degree of polish and on that account enabling a very attractively got up product to be marketed.

The diagram facing page 3 shows the importance of the rice export trade of the main exporting countries in relation to their domestic production.

### C.—Indian production.

#### (1) NOTE ON AGRICULTURAL STATISTICS RELATING TO RICE.

The two principal all-India publications dealing with agricultural statistics are "Agricultural Statistics of India" and "Estimates of Area and Yield of Principal Crops in India", both issued annually by the Department of Commercial Intelligence and Statistics.

As far as the period up to 1936-37 is concerned the crop statistics referred to in the text of this report and quoted in Appendix III are based on the former publication. This is issued in two volumes (Volume I dealing with British provinces and Volume II with Indian States) and contains complete and detailed statistics relating to area only. Unfortunately, however, "Agricultural Statistics of India" sees the light of day only some two years after the last crop to which it refers has disappeared into consumption. Its utility is, therefore, largely historical. For reference purposes, however, the publication "Estimates of Area and Yield of Principal Crops in India" is more useful as it issues about a year in advance of "Agricultural Statistics of India" and gives both the area and outturn (yield per acre and gross production) of important crops for those British provinces and Indian States for which forecasts are made. Owing to the difficulty of obtaining statistics from certain areas in time for publication in the forecasts certain important tracts are excluded in "Estimates of Area and Yield of Principal Crops in India", so that the figures given in these two publications are liable to differ, in some instance, by an appreciable extent.

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\*Spain's export trade was largely interrupted as a result of the Civil War. With the restoration of peace-time conditions, Spanish rice will re-appear in the world markets.

The three forecasts for rice, which are issued each season from Calcutta by the Department of Commercial Intelligence and Statistics, do not take account of (a) several important areas in the Punjab and in the Madras States of Travancore, Cochin and Pudukottai, which on an average contain about 2 million acres under rice and produce more of this food grain than any one of the seven States or Agencies at present included in the forecasts, (b) Kashmir and a number of minor States accounting for an average area of about 450,000 and 290,000 acres respectively and (c) the Bihar and Orissa Feudatory States (26 in number) now included in the Eastern States Agency for which reliable data are not available but which are reported to have had an average area of some 3.33 million acres under rice during the ten-year period ending 1936-37. It will be seen, therefore, that the forecasts ignore the comparatively large figure of 6.07 million acres or roughly 8 per cent of the area actually seeded.

The published statistics concerning the production of rice do not refer to the grain in the husk or paddy—the form in which the crop is harvested—but are expressed in terms of rice calculated in accordance with varying formulae adopted by different provinces and States. As the conversion factors (ratio of rice to paddy) are discussed in some detail elsewhere in this Chapter, it will suffice merely to indicate here that the methods adopted appear to be responsible for a serious understatement of about 2.8 million tons in the published statistics of total production.

## (2) ACREAGE.

Rice is by far the largest single crop grown in India. The total area under this cereal, based on the average for the decennium 1927-28/1936-37, is reported to have amounted annually to no less than 76.26 million acres representing some 18 per cent of the total cultivated area in India and about 36 per cent of the entire acreage under food crops in this country. In 1937-38 and 1938-39, the area sown to rice is estimated to have amounted to 79.19 and 73.38 million acres respectively. The latest forecast for 1939-40 makes mention of 72.34 million acres but this figure is incomplete for the reasons given in the previous section.

As will be seen from the map facing page 6 and the diagram facing page 24 the rice crop is of unique importance in Bengal, Madras, Bihar, Orissa, the Central Provinces and Assam. Rice is also a very large and valuable crop in the United Provinces and only ranks second to wheat which occupies the greatest area in that province. In Sind, both rice and wheat are of equal importance and individually cover a larger area than any other crop, while in Travancore and Cochin, in South India, rice is the most important local crop. As regards Bombay, although *jawar*, cotton and *bajra* all occupy larger areas, as much as 2 million acres or thereabout are normally sown to rice in that province.

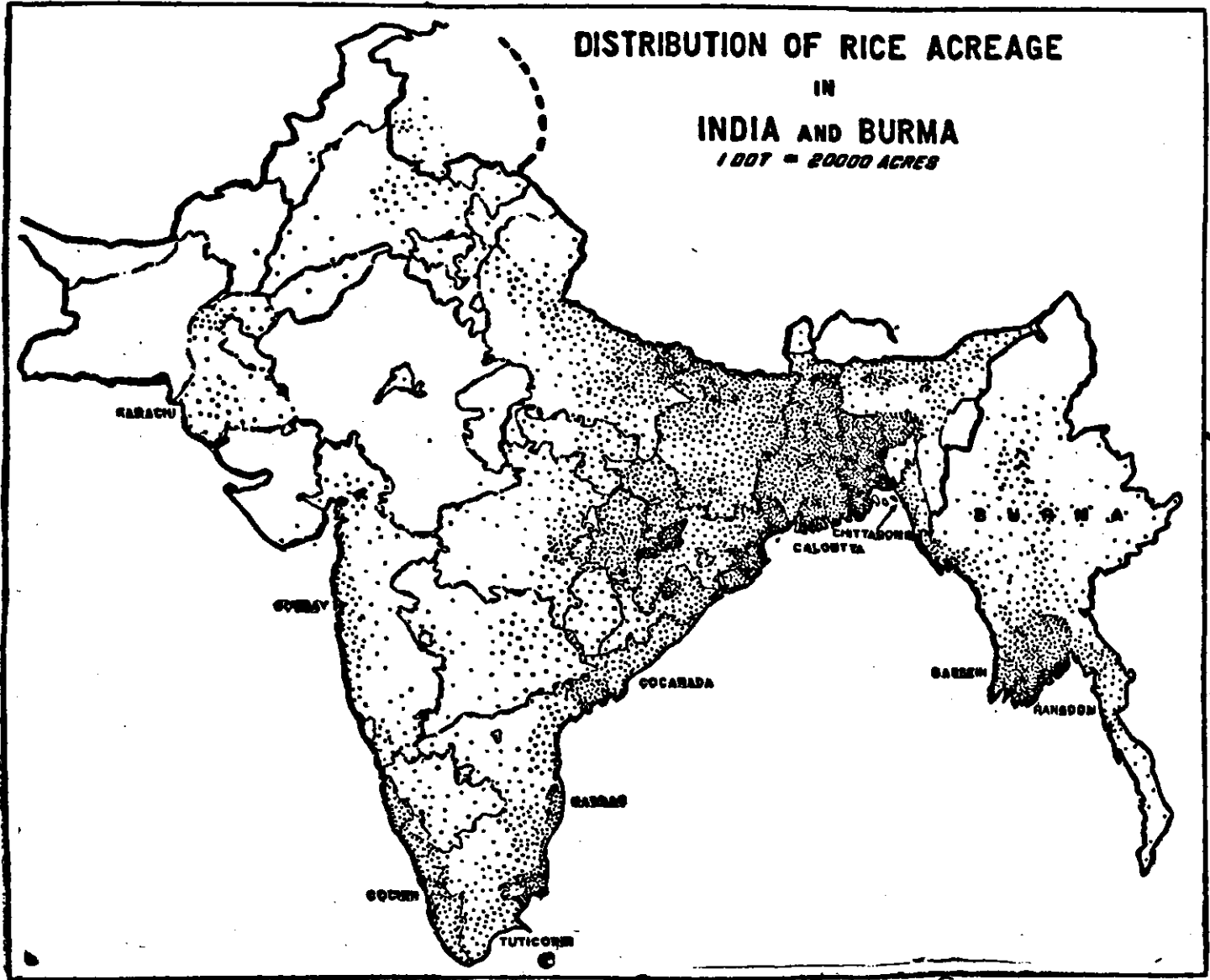
The following table conveniently summarises the more detailed figures given in Appendix III.

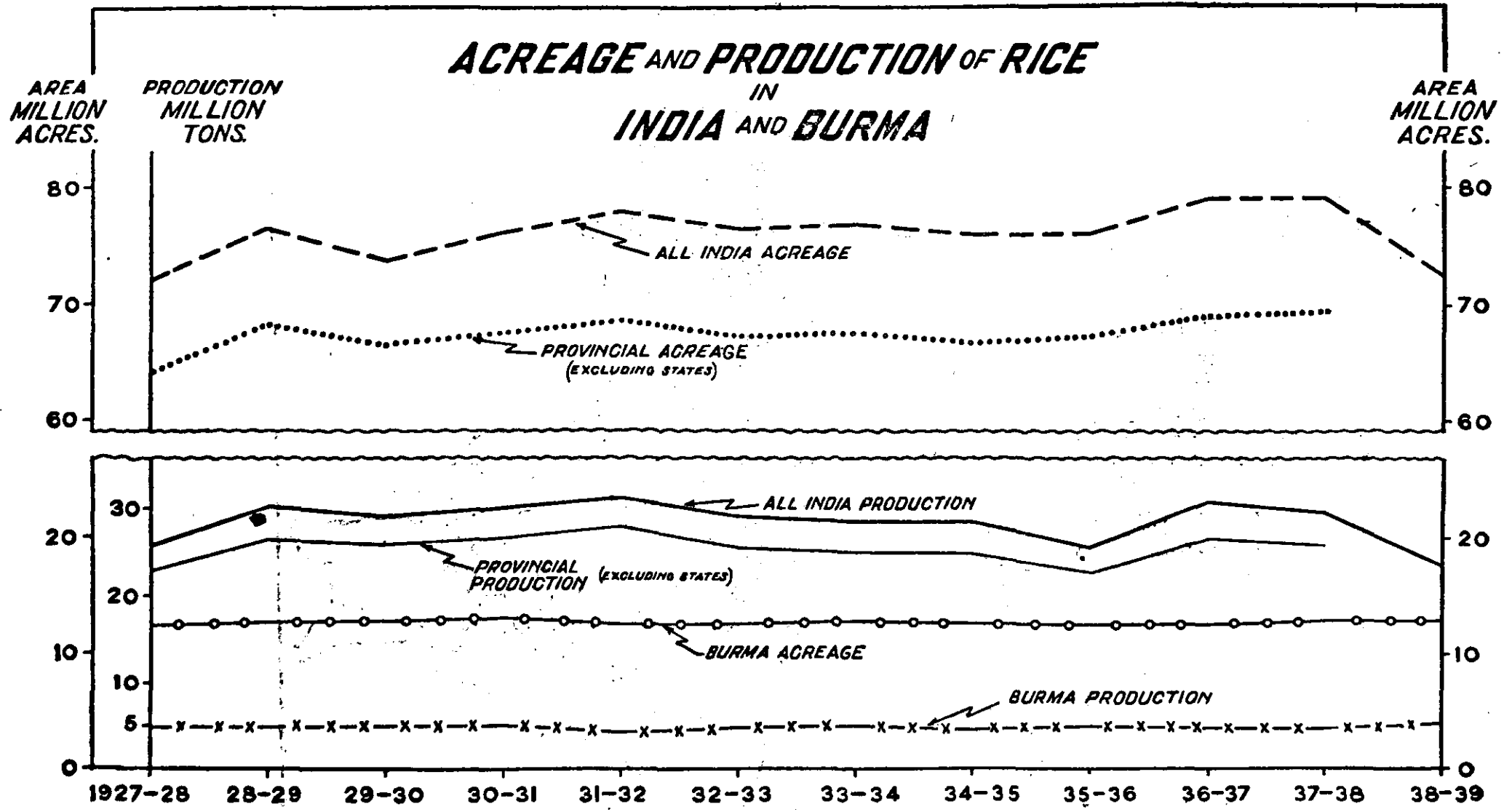
*Area under rice in the main producing areas.*

(Million acres).

Provinces/States.	Average 1927-28/ 1936-37.	Proportion of total area in British India/ Indian States.	Proportion of all- India acreage.	1937-38.	1938-39.
		(British India).			
		Per cent.	Per cent.		
Bengal .. .. .	21.03	31.22	27.57	22.20	21.99
Madras .. .. .	11.04	16.39	14.48	10.14	9.84
Bihar .. .. .	10.26	15.23	13.45	9.51	9.58
United Provinces ..	6.72	9.98	8.81	7.15	7.79
Central Provinces and Berar	5.55	8.25	7.29	5.76	5.84
Assam .. .. .	4.81	7.14	6.31	5.06	5.33
Orissa .. .. .	3.73	5.54	4.89	5.15	5.14
Others .. .. .	4.21	6.25	5.52	4.48	..
<b>Total ..</b>	<b>67.35</b>	<b>100.00</b>	<b>88.32</b>	<b>69.45</b>	<b>..</b>
		(Indian States).			
Feudatory States in Bihar and Orissa.	3.33	37.38	4.36	3.53	..
Central Provinces States ..	1.29	14.48	1.69	2.03	2.03
Madras States .. .. .	1.08	12.12	1.42	1.02	..
Hyderabad .. .. .	0.99	11.11	1.30	0.96	0.95
Mysore .. .. .	0.73	8.19	0.96	0.71	0.74
Others .. .. .	1.49	16.72	1.95	1.49	..
<b>Total ..</b>	<b>8.91</b>	<b>100.00</b>	<b>11.68</b>	<b>9.74</b>	<b>..</b>
<b>Grand total ..</b>	<b>76.26</b>	<b>..</b>	<b>..</b>	<b>79.19</b>	<b>..</b>
<b>BURMA ..</b>	<b>12.71</b>	<b>..</b>	<b>..</b>	<b>12.94</b>	<b>12.84</b>







It will be observed from the preceding table that out of an average of 76·26 million acres under rice in the whole of India during the decennium 1927-28/1936-37, 67·35 million acres or nearly ninety per cent were located in the provinces of British India of which by far the largest rice-growing unit is Bengal with 21·03 million acres. During the above period this province accounted for more than 31 per cent of the rice area in British India and nearly 28 per cent of the all-India acreage. The next most important rice-growing provinces are Madras and Bihar with 11·04 and 10·26 million acres respectively. Jointly, therefore, Bengal, Madras and Bihar are seen to be responsible for about 63 per cent of the area in British India and nearly 56 per cent of the entire rice acreage in India.

The crop map to which reference has already been made, not only shows the distribution of rice acreage in India and Burma as a whole but indicates the different localities in which the acreage is mainly concentrated.

In Bengal, for example, the cultivation of rice is seen to be fairly general. The greatest concentration, however, occurs in the southern and south eastern parts of the province in the districts of Faridpur, Noakhali, Bakarganj, Midnapur, Chittagong, Tippera and Dacca. Roughly 40 per cent of the total provincial area under rice lies within these districts.

In Madras, concentrated areas of rice cultivation occur in the districts in the north and south of the province. For instance, about 44 per cent of the total provincial rice area is located in the East Godavari, West Godavari and Kistna districts, grouped round the delta of the Godavari and Kistna rivers, while some 26 per cent is centred in the Tanjore district in the south. These two areas jointly account for approximately 70 per cent of the rice acreage in Madras.

In Bihar, rice is grown all over the province but the main rice areas lie north of the Ganges in the Champaran, Muzaffarpur and Darbhanga districts in which approximately 24 per cent of the total rice area is contained.

In Orissa, rice culture is concentrated largely to the coastal districts of Balasore, Cuttack and Puri and further inland in Sambalpur. These four districts account for roughly 72 per cent of the total provincial area under rice.

In the United Provinces the north-eastern districts of Gorakhpur, Basti and Gonda constitute the main centres of rice cultivation and contain nearly 33 per cent of the total acreage under this crop.

In Assam, the Sylhet and Kamrup districts represent the most important rice growing tracts and are responsible for approximately 50 per cent of the total provincial rice acreage.

In the Central Provinces, rice cultivation is largely centred in the eastern parts of the province, in the Chhattisgarh division, embracing the districts of Raipur, Bilaspur and Drug. These areas comprise nearly 64 per cent of the total acreage devoted to this crop.

The rice producing tracts of the Punjab are located mainly in the northern districts of Kangra, Gujranwala, Sialkot and Sheikhupura, in which some 46 per cent of the province's rice is to be found. The remaining 54 per cent is fairly evenly distributed over the eastern and the south western districts.

Over 50 per cent of the total area under rice in the Bombay Presidency lies in the four districts of Kolaba, Ratnagiri, Thana and Kanara.

Most districts in Sind contain some acreage under rice although this may not be large, but the greatest concentration of production occurs in the two districts of Larkana and Hyderabad, which contain over 50 per cent of the local area under this crop.

As regards the Indian States, the average area under rice during the period 1927-28/1936-37, was 8.91 million acres or more than 10 per cent of the rice area in the whole of India. The Eastern States Agency, formerly known as the Feudatory States in Bihar and Orissa, is the most important unit in this group and contained 3.33 million acres of rice or about 37 per cent of the total area in the Indian States. The Central Provinces States (some of which have recently been transferred to the Eastern States Agency) contained 1.29 million acres so that the two groups are responsible for more than 50 per cent of the area under rice in the Indian States. Other important rice growing States are Travancore, Hyderabad and Mysore which on an average cultivated 0.7, 0.99 and 0.73 million acres respectively during the ten years ending 1936-37.

In the Eastern States Agency, the chief producing areas are the States of Mayurbhanj, Bastar, Kalahandi, Keonjhar, Gangapur, Raigarh and Patna; in that order of importance. The three first named contain nearly 50 per cent of the area under rice shown against the Feudatory States in Bihar and Orissa in the table on page 6.

In Hyderabad, 75 per cent of the total rice acreage is more or less uniformly distributed over the eastern half of the Nizam's Dominions.

In Mysore, about 50 per cent of the local rice acreage is centred in the districts of Shimoga, Kadur and Hassan.

In Kashmir, the cultivation of rice is the most important agricultural occupation in the valley of the Jhelum River at an elevation of some 5,000 feet. The districts of Srinagar and Baramulla contain over 50 per cent of the total acreage under rice in the State. Rice is also grown fairly extensively in the western and south western districts along the foothills bordering on the Punjab.

(a) *Irrigated and unirrigated area.*—Based on the period 1927-28/1936-37, the total irrigated area under all crops in India amounted on an average to about 61.5 million acres, of which some 83 per cent or just over 51 million acres were to be found in the provinces, the remainder being located in the States. Roughly, 55 per cent of this area is irrigated by canals, 25 per cent by wells, some 15 or 16 per cent by tanks or reservoirs and the remainder by other agencies.

Of all the crops in India grown under irrigation rice is by far the largest. As will be seen from Appendix IV, the average irrigated area under this cereal between 1927-28 and 1936-37 covered 19·7 million acres representing about 32 per cent of the total irrigated area in India\* or some 26 per cent of the total acreage under rice. About 70 per cent of the total irrigated area under rice in the provinces is located in Madras, Bihar, Bengal and Sind.

Rainfall naturally plays an important part in determining the extent of the irrigated and unirrigated areas under rice in the different provinces and States. Where precipitation is relatively high, as for example above 50 inches per annum, it will be found that the area artificially watered is much smaller than the acreage dependent on rain. Bengal, Assam, Bihar and the United Provinces are typical of these conditions. On the other hand, where rainfall is light and variable as in the Punjab or in Sind and in many parts of Madras, the area under irrigation greatly exceeds the area dependent on natural conditions.

The largest tracts under irrigated rice occur in Madras—mainly in the southern and eastern districts—where some 8 million acres on an average obtain their water requirement by artificial means—largely by tanks or reservoirs. Local variations in the irrigated area have been comparatively small and have ranged from 7·6 million acres in 1927-28 to 8·5 millions in 1930-31. In 1937-38 the latest year for which figures are available the irrigated rice area was 7·93 million acres. The irrigated area in this province is likely to be further augmented when more than 1·25 million acres—a proportion of which is ultimately to be given over to rice cultivation—will be brought under irrigation after the completion of the Tungabhadra and the Upper and Lower Bhavani irrigation projects.

Bihar contains the second largest area under irrigated rice comprising some 3 million acres and representing on an average about 29 per cent of the total rice acreage of the province. Wells and tanks are the chief means by which the local crop is watered.

In Bengal, some 1·5 million acres on an average were sown to irrigated rice in the decennium 1927-28/1936-37. This is equivalent to about 90 per cent of the total irrigated area but only about 7% of the rice area of the province. During this period the irrigated area expanded by about 42 per cent from 1·2 to 1·7 million acres, while the latest figures for 1937-38 show a further increase to 1·83 million acres. This is due to the opening up of new canal irrigation works, such as the Damodar Canal System in the Burdwan district. Other areas which have shared in the increase are the neighbouring districts of Birbhum, Bankura, Murshidabad and Midnapore. Tanks are the most important source of irrigation in this province.

The entire rice crop of Sind is raised on irrigated land to the extent of an average of 1·17 million acres. Some slight contraction of area

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\*In comparison, it is interesting to note that wheat, the second largest food crop in India, occupies barely 14 per cent of the country's total irrigated area.

took place between 1931-32 and 1935-36 due, it is reported, to the preference given by the cultivators to wheat and cotton, partly because of better returns and partly owing to the lower water requirements of these two crops. From 1936-37, there has been a tendency for the area to expand again, the latest available figures for 1937-38 showing 1.24 million acres.

In the Central Provinces, there are on an average about 1 million acres of irrigated rice, equivalent to about 18 per cent of the total provincial rice area. In the Punjab irrigated rice covers some 700,000 acres, which is more than three times as large as the local rain-fed area. The average areas under irrigated rice in the United Provinces and Assam are about 600,000 acres in each case, but whereas this represents 10 per cent of the local irrigated area in the former instance the area in Assam deriving its water supply by natural means is seven times larger than irrigated acreage.

(b) *Trend of acreage.*—The changes in acreage which have taken place in the recorded area in India during the past 11 years are relatively insignificant (see diagram facing page 7). The largest and smallest areas sown to rice occurred in 1936-37 and 1927-28 respectively and amounted in the former instance to close on 79 million acres and in the latter to about 72 million acres. On the whole, there is no evidence of any definite or consistent trend either towards an expansion or contraction of area.

(c) *Cultivation—times of sowing and harvesting.*—Rice culture is perhaps one of the most laborious of all agricultural occupations, for the crop grows best in combination with high temperatures and plenty of water. Generally, the seeds\* are first sown in well manured specially prepared seed beds. The ground in which the rice is to be eventually grown has meanwhile been levelled out and the borders embanked with *bunds* to retain the water. The surface is puddled into a thin consistency and may be manured. As soon as the seedlings have attained a height of a few inches they are removed from the nursery and transplanted by hand into the already prepared field, as illustrated in the plate facing this page. From this stage, given favourable conditions of sunshine and ample water, the development of the plant is rapid. The deep water rices of Assam, for instance, are known to grow at the astonishing rate of 6 to 12 inches per day, keeping pace with the rise of the flood water level.

In addition to the method of transplantation, rice is also sown broadcast in many parts of India, notably in Bengal, where nearly 11 million acres or half the total rice acreage of the province is sown in this manner. The practice is probably, to a large extent, responsible for the comparatively low yields owing to the inadequate preparation of the soil, particularly where the seeds are sown with the first showers of rain in land which has inadequate moisture. The broadcast method is also fairly

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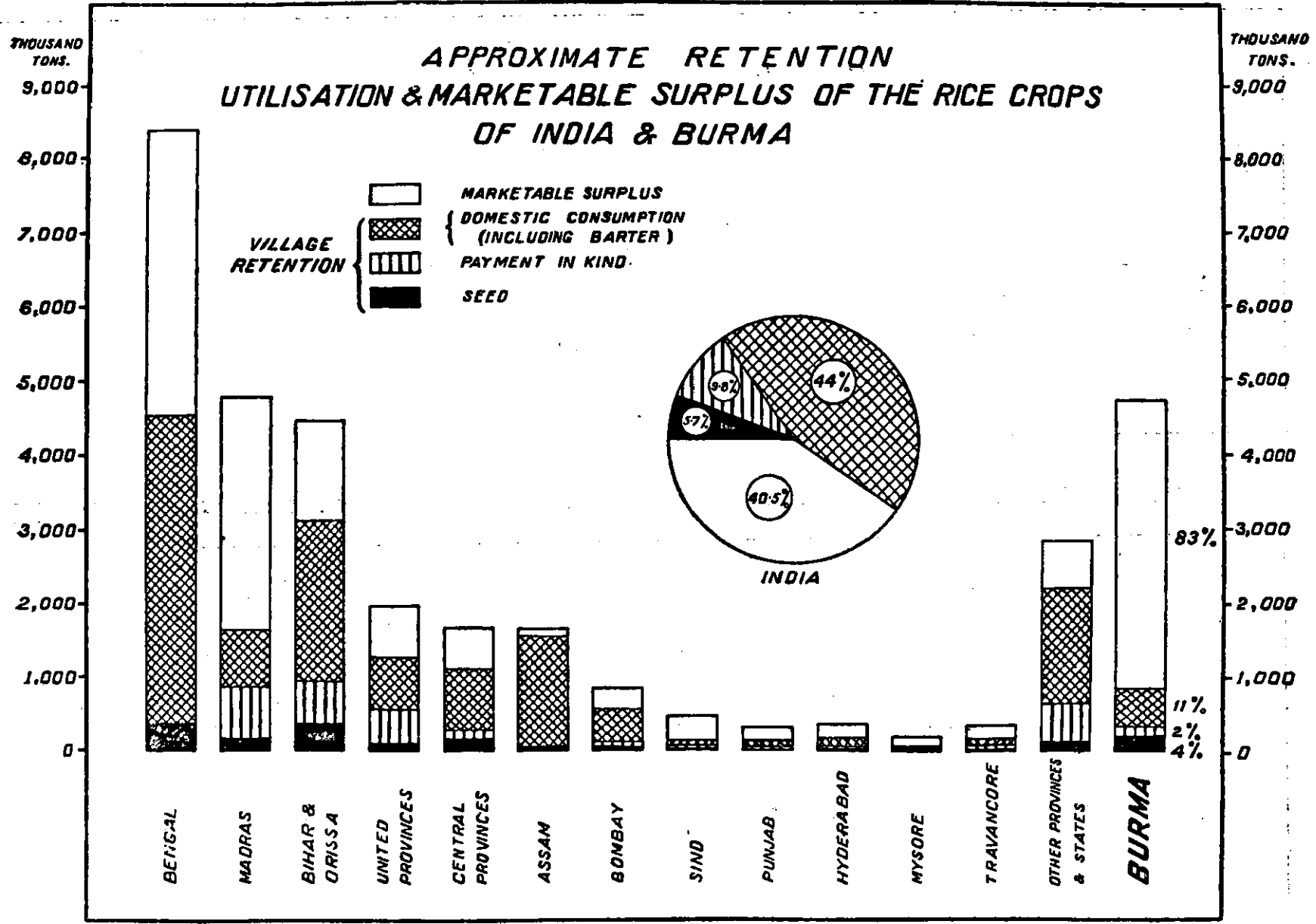
\* Rice is always sown in the form of paddy—the unhusked grain.



PUDDLING—PREPARING LAND FOR RECEIVING TRANSPLANTED AMAN (WINTER) PADDY (BENGAL).



LATER—THE SAME PLOT SHOWING TRANSPLANTING IN PROGRESS.





common in the Central Provinces, the United Provinces, Bihar and in Orissa, but is not greatly in vogue in other areas.

Broadcast sowing is the exception rather than the rule in the other main rice growing countries. In Burma, for example, only about 5 per cent of the total area is under broadcast rice and the great bulk of the rice crops of Indo-China, Siam and China is produced from transplanted seedlings. If, therefore, India is to increase her average yield per acre a change in cultural practices in this respect is indicated.

In the course of a year three rice crops are raised in Bengal, Assam, Orissa, the United Provinces, Bihar, and in Madras and are generally known as the *aus* (autumn), *aman* (winter) and *boro* or *dahua* (summer) crops according to the season in which they are harvested. The summer crop, which as the table on page 12 shows is of negligible proportions in Orissa, the United Provinces and Bihar, is also sometimes called the "Spring crop" from the period of sowing. The three crops do not necessarily occupy the same land although double cropping does take place in some areas and to a limited extent only. In Bengal, for example, *aus* or autumn rice may sometimes be followed by *aman* or winter rice or by some *rabi* crop. The normal rotations are with pulses, *e.g.*, peas, gram, etc. In a few places in the west of the United Provinces rice may be sown after wheat.

As the times of sowing and harvesting in the main rice producing tracts are referred to in some detail in the table on pages 28 and 29, brief mention thereof need only be made at this point.

Winter rice is by far the most important crop. The sowing time varies according to locality but is normally between June and August, while harvesting usually commences about November and is over by about the end of January. The autumn crop is sown in May and June, occasionally even as late as July and is harvested mainly in September. The summer crop is put in the ground from about the end of January to early March and is harvested during May and June. In Bengal, the winter rices consist mainly of low land rices most of which are sown in beds about June, transplanted in July and mature in November and December. The autumn crop comprises the high-land types principally sown in April and grown with rain only. These usually have a growing period of 90 to 115 days regardless of the time of sowing. Conditions in Bihar and in Orissa are somewhat similar. In Assam, one of the main features of the winter crop is that it is sub-divided into two types, one for which the optimum water depth is a few inches and the other a long-stemmed deep water paddy grown in water, which may be as much as 15 to 20 feet deep.

The relative importance of the three crops in Bengal, Assam, Orissa, the United Provinces and Bihar may be gauged from the following table.

*Acreage under autumn, winter and summer rice in north eastern India.*

(Million acres).

Harvest months.	Autumn. August—September.		Winter. November—January.		Summer. February—May.	
	1937-38.	1938-39.	1937-38.	1938-39.	1937-38.	1938-39.
Bengal ..	5.86	5.73	15.92	15.84	0.41	0.41
Assam ..	1.02	1.04	3.83	4.09	0.20	0.20
Bihar ..	2.31	2.29	7.19	7.28	0.01	0.01
Orissa ..	0.94	0.94	4.18	4.17	0.03	0.03
United Provinces	4.43	4.90	2.70	2.87	0.02	0.02
Total ..	14.56	14.90	33.82	34.25	0.67	0.67

In Madras, where a wide range of natural conditions prevails, the west coast and some of the central districts receive the bulk of the annual rainfall from the south-west monsoon, while the east coast is influenced mostly by the north-east monsoon. The times of sowing and harvesting, therefore, vary considerably in different parts of the Presidency and, in many cases, follow closely upon each other. In the East and West Godavari districts and in the Circars the first or autumn crop is harvested in October and November, the second or winter crop in December and January and the third or summer crop in April and May. In the central districts, the first crop ripens in October, the second about December and the third in April. In the Nellore area the harvest timings are approximately January, March and May for the three crops. In the southern districts the first crop is harvested in September, the second in February and the third a few weeks later. On the Malabar coast only two croppings are normal, the first in September and the second in January and February.

In the rest of India only one crop of rice is usually grown, the normal harvesting of which falls between the end of August and the end of October or early in November. The areas in which these conditions obtain comprise the Central Provinces, the Central India States, Sind, the Punjab and the North-West Frontier Province.

### (3) PRODUCTION.

(a) *Methods of estimation.*—The methods adopted in calculating statistics of outturn have already been described in the Report on the Marketing of Wheat (Marketing Series No. 1) and are substantially the same in the case of rice with the exception of the introduction of a new element. This is the fact that the produce is harvested in the form of

paddy or rice in the husk and is subsequently converted into terms of rice for the purpose of the published statistics. It will be sufficient, therefore, to refer very briefly to the three primary factors of area, standard yield and seasonal condition on which the estimates of production of the crop are based, leaving the fourth factor, namely, the conversion factor for paddy into rice, to be dealt with in more detail.

The area of the rice crop grown in the temporarily settled\* provinces such as the Punjab, the United Provinces, the Central Provinces, Bombay, Madras, etc., is fairly accurately known since the basis of assessment for land revenue is revised periodically. Unfortunately, two of the most important rice producing provinces, namely, Bengal and Bihar, which between them account on an average for about 41 per cent of the total rice acreage in India, consist very largely of permanently settled\* tract in which the chief sources of information concerning areas and yields are the reports of petty village officials such as *thanadars* (heads of village police stations) and *chowkidars* (village watchmen). The all-India statistics of acreage under rice must, therefore, be regarded as less reliable than estimates for crops, such as wheat, which are mainly grown in the temporarily settled tracts.

The unsatisfactory position with regard to the collection of primary data in the permanently settled areas may be illustrated by citing one or two instances. In 1936, the agricultural authorities in Bihar were confronted with an inexplicable fall of some 100,000 acres under rice in a certain district but no explanation has ever been forthcoming. In another case, an actual survey of the jute area in an important district in Bihar revealed the real acreage to be nearer 300,000 than the stereotyped figure of 120,000, which had been appearing in the official estimates year after year without change. A third example is revealed by a recent examination by the marketing staff of the Indian Central Jute Committee of statistics relating to jute grown in Bengal. This disclosed that the official estimates of area were liable to fall short of the probable area sown by as much as 45 per cent. Since jute and rice are grown side by side in Bengal and in Eastern Bihar the estimates for rice are probably equally conjectural. In view of the large area involved in these two provinces, the effect of local inaccuracies on the all-India statistics of area (and production) of rice must be regarded as very serious.

The second factor—standard yield—is officially described as “the average yield on average soil in a year of average character” and is supposed to be derived from the information based upon crop cutting experiments conducted over a period. Annual crop cutting experiments are presumed to be made in all provinces and major States with a view

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\* “By the ancient law of the country” to quote the opening words of Regulation XIX of 1793, by which the permanent settlement was created in Bengal, “the ruling power is entitled to a certain proportion of the produce of every acre of land unless it has transferred or limited its rights thereto. The procedure by which that proportion is determined is styled a settlement of the land revenue. A settlement is of two kinds: permanent, by which the demand of the State is made fixed and unalterable for ever; temporary, under which the State demand is revised at recurring periods of greater or less duration”.—Land Revenue Policy of the Indian Government published by order of the Governor General of India in Council, 1902.

to the ultimate revision, if necessary, of the standard yield figures at the end of every five years. These experiments, however, are not always carried out on a sufficiently large scale and the methods employed lack uniformity. Instances have been observed which cast doubts on the results and the validity of such experiments owing to the perfunctory manner in which they are undertaken.

The accuracy of the majority of the standard yields, as given in official publications, would, therefore, be questionable in any event, but the fact that paddy—the form in which the grain is harvested—is converted into terms of rice interposes another factor which if based on defective or inconsistent formulæ is liable seriously to affect the total outturns of rice when the estimates of individual areas are being calculated. The Department of Commercial Intelligence and Statistics merely compiles the crop estimates of rice, as such, forwarded by the provinces and reporting States with a view to their ultimate publication. The Department, therefore, pays no regard to the ratios used by the local administrations when converting paddy into rice. Detailed enquiries made in the course of the survey from provinces and States have shown that in many instances the authorities concerned were unable to explain why a particular figure had been adopted and when and how the conversion factors being used for the framing of the official estimates were originally arrived at. In cases where this is determined experimentally, the ratio of rice to paddy was found to be ascertained by a variety of methods, some of which bore little or no relation to actual practical conditions, and by the utilisation of hulling apparatus of various types and degrees of efficiency. The important fact, for instance, that as much as three-fourths of the rice produced in this country is the result of hand-pounding paddy—a method which gives a proportionately larger output of rice (including edible brokens) than machine-milling—does not appear to be taken into consideration. The published estimates of rice production cannot, therefore, be regarded as representing the true position of supplies.

The extent of the divergency between the probable outturn of rice in India and the officially reported production caused by errors in converting paddy into terms of rice is capable of being roughly assessed. It is found, for example, in commercial practice that 100 units of paddy will yield an average of 74 units of rice and consumable by-products including bran and broken grains of all sizes. This is in fact the proportion which has long been accepted by the authorities and by the trade in Burma as the basis for converting paddy when calculating the local production estimates. In India the conversion factors at present in use range from 62·0 in the Central Provinces to 70 per cent in Bombay and give an average of about 65 per cent only for the whole of India. Making due allowance for a certain proportion of bran and small particles, which cannot be included as consumable products other than as cattle food, it is obvious that there exists a discrepancy of some magnitude between the commercial ratio of rice to paddy adopted in the official estimates and the actual relationship. Enquiry has shown that in working out the outturn of rice only a proportion of broken grains (*i.e.*, halves and larger), is included as rice and that fragments and small brokens less than half a grain

are entirely ignored in spite of the fact that such products are of edible and marketable value.

In order, therefore, to establish a more reasonable basis for arriving at the production of rice a comparison is given in Appendix V between the official estimates of production and the probable outturn based upon actual hulling trials, commercial milling results and general observations. It will at once be apparent that in practice hand-pounding and machine-milling paddy yield different quantities of rice. Hand-pounding, for example, will normally give an average of about 72 per cent of rice (including edible brokens) the balance being made up of about 3 per cent bran, including the germ, and very small fragments or particles of the rice kernel *plus* 25 per cent of husk carrying a small proportion of nutritive elements in the form of residual bran and small crushed particles of rice. Machine-milling as normally practised in India\* results in a somewhat lower yield of rice as compared with hand-pounding. By machine-milling an average of about 68 per cent of rice is obtained including edible brokens. The proportion of bran including some of the germ and very small particles of the rice kernel increases to 8 per cent (as compared with about 3 per cent in the case of hand-pounding) leaving 24 per cent of husk, possessing practically no feeding value, particularly where "self-contained" types of milling machinery are used, which completely separate the husk from the rest of the grain. Having regard to these proportions and the fact that in the important rice producing areas mentioned in Appendix V about 72 per cent of the production of paddy is hand-pounded and 28 per cent milled by machinery, a more rational and conservative figure for converting paddy into rice would be 70 per cent.

The approximate discrepancy which exists between the published official estimates of production and the probable actual outturn is shown in Appendix V. On the basis of data relating to eleven major provinces and States† the difference works out at 2.16 million tons or an underestimate of 9.9 per cent. Applying the same proportion to India's production as a whole, it would seem that the present methods of compiling the outturn of the crop are responsible for an under-statement each season of nearly 10 per cent. This is in addition to the under-estimate of the acreage already referred to.

Reckoning the average reported production of rice at 29 million tons (1927-28/1936-37), this error alone would represent something not far short of 3 million tons.

A comparatively large error of this kind tends to give an entirely misleading picture of the supply position of rice in India. Since the discrepancy is capable of correction, it is suggested that pending any further examination, which might be made of the ratio of rice to paddy, the more

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\*The paddy can be milled to varying degrees of bran yield. If the proportion of bran and pericarp removed is large the polish may improve but the outturn of "head rice" or whole grains decreases and the proportion of broken grains increases with, however, a net reduction in the total yield of rice.

† Bengal, Madras, Bihar and Orissa, the Central Provinces, Assam, Sind, Bombay, Hyderabad, Mysore and Travancore.

reasonable conversion factor of 70 be accepted uniformly in all rice producing areas.

The published standard yield of rice for the last five quinquennia in the major producing areas are quoted below for what they are worth. It is significant that in some instances no revisions or corrections have apparently been considered necessary for a period of 25 years.

*Standard yields of rice.*

(lb. per acre).

	Quinquennium ending.				
	1911-12.	1916-17.	1921-22.	1926-27.	1931-32.
<b>INDIA.</b>					
<b>Bengal—</b>					
Winter .. ..	983	1,036	1,029	1,022	1,111
Summer .. ..	1,104	1,179	1,156	1,142	1,238
Autumn .. ..	807	871	888	892	1,023
<b>Bihar and Orissa—</b>					
Winter .. ..	1,234	1,234	987	987	987
Summer .. ..	800	800	800	800	800
Autumn .. ..	800	800	800	741	741
<b>Assam—</b>					
Winter .. ..	1,008	952	896	896	896
Summer .. ..	..	1,008	1,008	1,008	1,064
Autumn .. ..	672	706	706	706	717
Madras .. ..	..	1,047	1,065	1,057	1,055
United Provinces ..	900	900	900	900	900
Central Provinces ..	624	624	624	647	648
Bombay .. ..	1,230	1,230	1,230	1,230	1,230
<b>BURMA ..</b>					
	997*	1,034*	970	1,000	1,000
	1,140†	1,083†	..	..	..

\*Upper Burma.

†Lower Burma.

In view of the prevailing conditions in regard to the conversion of paddy into rice by manual labour and by power milling, the adoption of the suggested ratio of rice to paddy of 70 : 100 would result in the standard

yield of rice for the 5 quinquennia ending 1931-32 being stated more accurately as follows.

	Probable yield. (lb.)	Official standard yield. (lb.)	Difference.	
			lb.	Per cent.
Bengal .. .. .	1,171	1,090*	+ 81	+ 7.4
Bihar and Orissa .. .. .	1,043	919*	+124	+ 13.5
Assam .. .. .	1,000	870*	+130	+ 15.0
Madras .. .. .	1,088	1,055	+ 33	+ 3.1
United Provinces .. .. .	968	900	+ 68	+ 7.6
Central Provinces .. .. .	747	648	+ 99	+ 15.3
Bombay .. .. .	1,218	1,230	— 12	— 1

The difference between probable yield and the official figures ranges from *minus* 1 per cent in the case of Bombay to as much as 15.3 per cent in the Central Provinces.

The third and probably the most difficult factor to assess in computing the outturn of any crop is the seasonal factor. This is estimated in India in terms of the traditional method known as the *annawari* system, *i.e.*, in sixteenths, the rupee of 16 annas being taken as the basis. The standard of the normal crop is fixed at so many annas and the annual outturn is estimated at so many annas above or below the normal as the case may be. In a few instances, 16 annas are taken to be a normal crop whereas in other areas this figure would represent a bumper harvest. Generally, however, the normal crop is regarded vaguely as something between 12 and 14 annas.

(b) *Yield per acre.*—Rice yields are affected by a number of factors, which are liable to vary from place to place and from year to year.

\* Weighted average for the winter, summer and autumn crops.

NOTE.—Considerable attention has been and continues to be given to the difficult problem of improving rice statistics. The subject was very fully discussed at its first meeting in January, 1937, by the Rice Committee appointed by the Imperial Council of Agricultural Research and it was resolved that all provinces be recommended to develop an adequate system of determining standard yields by properly randomised crop cutting experiments based upon the experiments already conducted in the United Provinces. This consisted of selecting a tract covering between 1,000 and 1,500 acres, from which 40 samples were chosen each comprising about 1/20 acre. In each sample about 20 random sub-samples of 10 square feet having been measured off by means of a circular hoop, the plants in the areas enclosed were then cut. The data obtained by this method were found to have the relatively small error of 6 to 7 per cent.

A method has since been worked out by Professor P. C. Mahalanobis in connection with crop cutting experiments on sugarcane and is now in course of trial. No action has, therefore, been taken on the above resolution pending the result of the experiments now in progress.

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Water has probably the most important influence on yield. In those provinces in which rice is mainly a rain-fed crop, for example in Bombay, good yields depend on the timely onset of the monsoon and well distributed precipitation during the growing period of the crop. Experience has shown that a long break during the growing period followed by heavy rains at the time of harvest not only reduces the yield considerably but damages the quality of the rice. Deficiency in rainfall, if serious, cannot always be made good by artificial irrigation, even where such facilities amply exist, mainly because should the monsoon fail all the *kharif* or autumn crops require water simultaneously with rice. The following table based on the results of actual crop cutting experiments conducted in different provinces will give some idea of the relative superiority of yields on irrigated land over unirrigated.

*Average outturn of paddy (rice in the husk).*

(lb. per acre).

	Irrigated.	Unirrigated.
Madras .. .. .	1,694	1,138
Central Provinces and Berar ..	1,200	900
United Provinces .. .. .	1,100	850
Punjab .. .. .	1,269	587

That irrigation tends to ensure a greater degree of stability in the yield per acre on irrigated land is shown from the following table based on the average of 5 years' data.

*Average yield of paddy (rice in the husk) on irrigated and unirrigated land in Madras.*

(lb. per acre).

	Average.	Minimum.	Maximum.
Irrigated ..	1,694	1,308	1,985
Unirrigated ..	1,138	715	1,660

On the basis of these figures, it will be observed that the variations in the yield on irrigated land range from about 23 per cent below to about 17 per cent above the average, while on unirrigated land the variations are from 37 per cent below to nearly 46 per cent above the average.

In heavy soils rice does better than on light soils. For example, during the quinquennium ending 1934-35 the average yield of paddy in the Sheikhpura district of the Punjab was 1,637 lb., whereas in the Muzaffargarh district of the same province where the soil is sandy it averaged 788 lb. only.

The yield of rice also varies according to the crop and the varieties grown. Summer rice generally gives the largest yields and autumn the smallest, while the winter crop normally falls between these two extremes. On the basis of the actual yield per acre obtained by dividing the estimated production of rice by the acreage sown, the relative outturns



of the autumn, winter and summer crops may be gauged from the following table.

*Yield of rice in some of the main producing areas.*

(lb. per acre).

					1937-38.	1938-39.	Average 1937-38/ 1938-39.
<b>Bengal—</b>							
Autumn crop	..	..	..	..	750	549	649
Winter crop	..	..	..	..	967	843	905
Summer crop	..	..	..	..	1,071	1,095	1,083
<b>Bihar—</b>							
Autumn crop	..	..	..	..	612	527	569
Winter crop	..	..	..	..	782	650	716
Summer crop	..	..	..	..	747	689	718
<b>Orissa—</b>							
Autumn crop	..	..	..	..	615	590	602
Winter crop	..	..	..	..	716	618	667
Summer crop	..	..	..	..	618	640	629
<b>Assam—</b>							
Autumn crop	..	..	..	..	650	541	595
Winter crop	..	..	..	..	798	735	766
Summer crop	..	..	..	..	1,057	999	1,028

Bold or large grained rices, under similar conditions of soil, weather and cultural treatment generally yield more abundantly than the small, fine, slender varieties. Records show, for example, that in Bengal, *Dadhkhani*, a fine variety, has been known to yield 1,625 lb. of paddy per acre whereas *Nagra* a large grained type gave 2,505 lb. In Orissa, the fine *Lakshimibhog* variety yielded 1,646 lb. and the bold *Baromal* 2,633 lb. In the Central Provinces the well-known *Chinoor* variety gave an outturn of 1,810 lb. as compared with *Gurmatia's* 2,057 lb. In Madras, the small round-grained white *Sirumani* yielded 2,468 lb. of paddy while *Chitrakali* a bold type gave 3,044 lb. Similarly in Sind, *Jajaj* produced 1,059 lb. of rice and the larger grained *Kangni* 1,349 lb. In the Punjab, the yields favoured *Jhona*, a bold variety, which gave 3,522 lb. of paddy per acre as against 2,754 lb. in the case of the long fine slender *Basmatia*.

Bold types may be said to give roughly from 15 per cent to 60 per cent more yield than fine rices.

The method of sowing is yet another factor which influences the yield of rice. Transplanted rice normally gives a higher yield than when the crop is either sown in drills or broadcast. For instance, in the Karnatak division of the Bombay Presidency where the crop is generally sown in drills, the yield per acre of rice was found to average 1,100 lb., while in

the Konkan area where the practice is to transplant the seedlings the yield during the same period was 100 lb. greater, which is equivalent to 9 per cent. In the Balaghát district of the Central Provinces, tests have shown that rice sown broadcast gave 1,350 and 900 lb. of paddy on irrigated and unirrigated land respectively, while the corresponding yields of transplanted rice in the same area rose to 1,600 and 1,050 lb. respectively being 19 and 17% greater than broadcast rice. In the United Provinces, experiments at the Cawnpore Research Farm have shown that transplanted rice is capable of as much as 70 per cent fresh yield than broadcast rice.

Although transplantation shows the best returns, there are important practical limitations to its general adoption. The most noteworthy of these factors are the supply of labour and the situation of the land. Where the land is dependent on Nature for moisture, transplanting is only possible on low lying tracts capable of holding water. The transplantation process is also slow and laborious. In many parts of the country sufficient agricultural labour to enable the available areas to be covered cannot be obtained at the time it is most required, either on account of scarcity or the inability of the grower to hire such assistance.

The bulk of the autumn rice in Bengal is sown broadcast which accounts in large measure for the relatively poor yields of this crop.

For comparative purposes, the reported average yield of rice per acre in some of the important areas in India and in Burma for the three quinquennia ending 1916-17, 1931-32, 1936-37 and for the seasons 1937-38 and 1938-39 is given in the following table.

*Average yield of rice.*  
(lb. per acre).

	1912-13 to 1916-17.	1927-28 to 1931-32.	1932-33 to 1936-37.	1937-38.	1938-39.
<b>INDIA.</b>					
Bengal .. .. .	837	933	921	911	771
Madras .. .. .	948	1,044	1,048	1,071	914
Bihar and Orissa .. .. .	1,039	872	701	740*	621*
Orissa .. .. .	..	..	..	697	613
United Provinces .. .. .	700	555	629	641	583
Central Provinces and Berar .. .. .	625	653	655	589	648
Assam .. .. .	759	717	717	778	706
Bombay .. .. .	1,096	976	967	987	909
Sind .. .. .	806	..	861	909	973
Baroda .. .. .	..	532	569	455	436
Bombay States .. .. .	..	1,008	968	..	..
Central Provinces States .. .. .	..	623	574	..	..
Hyderabad .. .. .	..	756	689	813	857
Mysore .. .. .	..	644	669	615	700
Coorg .. .. .	1,348	1,299	1,368	1,493	1,449
BURMA .. .. .	922	851	858	794	936

\* Bihar only.

It will be observed that the reported average yield per acre is much greater in Coorg than in any other part of India. (The average rainfall in Coorg is about 130 inches per annum). The next highest yields occur in Madras, Bombay (including the Bombay States) and Bengal. The lowest yield per acre is found in Baroda. It is also seen from the preceding table that whereas the reported average outturns in Madras, Bengal, the Central Provinces and Sind have increased somewhat during 1932-33/1936-37 as compared with the average of twenty years back, there appears to have been a fall in the recorded yield in Bihar and Orissa, the United Provinces, Assam and Bombay. If the published statistics are to be accepted at their face value the heaviest decline in yield has occurred in Bihar and Orissa and amounts to about 27 per cent. The estimates, which are now issued separately in respect of Bihar and Orissa since 1937, are consistent but it is difficult to ascribe any reason for the serious diminution in the estimated yield since abnormal weather conditions have not prevailed every year.

The following are the estimated annual average yields of rice in lb. per acre for the whole of India during the past 12 years.

*Average yield of rice per acre in India\*.*

				lb.
1927-28	..	..	..	799
1928-29	..	..	..	873
1929-30	..	..	..	907
1930-31	..	..	..	878
1931-32	..	..	..	906
1932-33	..	..	..	841
1933-34	..	..	..	817
1934-35	..	..	..	831
1935-36	..	..	..	752
1936-37	..	..	..	861
1937-38	..	..	..	826
1938-39	..	..	..	728

The following table based on data contained in the International Review of Agriculture, shows the estimated average yield of rice in India and certain other rice growing countries of the world.

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\* Estimates of Area and Yield of Principal Crops in India.

*Approximate yields of rice in important countries of the world.*

(lb. per acre).

	Average 1909-13.	Average 1926-27 to 1930-31.	Average 1931-32 to 1935-36.	1936-37.	1937-38.	1938-39.
India (including Burma) ..	982*	851	829	861	826	728
Burma ..	..	887	845	833	813	959
Indo-China ..	928†	661	637	..	..	..
Siam ..	..	1,017	961	863	829	943
United States of America ..	1,000	1,333	1,413	1,505	1,471	1,469
Italy ..	1,952	2,797	2,963	2,839	3,258	2,903
Spain ..	2,969	3,749	3,709	..	..	..
Egypt ..	2,119	1,845	1,799	2,083	2,001	2,153
Japan ..	1,827	2,124	2,053	2,339	2,305	2,276

\* 1914-15 to 1918-19.

† 1912-13 to 1913-14.

The yields per acre in India compared not unfavourably on the whole with those of certain other territories in South-east Asia but fall far short of the Mediterranean countries, the United States and Japan. Although figures of yields per acre are unavailable in respect of China it is patent that China makes a better showing than India as illustrated in the diagram facing page 2 in which China's average share of world production is greater than that of India in spite of the fact that the area under rice in China is relatively smaller. If, therefore, the present official estimates are a true reflection of production in India, rice yields in this country are capable of improvement.

(c) *Total outturn.*—The total quantity of rice estimated to have been produced in India and Burma during the period 1927-28/1939-40 is given in Appendix VI. The position is summarised in the table below :—

*Outturn of rice in the main producing areas.*

(Million tons).

Provinces States.	Average 1927-28/ 1936-37.	Proportion of total production in British India/ Indian States.	Proportion of all-India production.	1937-38.	1938-39.
		(British India).			
Bengal.. .. .	8.64	33.87	29.79	9.03	7.57
Madras .. .. .	5.15	20.19	17.76	4.85	4.10
Bihar .. .. .	3.64	14.27	12.55	3.14	2.65
United Provinces ..	1.76	6.90	6.07	2.06	2.06
Central Provinces and Berar	1.63	6.39	5.62	1.55	2.26
Assam .. .. .	1.54	6.04	5.31	1.75	1.69
Orissa .. .. .	1.29	5.05	4.45	1.57	1.41
Others* .. .. .	1.86	7.29	6.42	1.86	..
<b>Total .. .. .</b>	<b>25.51</b>	<b>100.00</b>	<b>87.97</b>	<b>25.81</b>	<b>..</b>
		(Indian States).			
Federatory States in Bihar and Orissa .. .. .	1.47	42.12	5.07	1.50	..
Central Provinces States ..	0.34	9.74	1.17	0.48	..
Madras States .. .. .	0.50	14.32	1.73	0.50	..
Hyderabad .. .. .	0.32	9.17	1.10	0.37	0.35
Mysore .. .. .	0.21	6.02	0.72	0.22	0.20
Others .. .. .	0.65	18.63	2.24	0.65	..
<b>Total .. .. .</b>	<b>3.49</b>	<b>100.00</b>	<b>12.03</b>	<b>3.72</b>	<b>..</b>
<b>BURMA .. .. .</b>	<b>4.85</b>	<b>..</b>	<b>..</b>	<b>4.59</b>	<b>5.97</b>

\*Includes Bombay, 0.86; the Punjab, 0.47 and Sind 0.46 million tons.

The average total production of rice in India as shown in the preceding table amounted to 29·00 million tons annually between 1927-28/1936-37, of which about 88 per cent was produced in British India and about 12 per cent in the Indian States. The shares of different provinces and States in production and acreage are represented in diagram facing this page. It will be observed that Bengal not only contains the greatest area under rice but is also the largest producer. During the above period this province was responsible for nearly 34 per cent of the outturn in British India and over 30 per cent of the total all-India production. Madras and Bihar rank second and third in importance and occupy the same positions in production and acreage. The former's share of production in the British Provinces amounted to over 20 per cent and that of Bihar to some 14 per cent. Of the all-India production, Madras accounts, on an average, for 18 per cent and Bihar for nearly 13 per cent. Bengal and Madras together produce an average of more than 54 per cent of the production in British India and over 47 per cent of the total Indian output.

About 42 per cent of the production of rice in the Indian States grows in the Feudatory States of Bihar and Orissa, and 39 per cent in the Central Provinces' States (Eastern States Agency), Hyderabad, Mysore and the Madras States, of which the most important rice growing units are Travancore, Cochin and Pudukottai in that order.

(d) *Trend of production.*—The diagram facing page 7 confirms that no consistent expansion or contraction of acreage or production has occurred and that fluctuations in area and outturn have been of a minor character. Such variations as have taken place can be attributed to the effect of seasonal conditions.

#### (4) VILLAGE RETENTION AND MARKETABLE SURPLUS.

The proportion of the rice crop retained in the villages and holdings for domestic consumption, barter, seed and payment of wages in kind varies enormously from one area to another and is influenced by numerous factors, the more important of which have already been described in the Report on the Marketing of Wheat (Marketing Series No. 1).

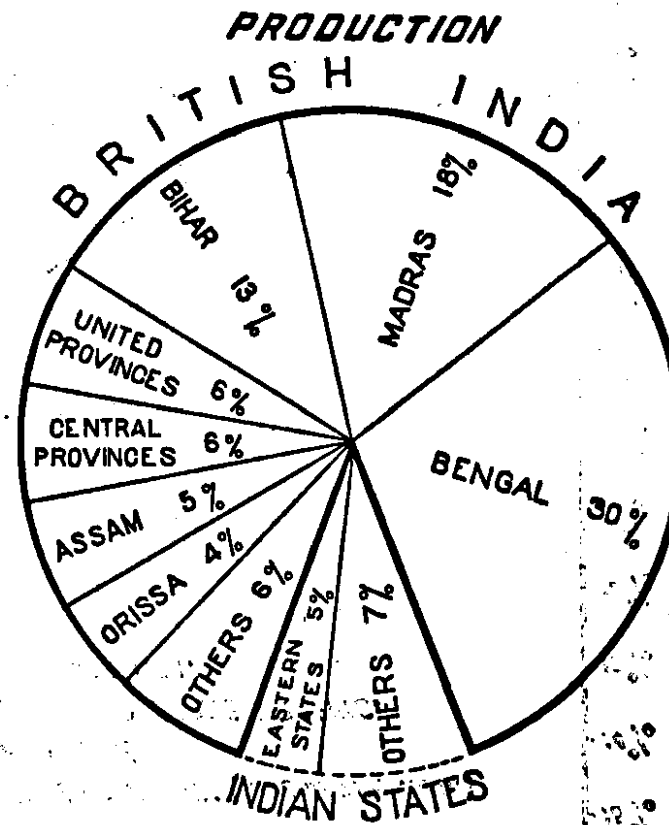
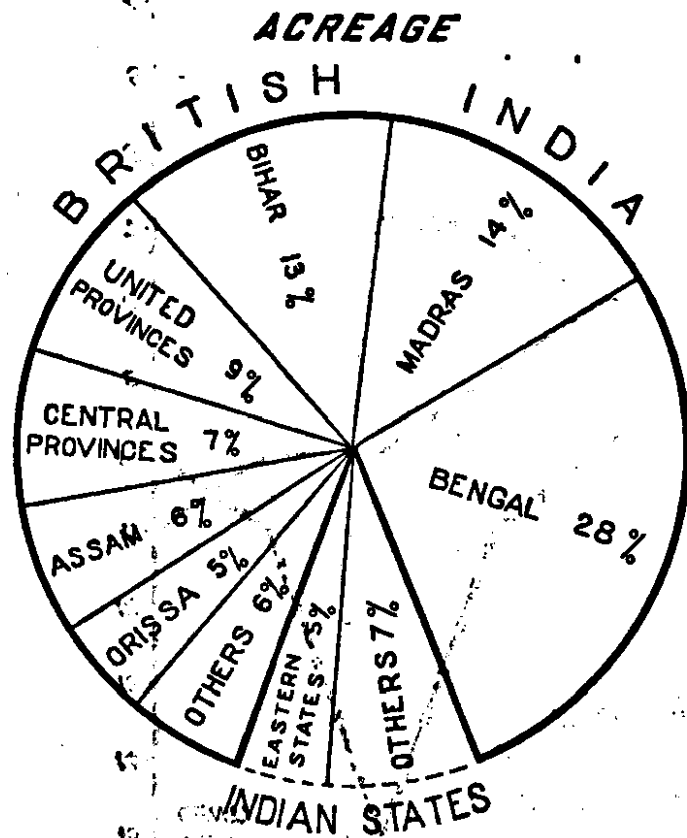
Summarised briefly, village retention depends upon :—

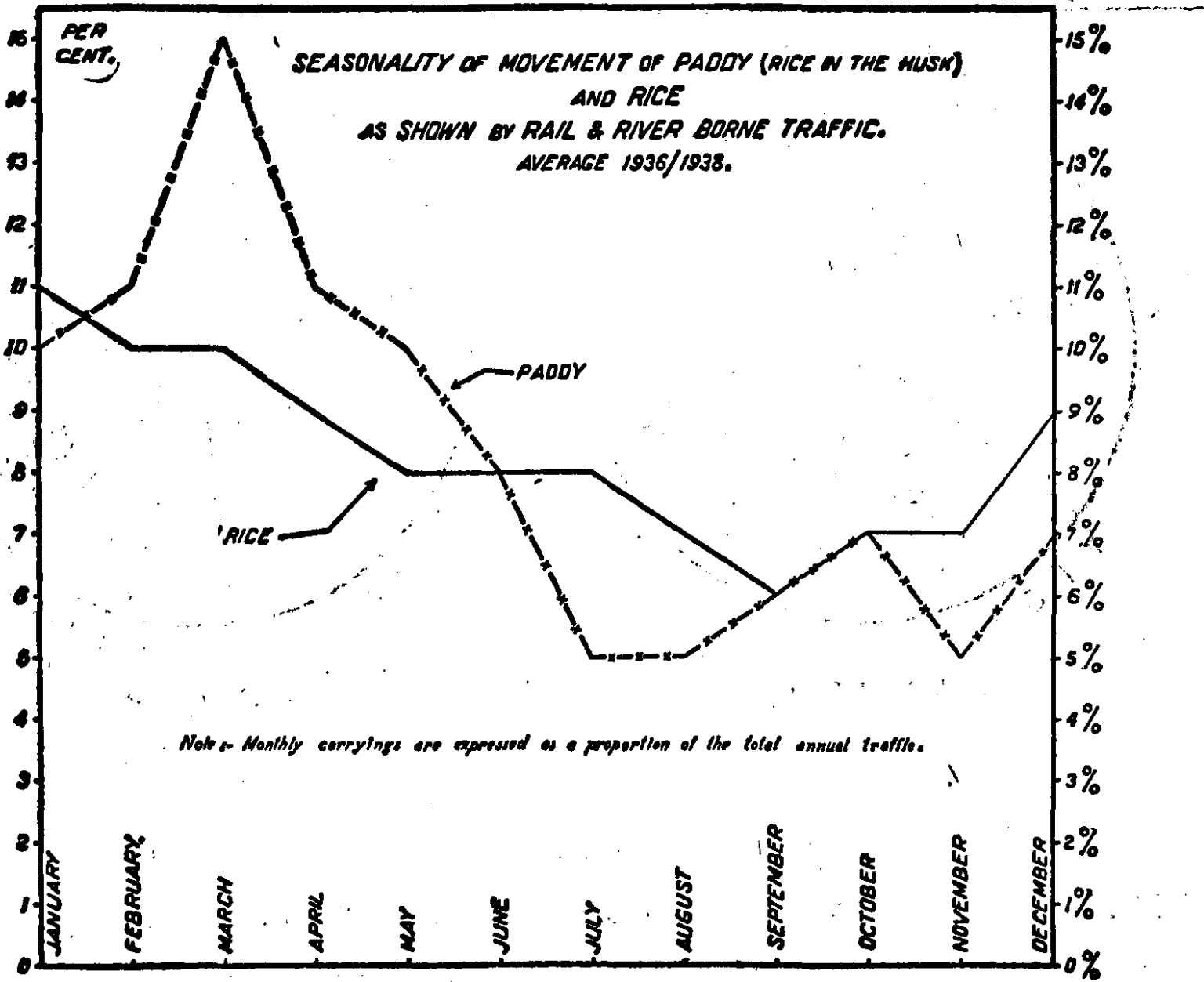
- (a) the extent of the practice of paying hired labour (for harvesting, etc.) by wages in kind ;
- (b) the prevalence of barter transactions in which rice is exchanged for other commodities ;
- (c) the quantities used for seed and for stockfeeding and
- (d) the volume of domestic or house-hold consumption by the growers themselves and their dependents.

The last factor also involves such considerations as the size of the holding, the degree of indebtedness of the producer, the qualities or types grown ; the relative importance of rice in the local dietary and the comparative market values of other crops grown on the holding.

# SHARE OF DIFFERENT PROVINCES & STATES IN ACREAGE & PRODUCTION OF RICE IN INDIA.

AVERAGE  
1927-28/1936-37







Appendix VII shows approximately how much of the rice crop is retained on an average in each of the more important provinces and States, the quantities used for barter, for seed and payments in kind and the marketable surplus. The all-India position and that of each major province and State is also illustrated in the diagram facing page 11.

Taking India as a whole, the total village retention amounts roughly to sixty (59·5) per cent of the crop, which based on an average production during 1934-35/1936-37 of 28·38 million tons works out to 16·88 million tons. This places the marketable surplus at 40·5 per cent or almost 11·5 million tons. Of the total quantity retained, 11·91 million tons representing 42 per cent of the total crop is used for domestic consumption, some 0·56 million tons or 2 per cent change hands in barter transactions, 2·80 million tons or 9·8 per cent is given to hired labour as wages in kind and 1·61 million tons used for seed purposes.

The position regarding village retention in different provinces and States is as follows.

(a) Most cultivators harvest their produce with the aid of family labour or a few families may combine for the joint harvesting of the crop of each family in turn. In the United Provinces and the Central Provinces where hired labour is employed, payment in kind is the general rule. In Assam and Bengal, labour is generally hired on a cash payment basis. In Bengal, for example, the harvesting of the rice crop in many of the western districts is done by migratory Santhals from South-East Bihar and North-Eastern Orissa. In the north of Bengal, where there are many large *jotedars* (tenants or lease-holders), hired labour is employed on a considerable scale. Similar conditions prevail in the dense rice growing areas in Mymensingh in Eastern Bengal. In most instances it is customary for cash to be demanded and paid in return for the services rendered.

Enquiries made during the course of this survey have shown that the practice of paying wages in kind varies greatly. In Baroda, for instance, only about 2 per cent of the crop is disposed of in this way but in Travancore, the United Provinces and the Central Provinces the proportions are as high as 32·5, 23 and 21 per cent respectively. It is noteworthy that where more than one type of rice is grown the coarser or inferior qualities are invariably given to the labourers, the finer varieties being reserved for the market.

(b) Barter was found to account for a greater proportion of the rice crop in the United Provinces than elsewhere in India. It is estimated that roughly 10 per cent of the production of this province is disposed of in barter transactions. About 3 per cent of Bengal's rice crop is used for barter and a like proportion of the crop of Mysore. Other areas in which the bartering of rice is met with on an appreciable scale are the Central Provinces, Bombay and Sind. In each case about 2 per cent of the respective crops of those provinces are reckoned to change hands by barter. Out of an all-India total of some 561,000 tons disposed of in barter transactions, Bengal's share is roughly 253,000 tons and that of the United Provinces about 197,000 tons.

(c) Seed requirements depend upon the rates of sowing in different areas. A detailed statement is given in Appendix VII, which shows that the average retention for this purpose, expressed in terms of rice, is 5·7 per cent of the total Indian production, or about 1·61 million tons.

As regards stockfeeding, paddy or rice is rarely given to cattle or poultry. The only by-product fed to stock on any appreciable scale is rice bran\*. In the East Godavari district of the Madras Presidency a small amount of rice, in the form of paddy, is given to cattle in the puddling season. In Sind, wealthy *zamindars* give paddy to their riding horses and in Assam paddy, in small quantities, is utilised as cattle feed. Apart from the bran which is not included in the estimates of production, the total amount of the crop so consumed is negligible.

(d) Domestic consumption by producers and those directly dependent upon them is the most important factor in village retention, as it accounts for 42 per cent or 11·91 million tons of the total production of rice in India. A large proportion of the rice given out in the form of wages in kind is also consumed by the recipients in the rural areas. The largest proportion of the crop so retained in any province or State is that in Assam, where 90·5 per cent is estimated to be consumed in the villages and holdings. The figure would, however, appear to need further examination. The lowest domestic consumption is that of Baroda where only 12 per cent of the crop is thus used. Conversely, the marketable surplus is least in Assam and greatest in Baroda. Other high proportions of village retention are those of Bombay, Travancore, Bihar (and Orissa) and Bengal with 52, 50·5, 48 and 46·5 per cent of the respective total production.

Various factors have a bearing on the extent of domestic consumption and village retention generally, the size of holding is for instance important in Assam where rice is the main subsistence crop and domestic consumption highest. The small cultivators, who form by far the greater proportion of the agricultural community, were found in many cases to retain the whole of their rice crop. On the other hand, the few large landlords, *e.g.*, in the Cachar district, generally disposed of the whole or greater part of their produce. As similar conditions have been observed elsewhere not only in regard to rice but also during the course of surveys on other agricultural commodities, it may be regarded as a fairly general rule that the proportion of produce retained varies inversely with the size of the cultivator's holding.

Another factor which affects the amount retained by producers for seed, domestic consumption and barter is the financial position. Those heavily indebted are naturally obliged to part with a larger part of their produce immediately after the harvest to satisfy their creditors. Enquiries made from cultivators show that many of the smaller growers, *e.g.*, those with less than 3 or 4 acres, frequently sold their entire crop

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\* Rice straw is used as fodder and in some places, *e.g.*, Orissa, as material for thatching houses.

immediately after the harvest for the purpose of repaying their borrowings, meeting taxes and other dues. Some of the less indebted growers were found to retain between 30 and 40 per cent of their produce for seed and domestic purposes. Those who were comparatively better off contrived to keep as much as 90 per cent. The number in the last category is small as the great bulk of the area under rice is comprised of small holdings.

Where more than one type of rice is grown, the cultivator almost invariably retains the coarse inferior varieties for his own use and sells the finer rices which give a better cash return. The only exception occurs where comparatively large growers produce limited quantities of fine rices for their own private consumption or for the use of their friends. In such cases the bold or inferior varieties, surplus to requirements, are disposed of in the market, usually for cash. Broadly, village retention tends to be larger in areas growing a relatively huge proportion of bold grained varieties and to be smaller where fine rice cultivation predominates. In Madras, for example, in the West Godavari district, where a considerable proportion of the area is devoted to the production of fine rice, retention was found to approximate 39 per cent but in the adjacent district of East Godavari it was as high as 68 per cent, principally because the local production consists of the coarser types.

Obviously, where rice is the staple crop, the tendency is for retention to be greater. In the eastern districts of the United Provinces, for example, where the local inhabitants are predominantly rice eaters, retention was on an average found to be twice as great as in the western districts, where rice is not the staple food grain. Extreme cases are those of Assam, Baroda and Sind. In Assam, rice is the staple food-grain and the total retention amounts to as much as 94 per cent of production. In Baroda and Sind, where rice is not so important in the local dietary, the proportions of the rice crop retained amount to 20 and 32 per cent respectively.

Finally, a factor which influences the amount of rice retained in the village is the relative value of other local crops. In Bengal, for example, it was found that in the districts where rice is the main cash crop, *e.g.*, Bakerganj, Midnapore and Burdwan, the proportion of rice retained for village consumption varied between 40 and 60 per cent. In the districts of Mymensingh, Dacca, Faridpur and Rangpur, where the principal cash crop is jute, the growers retained 60 to 80 per cent of their output of rice.

#### (5) SEASON OF MARKETING.

The season of marketing is determined by the time of harvest, which varies in different areas as already indicated. The disposal of the rice crop commences shortly after threshings are over since the producer not only requires funds for the purpose of discharging his various financial obligations but is also generally compelled to liquidate previous borrowings by repaying either in kind or cash.

In considering the season of marketing, distinction must be made between paddy and rice. In the main rice growing areas, there are

for example, no large assembling markets comparable with the *mandis* of the Punjab and Northern India at which paddy (unhusked rice) is brought for sale by the producers. Only a relatively small proportion of the rice crop is assembled as paddy in the actual markets, the bulk being taken by the growers and other agencies (see Chapter V) to milling centres where the produce is converted into rice. No records are available at these centres to show the seasonality in the marketing of paddy but enquiries have established the fact that large quantities are hurried forward for sale as soon as threshings have been completed. The marked periodicity in the flow of paddy supplies is also borne out by the data quoted in Appendix VIII, which clearly establishes the concentration of paddy marketings in a few months of the year. The marketing of rice also shows a certain degree of seasonality but to a much lesser extent. This is partly due to the fact that the consumption of rice is for the most part fairly evenly spread over the whole of the year, particularly in those areas in which it is the staple food.

The following table conveniently summarises the times of sowing and harvesting in the more important areas and shows when the bulk of the crop is put on the market. This table should be studied in conjunction with Appendix VIII, which gives in terms of percentages the monthly arrivals of paddy and rice at a number of large producing and consuming centres based on the average of a number of seasons, the relevant data having been specially collected from the railway and customs authorities, from municipalities and from private sources.

*Normal periods of sowing, harvesting and marketing of rice in some provinces and States in India.*

—	Type of crop.	Normal sowing period.	Normal harvesting period.	Period during which the bulk of the crop is marketed.
Assam ..	Winter ..	June .. ..	November to January.	December to May.
	Autumn ..	April .. ..	July to August ..	August to September.
	Summer (Spring).	January .. ..	April to May ..	July to August.
Bengal ..	Winter ..	May to June ..	November to December.	End of December to early June.
	Autumn ..	April .. ..	August to September	October to December.
	Summer ..	November ..	February to March	April to May.
Bombay ..	Early ..	June .. ..	September ..	October to November.
	Late ..	June .. ..	October to November.	December to May.

*Normal periods of sowing, harvesting and marketing of rice in some provinces and States in India—contd.*

—	Type of crop.	Normal sowing period.	Normal harvesting period.	Period during which the bulk of the crop is marketed.
Bihar ..	Winter ..	June to July ..	November to December.	January to June.
	Autumn ..	June .. ..	September to October.	November to December.
	Summer ..	October to November.	February to March	April to May.
Central Provinces.	..	June .. ..	October to November.	December to May.
United Provinces.	Winter ..	June .. ..	November to December.	January to May.
	Autumn ..	June to July ..	September ..	October to December.
	Summer ..	December ..	May .. ..	*
Sind ..	..	May to June ..	October to November.	December to April.
Punjab ..	..	May to June ..	September to October	September to December.
Madras ..	First crop ..	Mid-July to September.	September to January.	October to February
	Second crop	September to November.	January to March ..	February to June.
	Third crop ..	December to February.	April to June ..	June to September.
Hyderabad	Winter ..	July to August ..	December ..	January to May.
	Summer ..	November to December.	April .. ..	May to June.

\* Practically the whole of the summer crop in the United Provinces is retained for domestic consumption. The quantities put on the market are, therefore, negligible.

Of the three crops of rice referred to earlier in this Chapter, the winter or *aman* crop is the most important, particularly in Bengal, Bihar, Assam and Orissa, and as might be expected, the principal season of marketing over the greater part of the rice growing tracts in India follows closely upon the harvest of this crop, which is in full swing from November to January. The monthly quantities and proportions of rail and riverborne traffic in paddy and rice in India, expressed as a percentage of the annual movement based on an average of three years (1936 to 1938), are quoted in Appendix IX and the monthly proportions illustrated in the diagram facing page 25. This clearly confirms that taking India as a whole there is a definite seasonality in the movement of both paddy and rice, a feature which is particularly emphasised in the case of paddy. For example, 57 per cent of the total annual traffic in

paddy is concentrated between January and May with a peak of 15 per cent in March alone. In comparison the proportion of the year's traffic in rice carried during the same period amounts to 48 per cent. July, August and November normally show least activity in the movement of paddy by rail and September in the case of rice. The range of variations between the lows and highs of traffic in paddy and rice are 5 to 15 per cent in the former and 6 and 11 per cent in the latter.

As regards the position in individual areas reference to Appendix VIII shows that in Bengal, for instance, the records of the three principal railways converging on Calcutta indicate that over a six-year period 50 per cent of the total annual arrivals of paddy as well as rice were received in the four months, January to April. Incomings of paddy were heaviest in January and February amounting to 28 per cent of the annual total arrivals, while receipts of rice were highest in February and March, being also 28 per cent of the total yearly imports. After March, arrivals diminish gradually, the months of least activity being July and August in the case of paddy and from September to November in respect of rice. It is interesting to observe that the range between the lowest and highest proportions of the year's imports of paddy is respectively from 2 per cent in August to 15 per cent in January. In rice, however, the comparable figures are 5 and 15 per cent, the former occurring in the months of September, October and November and the latter in March.

The winter crop of Bihar starts moving to the markets in January, quickly reaches a peak in February and March and slowly declines thereafter. Based on three years average arrivals of rice at Patna, the volume of incoming traffic between January and May amounted to 56 per cent of the total annual arrivals. The marketing of the crop continues throughout the year but drops to comparatively low levels between August and October just before the main winter crop attains maturity.

In Orissa, the heaviest arrivals of paddy take place between February and July. Average incomings of paddy and rice at the important distributing centres of Cuttack and Balasore taken together indicate that 67 and 56 per cent of the annual arrivals of paddy and rice respectively are received during the six months, February to July. Paddy arrivals decrease from July onwards but the movements of rice continue at a high level until September owing to the fact that the Balasore area normally maintains large stocks for export to Calcutta and the adjacent districts by water routes, which are best navigable during this period on account of the increased depth of the channels resulting from the monsoon rains. Much of this rice is stored in the form of paddy and milled and distributed as required.

In Madras, where rice culture is spread over the greater part of the year, the average of four representative centres\* shows that while the trend of rice arrivals lacks the pronounced seasonality noticed in respect of some of the more northerly provinces, the movement of paddy is

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\*Saltootars, Bellary, Rezwada and Coimbatore.

sharply accentuated between February and April when 40 per cent of the year's receipts are recorded. This is in consonance with the seasons of harvesting of the first and second crops, which together comprise about 90 per cent of the total rice acreage of this province. The relatively large imports of paddy noticed in October represent the earlier part of the movement of the first crop, the harvesting of which commences in September.

In the United Provinces, the crop begins to move immediately after the early rice is harvested in September. Three years' average arrivals of rice at Meerut, Bareilly, Benares and Jhansi point to a fairly high level of marketings in October, November and December, 9 per cent in each month. The period of greatest supplies, however, falls between January and March, following the harvesting of the late or winter varieties in December. During those three months, 33 per cent of the total annual arrivals of rice reach these markets. June to September constitutes the period of shortest supplies but the variation between the largest and lowest proportions of the year's receipts is not large and ranges from 5 per cent in June and July to 12 per cent in February.

The most important part of the marketing season in the Central Provinces is from November to May, the peak of activity being reached in January. During this period average receipts of rice and paddy at three large markets amounted to 88 and 79 per cent respectively of the total annual arrivals. During the monsoon the movement of the crop is at its lowest ebb.

It would appear from the proportions given in Appendix VIII that the seasonality of rice is remarkably pronounced as monthly arrivals range from 1 per cent of the total annual receipts in July to 20 per cent in January. The customary practice in many parts of this province is for cultivators to bring their produce themselves to the mill in the form of paddy and after having had it hulled on the spot to take the rice directly to the market for sale. The periodicity of marketings of rice in this case is the same as that of paddy as there is little or no time lag between bringing the paddy in and taking the hulled product away for disposal.

The average incomings of paddy and rice at Poona, in the Bombay Presidency, indicate October and November marketing of the crop, but December, January and February also show considerable activity in this respect. Arrivals of paddy and rice from October to February constitute 77 and 48 per cent respectively of the years' receipts and show that the marketing of the former is concentrated to a much greater extent within a limited period. The months of least movement are March and May in the case of rice and March to August in respect of paddy.

In Sind the crop is well on the move by January and the pressure of arrivals continues until about mid-April. Rail-borne imports of

Sind-grown rice into Karachi adequately reflect the marketing season in the Upper districts of the Province where the concentration of production is considerable and whence large supplies move down to Karachi. These show that an average of 42 per cent of Karachi's annual receipts are registered between January and April. June and July are months of reduced activity but marketings are well spaced out over the remainder of the year.

Actual records of sales of paddy by the co-operative commission shop at Dinanagar in the Gurdaspur district of the Punjab show that on a 5 years' average 61 per cent of the total annual sale took place during September and October and 22 per cent during November and December making a total of 83 per cent for the four months. There were no arrivals at all in July and August and only 1 per cent in each of the two preceding months of May and June. As the heaviest arrivals in any one month represent 34 per cent of the years' receipts, it will be seen that the range of variations is very wide indeed.

About 45 and 47 per cent of the annual receipts of rice and paddy respectively at six markets in Hyderabad normally occurs between December and March. Arrivals of rice are heaviest in January and those of paddy in March. Marketings of rice and paddy are smallest in July and September respectively. It is interesting to observe that the range of variation in monthly arrivals is also greater in the case of paddy than in rice. Paddy arrivals range from a low of 3 per cent in September to 14 per cent in March whereas rice between 5 per cent in July to 14 per cent in January.

As is the case with practically all other agricultural commodities, natural conditions have a considerable effect on the flow of the supplies. With the advent of the monsoon, for example, the movement of rice diminishes but while this does not necessarily apply to traffic by rail (or by large sea-going vessels) it is typical of conditions in the rural areas, particularly where communications are only by road. The greater proportion of the roads connecting the villages with the markets is unmetalled. In many cases these are merely rough tracks winding through the fields and liable to be rendered impassable for long periods after the first heavy showers. Rice is very susceptible of discolouration and tends to fracture badly in hulling if the paddy comes into contact with rain and is thereafter insufficiently dried. It was everywhere found that growers and others bringing the produce to the markets by cart, headloads or pack animals were careful to avoid, as far as possible, any occasion on which their goods might be unduly exposed to the elements.

In addition to illustrating the post-harvest rush of supplies, the following table relating to one of the largest rice markets in the Central Provinces shows how market arrivals diminish from June onwards when the monsoon breaks. The period July/September is outstanding as being responsible for only 6 per cent of the total annual receipts.



*Arrivals of rice\* by road in Raipur (Central Provinces).*

(Thousand maunds).

	1934.	1935.	1936.	Average.	Pro- portion. (Per cent).
January .. ..	247	299	188	245	19
February .. ..	227	191	113	177	14
March .. .. .	127	165	192	165	13
April .. .. .	115	141	149	135	11
May .. .. .	78	133	108	106	8
June .. .. .	54	62	47	54	4
July .. .. .	14	49	19	27	2
August .. .. .	18	25	22	22	2
September .. ..	21	31	34	29	2
October .. .. .	49	55	63	56	4
November .. ..	78	92	100	90	8
December .. ..	170	121	207	166	13

\*As mentioned earlier, this also reflects the movement of paddy as the rice in the husk is brought to the local mills hulled almost at once and the resulting product and by-products (rice and brokens, etc.) sent or removed straight to the *gunj* nearby.

Another example of the effect of natural conditions is seen in the importation of Burma rice into the important consuming and distributing centres of Kolhapur, the capital of one of the Deccan States in Bombay. In the dry weather, this area receives its supplies of Burma rice through Ratnagiri, a small open port to which the produce is transhipped via Bombay. The hazards of navigation are so great during the monsoon that country sailing craft and small coastal steamers do not ply on this route between mid-June and mid-September. In consequence this sea-borne trade is diverted to the railway during this period.

The extent of the diversion caused by the monsoon is clearly shown in the following table.

*Imports of rice in Kolhapur (Deccan State) by rail.*  
(Maunds).

	1934.	1935.	Average proportion. (Per cent).
January .. .. .	Negligible	1,000	1
February .. .. .	"	500	..
March .. .. .	1,300	200	1
April .. .. .	700	400	1
May .. .. .	1,300	1,400	2
June .. .. .	21,000	24,600	31
July .. .. .	15,200	19,200	24
August .. .. .	8,500	13,700	15
September .. .. .	3,800	14,900	13
October .. .. .	7,600	3,400	7
November .. .. .	5,900	400	4
December .. .. .	600	Negligible	1

#### (6) TYPES AND QUALITIES.

(a) *General*.—Of the seven thousand known botanical varieties of rice (paddy) known to science, about four thousand have been identified in India. It is not surprising, therefore, to find considerable physical variations in the different types and qualities cultivated in this country. These diversities have given rise to a vast and confusing nomenclature. An additional complication is the fact that in some cases the trade descriptions of commercial rices are so loosely used as to be applied to rices of varying physical characteristics, while in others the same botanical variety of rice may be known by different commercial names in different districts. It is probably no exaggeration to say, therefore, that almost as many trade names are given to commercial rices as there are botanical varieties of paddy. Fortunately, most of the names are of purely local significance and no practical purpose would be served by attempting to refer to all of them, particularly since only about 40 per cent of the total production of rice is actually put on the market.

From a marketing point of view the quality of any variety of paddy is directly related to the nature and quality of the rice derived from it. For the sake of clearness and simplicity, therefore, it is proposed to describe physically only the main commercial types and to classify the various

varieties, qualities and types under the broad groupings of (a) fine, medium and bold (or coarse), (b) raw and parboiled and (c) machine-milled and hand-pounded rices. Every effort has been taken to present the ascertainable facts as concisely as possible and if the figures quoted are, at best approximations, they may be accepted as giving a reasonable picture of Indian rices.

There are many complex and often apparently irreconcilable factors, which determine quality in rice particularly in respect of consumer's requirements and cooking quality, but the rices having the desired characteristics are as a rule distinguished by certain physical factors of which those generally held by the trade to be the most important are the size and the shape of the grain. Other things being equal, fineness or slenderness as indicated by a fairly high length to breadth ratio and small size, singly or in combination, are the two main physical characteristics, which place rice high in the quality range. On the other hand, thick, squat, large or bold grained varieties with relatively low length to breadth ratios invariably occupy an inferior place in consumers' preference.

The first general classification which must be applied is that of conformation and in accordance with this criterion the production of rice in India has been divided into the three categories of fine, medium and bold (or coarse). In view of the almost infinite gradations of grain size and shape, it has been found impossible to lay down any hard and fast line of physical demarcation between these categories. The terms "fine", "medium" and "bold" overlap to some extent and cannot, therefore, be too strictly interpreted, particularly in respect of the rices covered by the middle group. In every case of doubt regarding the appropriate placing of a variety, the question has been resolved by a reference to its relative price level and to trade usage in classification. Thus in some instances the descriptions "fine", "medium" and "bold" do not necessarily reflect strictly the actual physical appearance and conformation of the grain.

The second classification to which rice conveniently leads itself is under "raw" and "parboiled". The practice of first steeping the paddy and subsequently applying heat (by steam or other means) is common in many areas. This treatment toughens the rice kernel and enables it the better to withstand hulling or milling without excessive breakage. Usually the bold or coarser varieties with a soft and chalky kernel structure are chosen for parboiling. The extent of the practice, which varies in the different tracts, is discussed in detail later in this section. The term "raw" is used to denote rice which has not been subjected to any form of treatment, prior to hulling, which involves the use of heat and moisture artificially applied.

The third classification relates to "machine-milled" and "hand-pounded" rice. Before it can be used for human consumption the paddy must be converted into rice. This may either be done by means of power-driven hullers or the husk may be removed by a pestle and mortar system operated by manual labour. The prevailing conditions which differ greatly from area to area are referred to in the appropriate section.

Fourthly, the various types and varieties of rice which are included in the three main groupings enumerated above possess, in their turn, a number of other physical characteristics, each of which constitutes a definite quality factor. These are :—

*General characteristics—*

- Translucency or chalkiness.
- Colour.
- Polish.
- Fragrance or aroma.
- Uniformity in size and shape.
- Age or maturity.
- Cooking quality.

*Special characteristics—*

- Proportion of foreign matter and impurities.
- „ „ broken grains.
- „ „ damaged or defective grains.
- „ „ red grains.
- „ „ chalky grains.
- „ „ weevilled grains.

Admixture with other varieties of rice.

From a marketing point of view it is essential to pay regard to the highly localised nature of the market for certain types of rice, owing to the fact that the degree of importance attached to each quality factor by consumers in different parts of the country varies widely. For instance, a long, slender, fragrant rice such as the highly priced *Basmati* variety grown in the United Provinces and the Punjab would not be appreciated by the main body of consumers in South India, while a parboiled hand-pounded rice of yellow or reddish colour popular in Bengal, Orissa or Bihar would hardly be considered fit for edible purposes by a large section of other consumers in Northern India. Thus, there are no recognised universal standards for rice applicable throughout India and quality factors cannot everywhere be translated into terms of price by a precise formula. Nor is it possible to ascribe to each individual quality factor a definite proportion of the total price difference which may exist between two grades of rice of the same commercial variety or between two different varieties. The importance of each of the factors enumerated above must, therefore, be considered in relation to other factors.

*General characteristics.*—Natural translucency (as distinct from the translucency imparted by parboiling) is almost everywhere accepted as a most desirable characteristic. It indicates a hard kernel structure, which implies freedom from any tendency to coagulate on cooking. On the other hand, an opaque chalky rice possesses a relatively soft kernel

structure and tends to cook into a glutinous mass. Translucent rices, therefore, command a higher price and are always reckoned of higher quality than the opaque varieties.

*Colour—(i) Natural colour as distinct from colour artificially induced or applied.*—Colour is a quality factor which is also highly regarded by many consumers. As a rule, the whiter the colour, the better the quality and the higher the price of the product. There are, however, some notable exceptions to this rule. In Bengal and Orissa, the *Patnai* or *Kalambank* varieties, which are mainly put on the market in parboiled form, may be specially given a yellowish tinge by a slight lengthening of the normal process of parboiling so that the grain absorbs some of the yellowish colour from the husk. This is in order to meet the demand from East Africa. *Durban Quality*, as this quality is known in the export markets\*, normally fetches as good a price as its white counterpart and may even be a little dearer. White types on ageing after the monsoon are inclined to turn slightly yellowish. This tendency is recognised by consumers in Bengal, Orissa and parts of Bihar and Assam, but in most other parts of India, particularly in urban areas, consumers would unhesitatingly give preference to white rice and accordingly pay more for the latter.

*(ii) Colour applied externally.*—The practice of artificially colouring rices is not very widespread and is confined mainly to a few centres in Bombay, Madras and Hyderabad. At Bhiwandi, in Bombay, for example, *Kolamba* rice may be coloured yellow by applying a mixture of yellow ochre and rice flour or wheat flour (*maida*). At Nasik in the same province the *Kamod* variety may also be given a yellow coating by powdered turmeric. In Madras, rices grown in the Circars and the Kistna districts and destined for export to the Ceded districts and Hyderabad markets may be coloured by the application of yellow or red ochre. The chief varieties thus treated are *Konamani* which may be coloured light rose or red, *Akkulu* which may be given a light yellow or red tint and *Kusuma* and *Delhibhogam*, both of which are coloured light yellow. In Hyderabad, colouring matter, when used, is only applied to the *Konamani* and *Khichidi* varieties, the former being treated with red ochre and the latter with yellow ochre or powdered turmeric. In Ganjam, in Orissa, both yellow ochre and turmeric are used on some of the local coarse rices.

The demand for coloured rice in Northern India is very limited. As a result the practice of applying colouring agents is rare and as far as can be ascertained prevails on a very small scale only in the Punjab where the *Basmati* and *Hansraj* qualities required for the Amritsar and Hyderabad (Deccan) markets are treated with powdered turmeric. So far no analytical examination has been made of the various colouring materials used with a view to determining whether or not they are in fact of a harmless nature. This is a point, however, which lies within the sphere of public health authorities. It may, however, be noted that the practice

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\* In Bengal and Orissa the term *Chap* or *Champ* is used to denote such qualities.

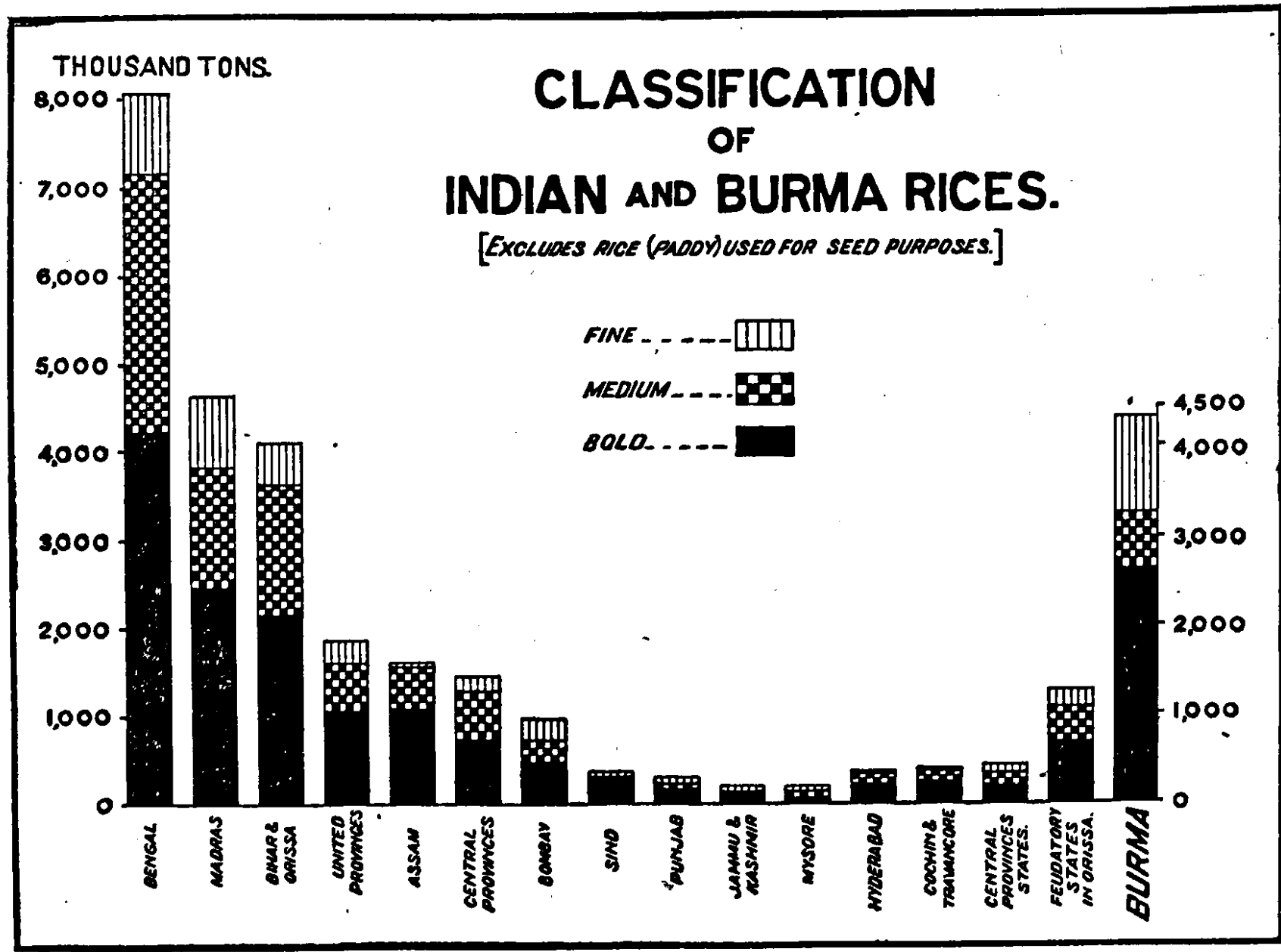
of washing the rice in two or three changes of water before actually cooking it prevails almost everywhere. This results in most if not all of the colouring material being washed away.

*Polish* is not a universally appreciated characteristic in India and only a comparatively small proportion of the rices turned out by the power driven mills is specially treated to impart that lustre or gloss, which is so highly esteemed in Western countries. Hand-pounded rices, which still form the greater part of India's production, are generally devoid of polish. Where it is customary to turn out a polished article, the rice is usually simply put through a second huller—suitably adjusted—and is not generally processed by a pearling cone. Where polishing or glazing agents are used as, for example, in the large rice milling centres of Kalyan and Bhiwandi in the Bombay Presidency, these may be a white odourless mineral oil or a vegetable oil such as castor oil or groundnut oil. The well-known *Sela Basmati* for which the centre of production is Saharanpur in the United Provinces is given a high polish by means of an application of ordinary wheat flour by a manual process. Powdered rock salt may also be used partly as preservative and partly for polishing as in the case of *Daudzai* parboiled variety of Peshawar in the North-West Frontier Province. Talc is employed in the Punjab and Sind and elsewhere. Wheat flour, however, used alone or in conjunction with Talc, seems to be about the most popular polishing agent. The customary procedure in the various provinces is discussed at greater length in Chapter IV (Preparation for market).

*Natural fragrance or aroma* is a much valued quality factor particularly where the scent persists after the rice has been cooked. Typical of the scented rices are the *Basmatis* grown in the United Provinces and in the Punjab and the *Mushkan* variety of the latter province. These have a characteristic musk or "mousy" odour. Another scented rice, which is perhaps not so widely known throughout India as the *Basmatis* but which is nevertheless in good demand in Central India, is the *Chinoor* variety cultivated in the Balaghat district and neighbourhood in the Central Provinces. *Ambemohar* is a scented variety grown in Bombay.

*Uniformity of size and shape* implies a reasonable degree of purity or freedom from admixture of other rices. Apart from this important aspect, rice, which is fairly uniform in size and shape, presents a more attractive appearance.

*Age or maturity* is a factor closely allied to cooking quality. Wherever it is possible to exercise preference, no consumer will eat rice which has only just been harvested and has an insipid watery flavour. Most rices are not really suitable for consumption until at least two or possibly three months have elapsed from the date of harvesting, while some of the translucent fine scented varieties such as *Basmati* must have been stored for one to two years before they are regarded as being at their best. Age, therefore, has a special significance in all the higher priced translucent fine rices and also plays some part in determining the value of the cheaper



varieties. Recent research\* indicates that the chemical constitution of old and new rices differs somewhat and thus causes variations in cooking properties. The exact nature of these changes in relation to cooking quality has, however, not yet been fully established.

*Cooking quality.*—For all practical purposes cooking quality depends principally on the age of the rice and the structure of the grain. Matured rice is always superior to new rice in this respect, while for ordinary day to day use a translucent hard textured product is preferred wherever a choice in the matter can be made. Special dishes, however, e.g., *kheer*—a kind of rice pudding made with milk—is best prepared with a soft starchy rice.

*Special characteristics.*—Apart from the foregoing factors each grade or quality of rice differs in respect of its impurity content and other components such as broken grains, etc. Over 1,500 ordinary market samples of a large number of commercial types were drawn in many assembling and distribution centres throughout India and were examined for their physical characteristics, including natural weight and length and breadth.

(i) *Foreign admixture.*—The foreign matter or impurity content of rice is usually low compared with many other food grains, wheat for instance, and although there may be a considerable range of variation, the majority of results will be seen to fall below 0.50 per cent. In a few cases practically no foreign matter at all was found in the samples examined but in a few others it was over 7 per cent. The latter instances are, however, quite exceptional and may be disregarded.

(ii) *Broken grains.*—The percentage of broken grains present in rice may range from less than 1 per cent in the case of specially sifted rice, such as *Chhana Jhona* of the Punjab or *Sifted Patnai* of Bengal, to over 63 per cent in the case of raw, soft, chalky varieties such as *Laki* from Karimganj in Assam.

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\*The Imperial Council of Agricultural Research Scheme of research on "Quality in Crops" with special reference to rice has been carried out from 1934 to May 1939, both from the botanical and chemical aspects at the Rice Research Station, Coimbatore, under the Paddy Specialist and at the Indian Institute of Science, Bangalore. Among the studies undertaken in connection with this scheme were (i) the changes in composition of raw and parboiled rice on polishing, (ii) the distribution of nitrogen and phosphorus in raw and parboiled rice, (iii) the influence of parboiling on the milling quality of rice, (iv) physical analysis and cooking qualities of ordinary bazar or commercial samples, (v) effect of aeration during storage on the cooking qualities of rice, (vi) micro-chemical investigation on the formation of starch and protein, (vii) histology of the rice grain, (viii) the chemical composition and nutritive value of parboiled rice and (ix) digestibility of different rices. The scheme was terminated at the end of May 1939, as much of the work proposed to be done in the future was already being carried out at the Nutrition Research Laboratories at Coonoor (Nilgiris, South India) and it was decided that the research was of a nature to be financed from the funds of the Indian Research Fund Association. A full report on the findings of these investigations is, it is understood, in course of preparation.

In regard to the effect of storage on cooking quality and digestibility, work so far done shows that stored or matured rice swells on cooking to about four times its original volume while newly harvested rice increases by only half that extent. It would also appear from these experiments that high temperatures and reduced aeration give the best conditions for storage.

Further work is, however, stated to be necessary to elucidate the precise nature of the changes undergone by the starch and other constituents of rice during storage.



(iii) *Red grains*.—Commercial rices, particularly the machine-milled varieties, contain a fairly low proportion of grains having red cuticle and variations range from nil to about 12 per cent. Certain qualities, however, such as the *Mayawati*, *Bora*, *Badal* and *Raomirail* varieties of Assam consist almost wholly of red grains but these are not marketed on any appreciable scale.

(iv) *Damaged and immature grains*.—The proportion of immature and defective grains ranges from nil to the exceptionally high figure of 17 per cent in the case of the *Joshwa* variety of Bihar and Bengal but the average sample contains not more than about 1 per cent as a rule.

(v) *Weevilled grains*.—A large proportion of the commercial samples analysed contained no weevilled grains at all. Some of the Bihar, Bengal, the Central Provinces and Bombay rices contained varying proportions ranging up to nearly 7 per cent. It is interesting to observe that rice, and in particular parboiled rice, does not appear to weevil as quickly as wheat.

(vi) *Specific weight*.—Natural test weights were found to range from 61.3 lb. per bushel in the case of the *Phulpakri* variety of Assam to 70.4 lb. for the large grained *Jhona* variety of the Punjab.

(vii) *Length and breadth*.—Lengths, breadths and ratios of length to breadth are more fully dealt with later in this Chapter. The lowest length to breadth ratio was found to be 1.70 and belonged to the *Sirumani* variety of Madras, which possesses a round shaped grain. The highest ratio 3.83 was that of *Saharanpur Sela*. The other Northern India rices of this class, e.g., *Basmati*, *Parmal*, etc., also possess high ratios. The results of the analysis will be found in Appendices X to XIX.

(b) *Classification of production according to conformation (grain size)*.—The classification of rice according to size must necessarily be somewhat elastic in view of the variations, which are found in the dimensions of the rice grains even of the same type or variety. An examination of Appendices XX to XXII giving the maximum, minimum and average lengths, breadths and ratios of length to breadth of a number of important commercial rices grouped under the three classes of fine, medium and bold (or coarse) will reveal the difficulties of attempting to lay down rigid limits for each class. It is, however, significant that the rough and ready classifications current in the trade can in most cases be readily reconciled with the measurements contained in the above Appendix and justify the following broad conclusions.

(i) Most of the fine rices, excluding the short fine types, have an average length to breadth ratio of well over 3, in many cases over 3.25 and in some as much as 3.75 and above.

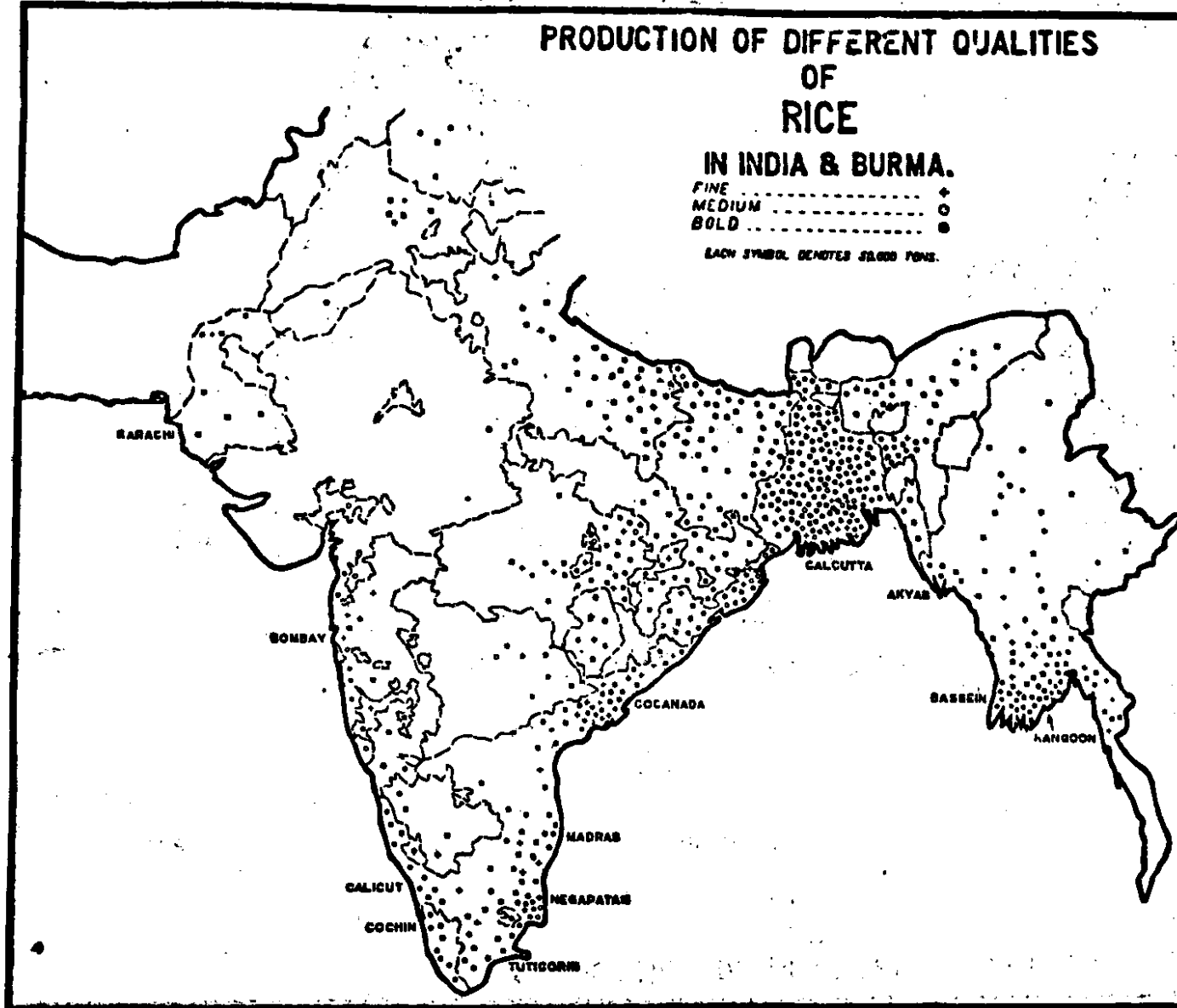
(ii) The length to breadth ratios of the average medium rices range from about 2 to approximately 3 with the greater number, however, exceeding 2.5. The only notable exceptions in this class are the *Red* and *White Sirumani* varieties of Madras, which have a small round grain and average below 2.

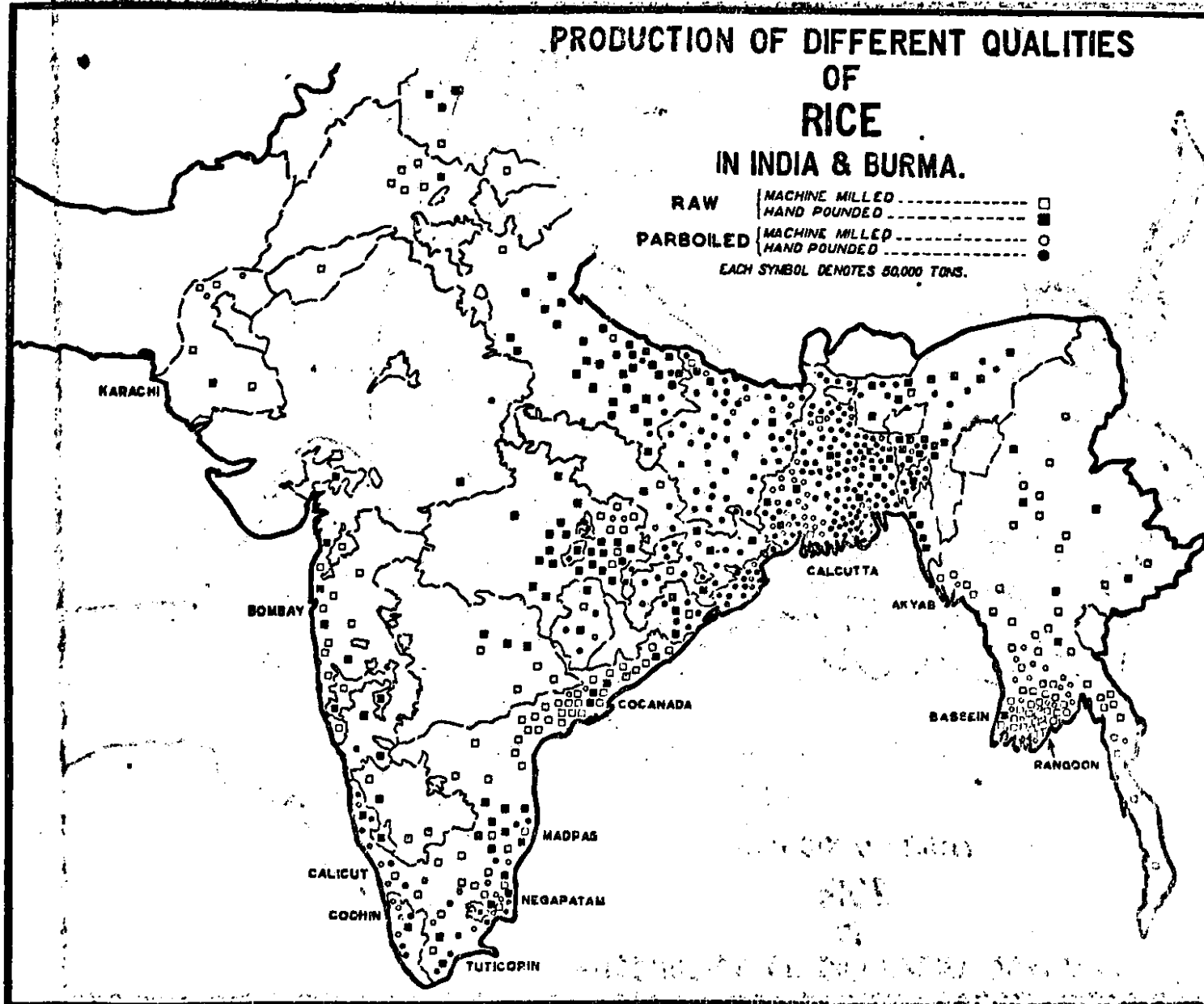
PRODUCTION OF DIFFERENT QUALITIES  
OF  
RICE

IN INDIA & BURMA.

FINE ..... +  
MEDIUM ..... ○  
BOLD ..... ●

EACH SYMBOL DENOTES 25,000 TONS.





(iii) The bold and coarse rices have a range of length to breadth ratios similar to the medium category, but in this case the tendency is for the ratios to fall below 2.5.

The average production of rice in India based on the triennium 1934-35/1936-37, excluding seed requirements, amounts to 26.74 million tons in round figures. Of this quantity, it is estimated that some 3.39 million tons or roughly 13 per cent consist of fine rices, 8.70 million tons or 32 per cent are medium rices and 14.65 million tons or 55 per cent may be classed as bold (or coarse) rices (see diagram facing page 42).

The following abstract of Appendix XXIII, based on the classification referred to, shows the position in the main producing areas, including Burma, which is treated separately in the second part of this Chapter. This is further illustrated in the diagram facing page 39. The map facing page 40 will show at a glance the quantitative distribution according to fine, medium and bold qualities in different areas.

*Classification of rice production into the categories of fine, medium and bold (or coarse) based on average production, less seed requirements for 1934-35/1936-37.*

	Fine.		Medium.		Bold (or coarse).	
	Thousand tons.	Per cent.	Thousand tons.	Per cent.	Thousand tons.	Per cent.
<b>INDIA.</b>						
<b>PROVINCES.</b>						
Bengal ..	886	11	2,939	36	4,228	53
Madras ..	828	18	1,362	29	2,483	53
Bihar and Orissa	447	11	1,479	36	2,171	53
United Provinces.	258	14	545	29	1,068	57
Central Provinces.	191	13	561	38	737	49
Assam ..	36	2	487	30	1,087	68
Bombay ..	216	28	192	24	379	48
Sind ..	38	11	..	..	323	89
Punjab ..	84	26	36	11	199	63
Others ..	24	13	60	33	99	54
<b>Total ..</b>	<b>3,008</b>	<b>13</b>	<b>7,661</b>	<b>32</b>	<b>12,774</b>	<b>55</b>

*Classification of rice production into the categories of fine, medium and bold (or coarse) based on average production, less seed requirements for 1934-35/1936-37—(contd.).*

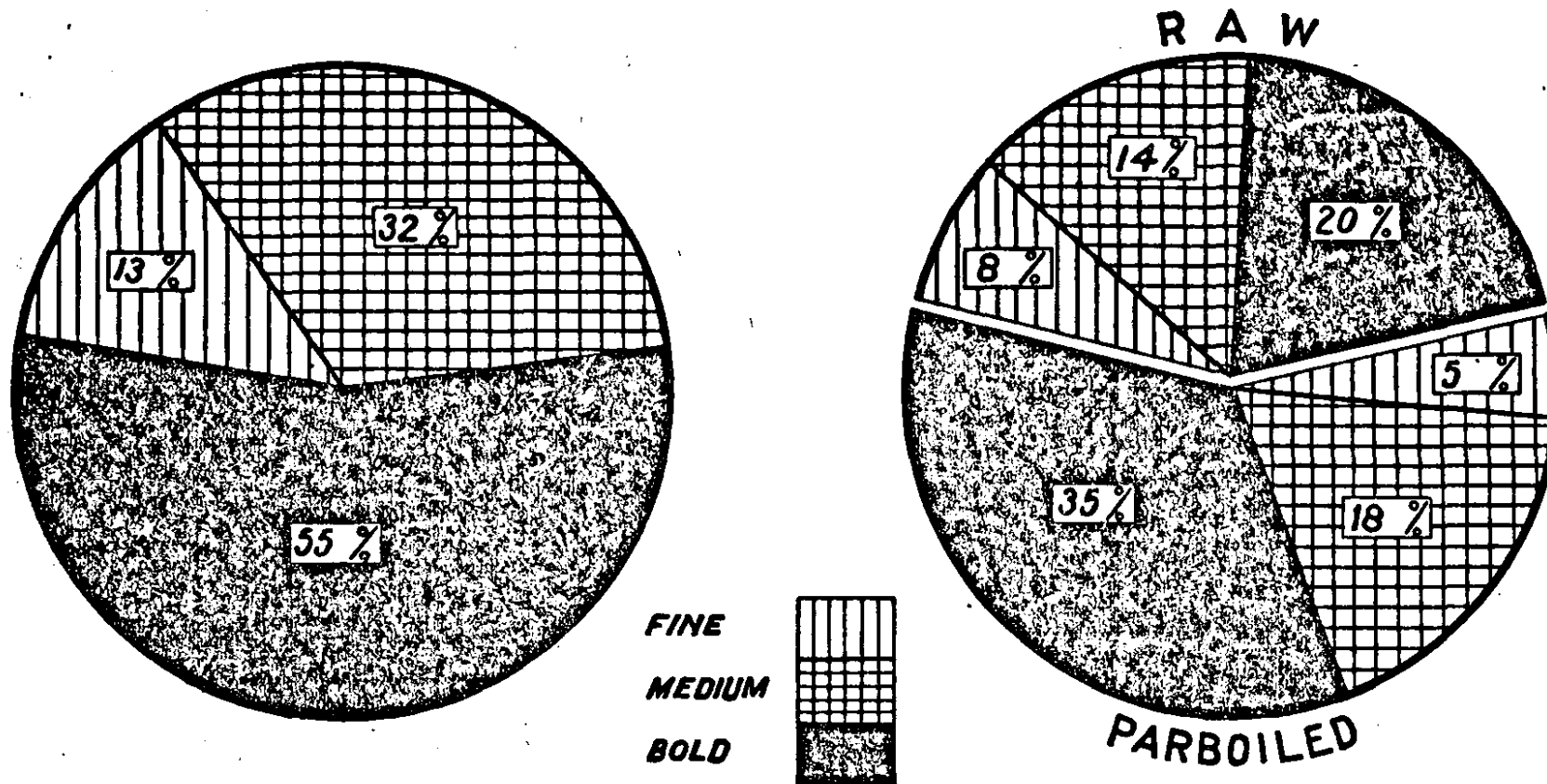
	Fine.		Medium.		Bold (or coarse).	
	Thousand tons.	Per cent.	Thousand tons.	Per cent.	Thousand tons.	Per cent.
<b>STATES.</b>						
Feudatory States in Orissa.	175	14	421	33	673	53
Central Provinces States.	52	13	153	38	198	49
Bombay States, including Khanpur.	39	22	36	20	104	58
Hyderabad ..	7	2	126	36	216	62
Mysore ..	59	30	59	30	77	40
Travancore and Cochin.	4	1	97	24	305	75
Baroda ..	15	33	17	37	14	30
Jammu and Kashmir.	..	..	50	26	145	74
Others ..	31	12	80	31	149	57
<b>Total ..</b>	<b>382</b>	<b>12</b>	<b>1,039</b>	<b>31</b>	<b>1,881</b>	<b>57</b>
<b>Grand total (India).</b>	<b>3,390</b>	<b>13</b>	<b>8,700</b>	<b>32</b>	<b>14,655</b>	<b>55</b>
<b>BURMA ..</b>	<b>1,047</b>	<b>24</b>	<b>655</b>	<b>15</b>	<b>2,662</b>	<b>61</b>

**Bengal.**—In Bengal fine rices are mainly grown in the districts of Bakarganj, Midnapore, Dinajpur and the 24-Parganas but relatively small quantities are also produced in nine other districts notably in Murshidabad, Jessore, Burdwan and Bankura. Of the twenty six districts in Bengal, thirteen grow no fine rice but all produce large quantities of medium and bold varieties, especially the districts of Mymensingh, Faridpur, Bakarganj, Midnapore and Rangpur in that order of importance.

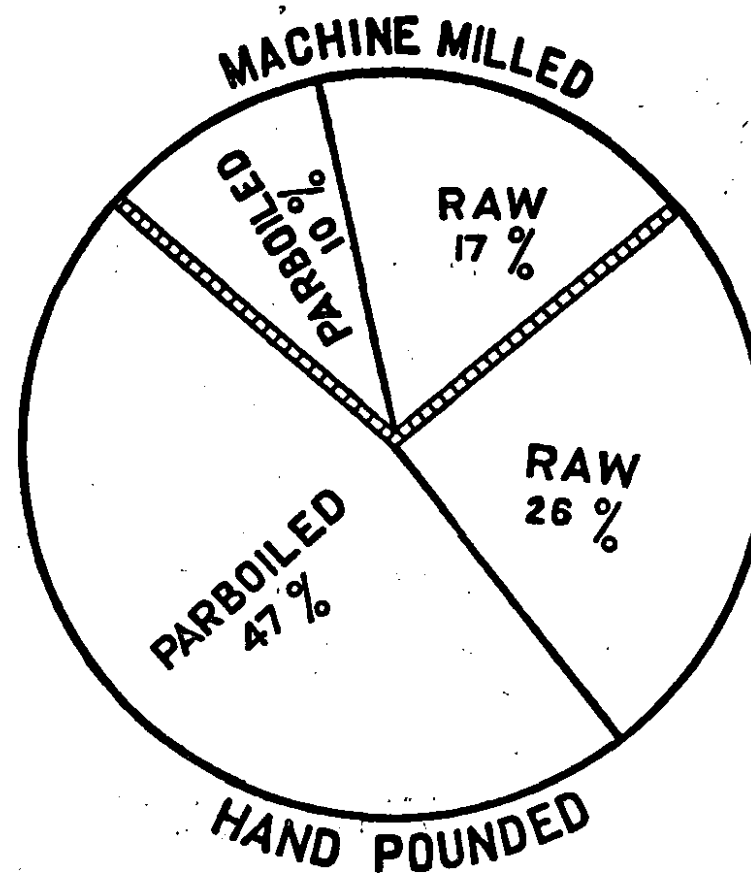
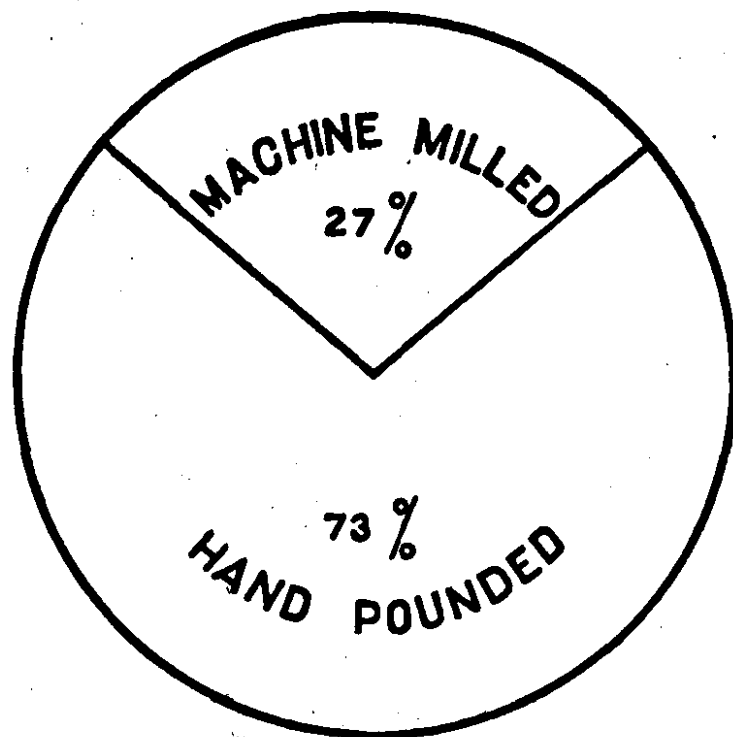
**Madras.**—In this province the West Godavari and Vizagapatam districts, and to a relatively smaller extent the South Arcot district, are the main fine rice growing areas, but some fine rice is also produced in the East Godavari, Kistna and Guntur districts and in a few places in the south of the presidency. The largest production of medium rice is centred round the Tanjore, Trichinopoly and South Arcot districts. Bold rices are grown in every district, the most important in this respect being Malabar, South Kanara, Tanjore, East Godavari and Kistna. The entire crop grown on the Malabar coast consists of coarse rice.

**Bihar.**—Bihar produces relatively little fine rice, the main areas being in Ranchi, Bhagalpur, the Santhal Parganas, Champaran and Purnea.

# CLASSIFICATION OF INDIAN RICES.



# CLASSIFICATION OF INDIAN RICES.



Medium and bold rices are grown everywhere but principally in Gaya, the Santhal Parganas, Ranchi, Muzaffarpur and Darbhanga.

**Orissa.**—In this province, Balasore, Cuttack, Sambalpur and Ganjam are the chief districts for the production of fine rice. The great bulk of Orissa's crop consists, however, of the larger grained types which are grown on a wide scale in each of Orissa's six districts.

**Central Provinces.**—In the Central Provinces, fine rice production is confined to the eastern districts of Raipur, Bilaspur, Balaghat and Bhandara. The other two types of rice are grown extensively in Raipur, Bilaspur and Drug and on a smaller scale in Balaghat, Bhandara, Chanda, Chhindwara, Mandla and Jubbulpore, in which districts the crop consists almost wholly of the bold types.

**Assam.**—With the single exception of the district of Sylhet, where some fine rice is grown, the rice crop of Assam consists mainly of the medium and bold varieties, the latter predominating. The Sylhet, Kamrup, Goalpara and Sibsagar districts are noteworthy as the chief producing areas, Sylhet being responsible for practically one-third of the total rice crop of this province.

**United Provinces.**—In the United Provinces, fine rice production is not large and is confined to the districts of Dehra Dun, Saharanpur, Naini Tal, Pilibhit, Basti. Although the crop of this province is fairly widely distributed, the largest rice areas are located in the northern districts bordering the foothills of the Himalayas and in the eastern districts. Of these Gorakhpur, Basti, Gonda and Bahraich are the most important and produce medium and bold varieties mainly.

**Bombay.**—Fine rices are mainly grown in the Thana, Kolaba and Nasik districts, while Ratnagiri and Kolaba are the most important areas for the medium varieties. Bold types are produced in moderate quantities in Belgaum, Dharwar and Kanara in the South and in Poona and Surat in the central and northern parts of the presidency.

**Sind.**—Local rice production in Sind is concentrated largely in the north of the province and consists mostly of bold rices. Fine rice is grown in Larkana which is the main rice growing district and accounts for over one-third of the total rice crop of Sind. Other rice tracts are found in the Upper Sind frontier area, Hyderabad, Dadu and Thar Parkar.

**Punjab.**—Practically all the rice grown in this province comes from the northern districts of Gujranwala, Sheikhpura, Gurdaspur, Sialkot and Amritsar and from the hilly tract of Kangra. Fine rices are grown principally in the Gujranwala and Sheikhpura areas.

**Hyderabad.**—Of the sixteen administrative districts in the Nizam's Dominions only four are concerned with rice culture on any appreciable scale. These are Warangal, Nizamabad, Karimnagar and Nalgonda. No fine rices are grown in these tracts.

**Mysore.**—Shimoga, Kadur, and Hassan are the main rice districts. A certain amount of fine rice is grown in Mysore district but the production of this State consists predominantly of bold varieties.



Cochin and Travancore are also concerned chiefly in the production of bold rices but medium rice is also grown in the Kottayam district of Travancore State and in the southern part of Cochin State. Quilon and Trivandrum are the other main rice areas in Travancore.

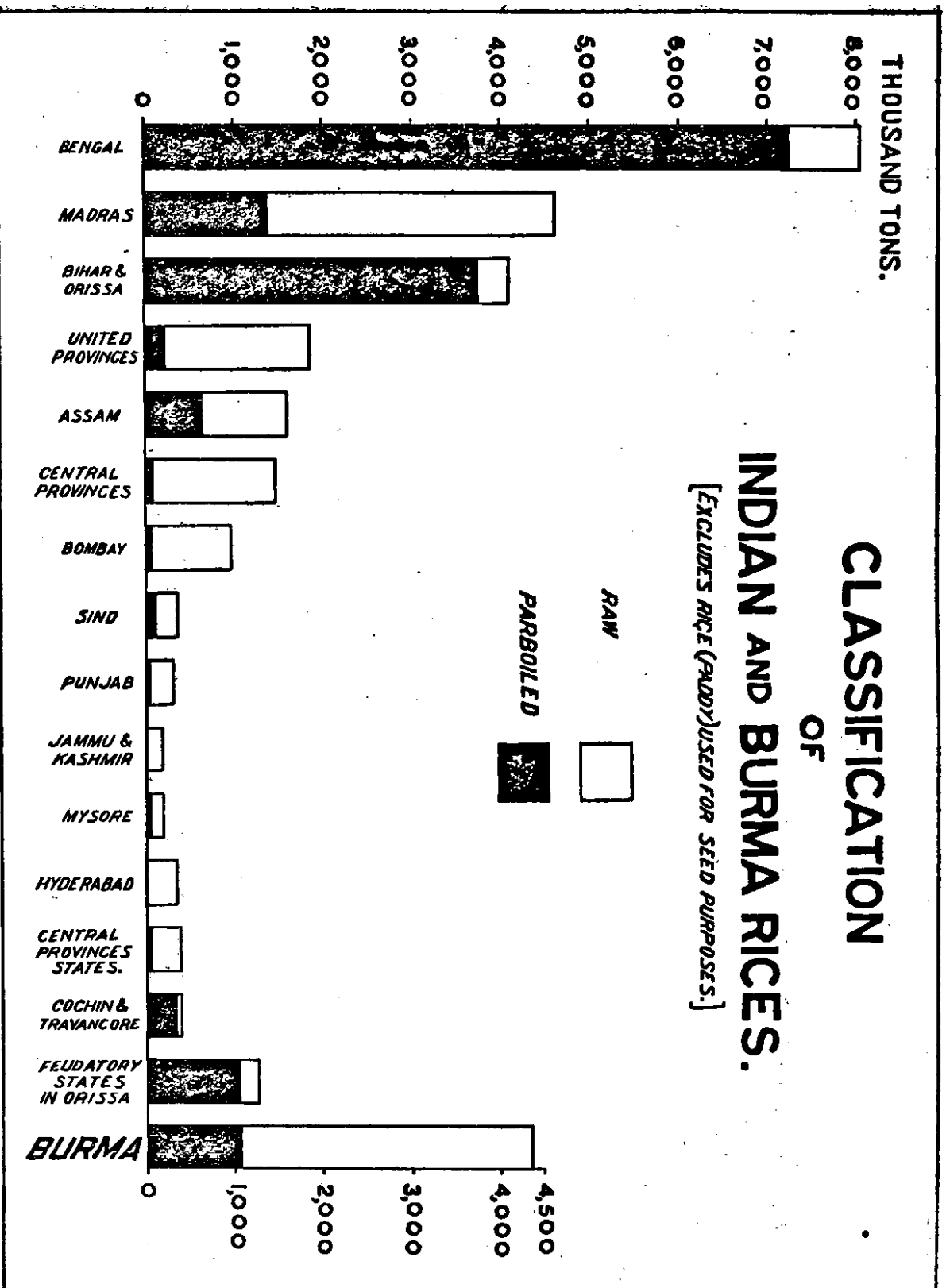
Details could not be obtained as regards the precise distribution of production types in the individual States forming the Feudatory States in Orissa, the Central Provinces States and certain Bombay States.

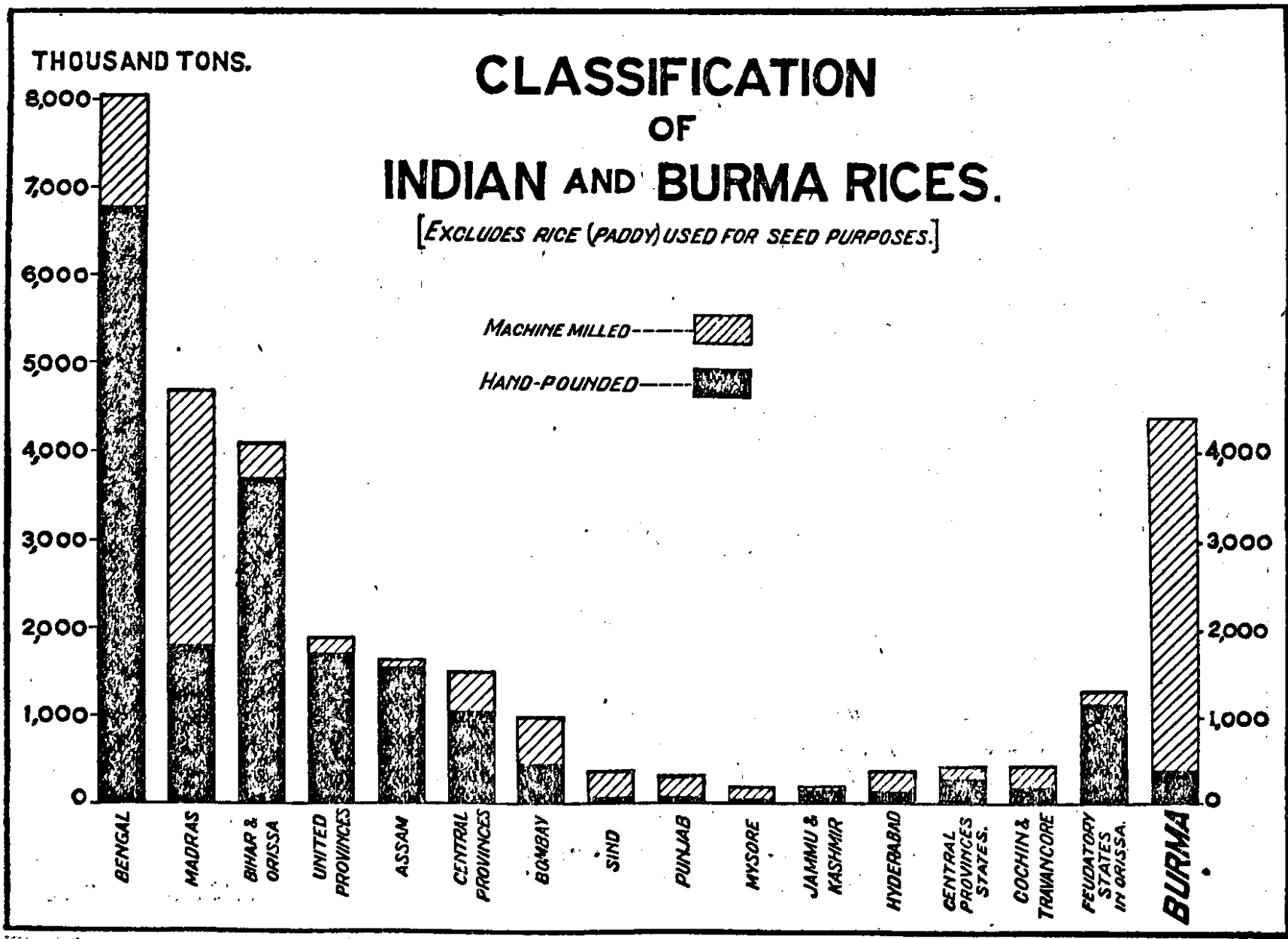
(c) *Classification by raw and parboiled.*—The greater proportion of the rice grown in India and used for human consumption is parboiled\*. On the basis of the average triennial production of 1934-35/1936-37, excluding the portion of the crop used for seed some 57 per cent or the equivalent of 15.32 million tons were parboiled, the remaining 43 per cent or 11.42 million tons being classed as raw or untreated rice (see the diagram facing page 43). The position in the provinces and States of India and in Burma may be readily assessed from the following abstract of Appendix XXIV and from the diagram opposite this page.

*Production of raw and parboiled rice.*

	Production <i>less seed</i> (1934-35/ 1936-37). (Thousand tons).	Raw.		Parboiled.	
		Thousand tons.	Per cent.	Thousand tons.	Per cent.
<b>INDIA.</b>					
<b>PROVINCES.</b>					
Bengal .. ..	8,053	809	10	7,244	90
Madras .. ..	4,673	3,164	68	1,509	32
Bihar and Orissa .. ..	4,097	397	10	3,700	90
United Provinces .. ..	1,871	1,641	88	230	12
Central Provinces .. ..	1,489	1,414	95	75	5
Assam .. ..	1,610	934	58	676	42
Bombay .. ..	787	752	96	35	4
Sind .. ..	361	252	70	109	30
Punjab .. ..	319	303	95	16	5
Others .. ..	183	76	42	107	58
<b>STATES.</b>					
Feudatory States in Orissa	1,269	200	16	1,069	84
Central Provinces States ..	403	383	95	20	5
Bombay States ... ..	179	161	90	18	10
Hyderabad .. ..	349	349	100	..	..
Mysore .. ..	195	188	96	7	4
Baroda .. ..	46	38	83	8	17
Jammu and Kashmir .. ..	195	195	100	..	..
Cochin and Travancore .. ..	406	33	8	373	92
Others .. ..	260	135	52	125	48
<b>Total (India) ..</b>	<b>26,745</b>	<b>11,424</b>	<b>43</b>	<b>15,321</b>	<b>57</b>
<b>BURMA ..</b>	<b>4,364</b>	<b>3,273</b>	<b>75</b>	<b>1,091</b>	<b>25</b>

\*The term is perhaps not altogether satisfactory but is applied to rice derived from paddy, which before hulling has been subjected to treatment with water and heat in a variety of ways.





The practice of parboiling will be seen to have a much greater vogue in Bengal, Bihar, Orissa, the States in and adjoining Orissa, Cochin and Travancore than elsewhere. On an average between 85 and 90 per cent of the total production of paddy in these areas is parboiled before milling. Parboiling is also done on a fairly large scale in Assam and in Sind where 42 and 30 per cent respectively of the crop of the two provinces are thus treated. It is significant that the areas noteworthy for parboiled rice are those in which the production of bold or coarse and medium rices of soft or chalky structure predominates. In Central India, Bombay and Deccan and in Mysore parboiling is the exception rather than the rule. Similar conditions obtain in the Punjab where only about 5 per cent of the crop is parboiled. The map facing page 41 shows the quantitative distribution of raw and parboiled qualities further subdivided into machine-milled and hand-pounded.

(d) *Classification by machine-milled and hand-pounded.*—In India the primitive method of the pestle and mortar is still very extensively employed to remove the outer husk with which the rice kernel is covered thus converting the paddy into rice. Approximately 73 per cent of the rice produced in this country is processed in this way. The balance of 27 per cent or 7·34 million tons is handled by the power-operated rice mills. These proportions are represented in the diagram facing page 43. Expressed quantitatively the proportion of hand-pounded rice represents roughly 19·41 million tons out of a total net outturn (after allowing for seed requirements) of 26·74 million tons. The labour involved in hand-pounding must be enormous and may be estimated as giving full-time employment to at least five and a quarter million people. This work is mainly done by women. Burma affords an interesting contrast since 92 per cent of the local crop (*less seed*) is processed in the power mills and only 8 per cent husked by manual labour. The following abstract of Appendix XXIV summarises the production of machine-milled and hand-pounded rice in India and Burma. This is also shown diagrammatically opposite this page. (See also map facing page 41).

*Production of rice by machine-milling and hand-pounding.*

	Production <i>less seed</i> (1934-35/ 1936-37). (Thousand tons).	Machine-milled.		Hand-pounded.	
		Thousand tons.	Per cent.	Thousand tons.	Per cent.
<b>INDIA.</b>					
<b>PROVINCES</b>					
Bengal .. ..	8,053	1,264	16	6,789	84
Madras .. ..	4,673	2,883	62	1,790	38
Bihar and Orissa ..	4,097	427	10	3,670	90
United Provinces ..	1,871	130	7	1,741	93
Central Provinces ..	1,489	447	30	1,042	70
Assam .. ..	1,610	54	3	1,556	97
Bombay .. ..	787	434	55	353	45
Sind .. ..	361	327	90	34	10
Punjab .. ..	319	287	90	32	10
Others .. ..	183	49	27	134	73

*Production of rice by machine-milling and hand-pounding—(contd.).*

	Production <i>less seed</i> (1934-35/ 1936-37). (Thousand tons).	Machine-milled.		Hand-pounded.	
		Thousand tons.	Per cent.	Thousand tons.	Per cent.
* INDIA— <i>contd.</i> STATES.					
Fedatory States in Orissa	1,269	130	10	1,139	90
Central Provinces States ..	403	121	30	282	70
Bombay States .. ..	179	113	63	66	37
Hyderabad .. ..	349	215	62	134	38
Mysore .. ..	195	144	74	51	26
Baroda .. ..	46	33	72	13	28
Jammu and Kashmir ..	195	39	20	156	80
Cochin and Travancore ..	406	158	39	248	61
Others .. ..	260	83	32	177	68
Total India ..	26,745	7,338	27	19,407	73
BURMA ..	4,364	4,004	92	360	8

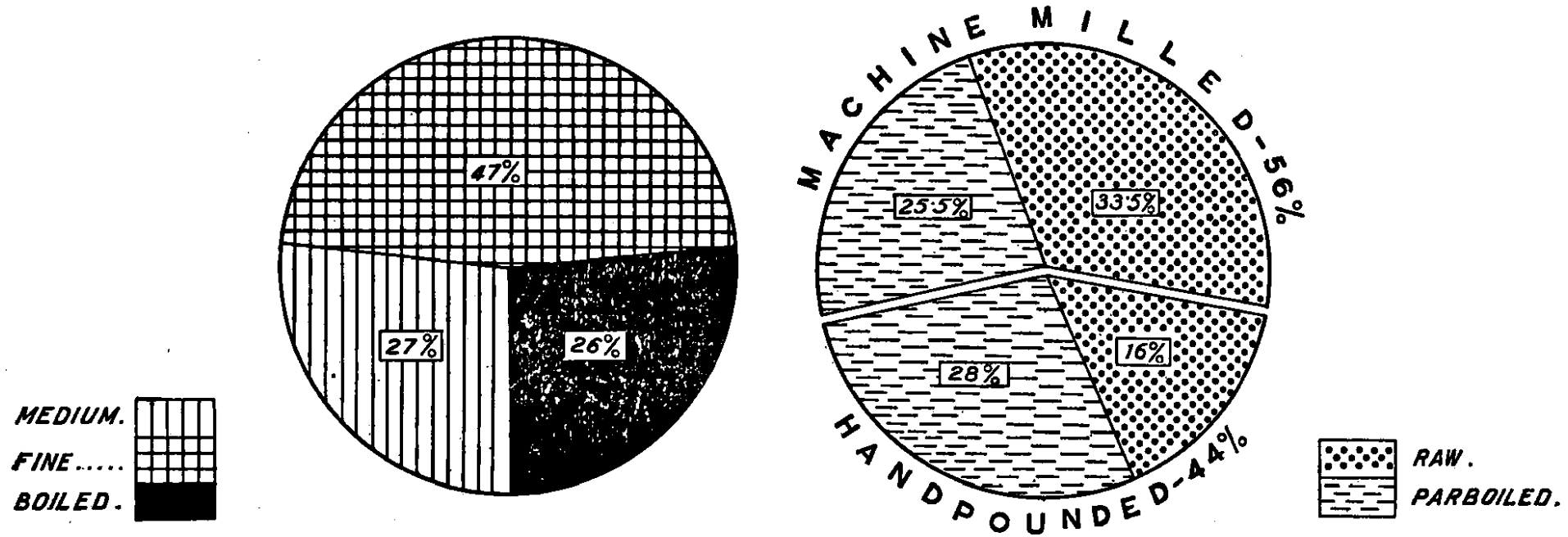
The outturn of machine-milled rice represents 90 per cent of the local production both in the Punjab and Sind. Madras with 62 per cent is also important in this respect but quantitatively the production of milled rice at nearly 2·9 million tons is greater in this province than in any other area. The rice milling industry is also comparatively well developed in Bombay and the Bombay States, where an average of nearly 57 per cent of the consumable production is milled by mechanical power. In Mysore, machine-milled rice forms about 74 per cent of the crop and in Baroda 72 per cent.

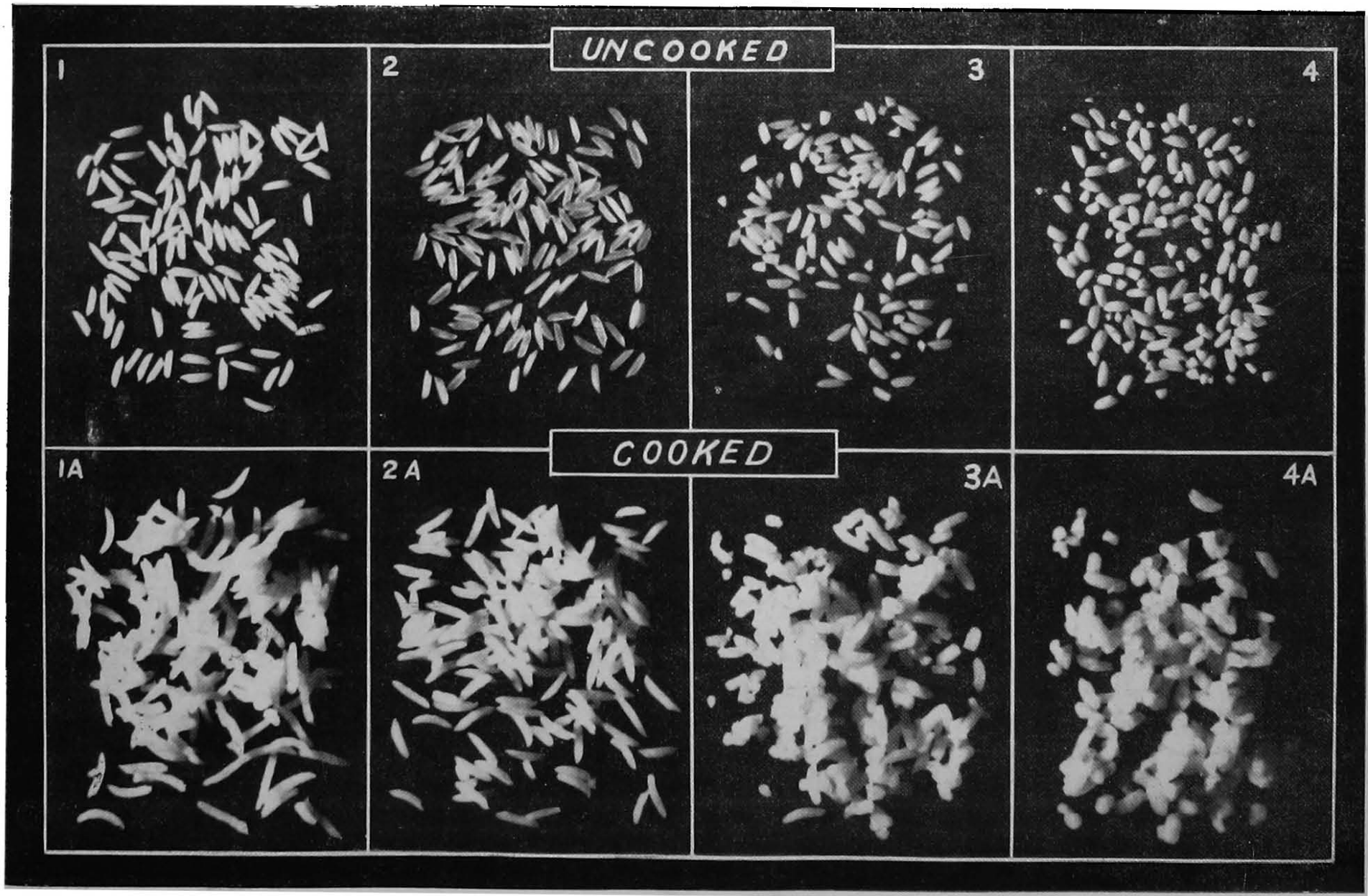
The hand-pounding method of dehusking paddy prevails very widely in Bengal, Bihar, Orissa (including the States in Orissa) and Assam and to a considerable extent also in the Central Provinces particularly in the districts bordering Orissa.

(e) *Summary and qualitative composition of the marketable surplus.*—From the marketing view-point it is necessary to consider the relative importance of the various classes or types of rice which actually enter commerce. General observations made during the course of this survey have enabled rough estimates to be formulated of the various proportions of the production of different qualities and types put on the markets in India. These estimates are contained in Appendix XXV and the all-India position is, for additional clarity, illustrated in the diagram facing this page.

(i) *Fine, medium and bold (or coarse) rices.*—Out of a total production in India of 28·38 million tons of rice some 11·5 million tons have been estimated to constitute the marketable surplus. This is equivalent to 40·5 per cent of the crop. Allowing for the equivalent in paddy of some 1·61 million tons of rice retained in the villages and holdings

# QUALITATIVE COMPOSITION OF THE MARKETABLE SURPLUS (11.5 MILLION TONS) OF RICE IN INDIA .





1 & 1A DEHRA DUN BASMATI (RAW)—UNITED PROVINCES.  
2 & 2A SAHARANPUR SELA BASMATI (PARBOILED)—UNITED PROVINCES.  
3 & 3A BUDHIABAKU (RAW)—CENTRAL PROVINCES.  
4 & 4A SMALL MILLS SPECIALS (RAW)—BURMA.

annually for seed purposes the net quantity available for edible use is about 26·76 million tons made up as follows.

	Tons.
Fine rices .. .. .	3,390,000
Medium rices .. .. .	8,700,000
Bold (or coarse) rices .. .	14,655,000
	<hr/>
Total ..	26,745,000
	<hr/>

The composition of the marketable surplus based on the conformation (size and shape) of the grain as abstracted from Appendix XXV is, roundly, as follows.

	Tons.
Fine rices .. .. .	3,100,000
Medium rices .. .. .	5,400,000
Bold (or coarse) rices .. .	3,000,000
	<hr/>
Total ..	11,500,000
	<hr/>

The approximate proportions of the total quantities of fine, medium and bold rices available for consumption (excluding seed) and put on the market are, therefore, 91 per cent in the case of the fine rices, 63 per cent for the medium qualities and only 20 per cent in respect of the bold (or coarse) varieties.

The fine rices constitute 27 per cent of the marketable surplus, the medium over 47 per cent and the bold nearly 26 per cent (see the diagram facing page 46). Roughly half the rice in the market consists of the medium type and the remainder of fine and coarse rice in about equal proportions.

(ii) *Raw and parboiled (machine-milled and hand-pounded) rices.*—The total production of raw and parboiled rices has been estimated at 11·42 and 15·32 million tons respectively. The raw rices comprise some 4·59 million tons milled by power driven machinery leaving about 6·83 million tons to be husked by manual labour. The parboiled qualities are divided up into approximately 2·75 million tons machine-milled and 12·57 million tons hand-pounded.

It is noteworthy that the bulk of the machine-milled product enters commerce and it is estimated that as much as 87 per cent of the 7·34 million tons turned out by the power mills is actually put on the market. This works out at about 6·41 million tons consisting of 3·83 million tons of raw rice and 2·58 million tons of parboiled.

In contradistinction, the comparatively small proportion of about 26 per cent of the total supply of hand-pounded rices is marketed. Of the



5.09 million tons, which the above proportion represents, some 1.85 million tons consist of raw rices and 3.24 million tons of parboiled.

The total marketable surplus in India is made up of raw and parboiled rices in approximately equal proportions, while nearly 56 per cent consists of machine-milled and a little more than 44 per cent of hand-pounded. (See diagram facing page 46).

Conditions vary from area to area as will be seen from Appendix XXV. In the fine rice group the marketable surplus forms a consistently high proportion of the local production and is nowhere less than 79 per cent. In Madras, it is as high as 97 per cent. Although the marketable surplus of the medium rices averages out at about 63 per cent of the total production of those varieties, there is a considerable range of variation in the proportions of different provinces and States. In Madras, for instance, 85 per cent of the locally produced medium rices are put on the market and in Baroda 88 per cent. In both areas retention for domestic consumption is comparatively low. The Punjab, where 81 per cent of the local medium rices enter trade, provides another example of small retention and a correspondingly high proportion of the crop put on the market. At the other end of the scale only 8 per cent of the medium rices of Assam are marketed. Domestic retention, it should be noted, is higher in this province than in any other part of India. In regard to the bold (or coarse) varieties, the marketable surplus of which forms a small proportion only of the total production of these types owing to the large retention by producers for subsistence purposes, the all-India average is reckoned to be 20 per cent. Conditions, however, vary appreciably in each tract. Bihar and Orissa and Bombay market, for instance, only 9 per cent of their respective output of bold rices and Assam as little as 3 per cent. On the other hand in Sind, where rice is an important cash crop and retention small, 75 per cent of the production of bold rice is marketed. The corresponding proportions in Madras and the Punjab are also fairly high at 48 and 45 per cent respectively but the other large producing areas range from about 14 to 16 per cent.

It has already been pointed out that a very large proportion of the output of machine-milled rice is actually marketed. In Bengal, the United Provinces, Assam, Bihar and Orissa practically the whole of the rice thus processed enters commerce. In Bombay, where the taste for hand-pounded rice appears to be confined mainly to some of the rural areas the proportion of milled rices put on the markets is smaller than in any other part of India and amounts to about 50 per cent of the local production.

Hand-pounded rices are principally consumed by the growers themselves and to a very limited extent only by urban dwellers. In Bengal, where the production of hand-pounded varieties is largest, about 38 per cent is marketed and much of this is consumed within the province itself, for the most part in the areas adjacent to the localities of production. In Assam less than 3 per cent of the local hand-pounded rice are marketed.

(f) *Trade descriptions.*—The innumerable trade names and synonyms given to the different types and varieties of rice are generally derived from some outstanding physical attribute either of the paddy or of the rice itself. The rice may also bear the name of the locality where it is grown, the centre in which it is assembled and milled or whence it is distributed. It is also interesting to note that some of the finer and more expensive rices may frequently be named from characters in Hindu mythology or may derive their names from Hindu divinities. The citation of a few typical examples of derivations will suffice. *Basmati*, the name of the well-known fine scented rice of Northern India, is derived from “*bas*” meaning smell or savour and “*mati*” the Sanskrit word for mind or sense. *Basmati*, therefore, signifies something fragrant to the senses. *Mushkan* is another trade name synonymous with *Basmati*, implying scented and deriving from the Persian word “*mushk*” meaning musk. *Dilpasand* is literally “*hearts delight*” and is the name given to a medium variety grown in the Central Provinces. *Hansraj*, a fine rice grown in the Punjab and the United Provinces derives its name from “*hans*” swan and “*raj*” king—king of swans—signifying a bright white colour, *Samundrasok*, a medium rice grown in the Central Provinces, means “*sea foam*” from “*samundar*”, the sea. *Hiranaki*, a fine translucent small grained rice also of the Central Provinces, is a compound of “*hira*” diamond and either “*naq*” meaning pure, exquisite or “*nak*” meaning conspicuous, all indicating clearly the physical appearance of this rice. Other descriptive trade names taken at random are *Tehri* or *Tedi* meaning bent or crooked and *Tulsi Amrit* signifying alixir of *tulsi* (a sacred plant), the former a medium variety of rice with a curved grain and the latter a hand-pounded high grade product, both grown in the Seoni district of the Central Provinces. *Radhamallam* is another fine rice of the Central Provinces meaning “*dear to the goddess Radha*”. *Seeta*, derived from the Hindu goddess Sita, denotes the well-known export rice of Bengal prepared by hand-pounding *Patnai* paddy. *Dudhkalma* and *Jatakalma* are two popular varieties of Bengal known generally by the abbreviated name *Kalma*. The former has a slightly white colour and is on that account given the prefix “*dudh*” or milk. The latter is produced from an awned paddy carrying tufty ears and is descriptively termed “*Jatakalma*,” “*jata*” meaning a tuft of hair. A very common general name for non-descript rices of inferior quality is “*mota*”, meaning fat or plump. The term is indiscriminately applied to a wide range of different types of rice, raw or parboiled, milled or hand-pounded.

Examples of rice carrying place names are *Saharanpur Sela* and *Burdwan Sela*. These well-known trade descriptions are given to parboiled rices produced in or near the towns and districts of those names, Saharanpur being in the United Provinces and Burdwan in Bengal. *Delhibhog* and *Dillichawal* (Delhi rice) are names given to the *Basmaties* produced around Saharanpur and Dehra Dun partly owing to the fact that Delhi formerly used to be a large distributing centre for these varieties and partly because Delhi is the best known place name within a reasonable distance of Saharanpur and Dehra Dun. On the

other hand, it might be assumed that *Nellore Samba* signifies a rice grown in or near the Nellore district in Madras, but this is not so as the name is given to a parboiled variety indigenous to the districts of Tanjore and Trichinopoly a considerable distance from Nellore.

The number of synonyms is very large; a few examples are the following.

The same variety of rice grown in South-West Bengal and in North Orissa is called *Patnai* in Bengal and *Kalambank* in Orissa. *Patnai* in its hand-pounded raw form is also known as *Seeta* in Calcutta and in the European and North American markets. When marketed as a parboiled rice *Patnai* is sold to South Africa as *Durban Quality* and when mixed with a proportion of *Kalma* rice (largely grown in and around the Burdwan district) it is referred to in Mauritius and in East Africa as *Bengal Fine*. *Patnai* which has been stored for several months acquires in common with practically all other varieties of translucent and semi-translucent rices, a slightly darker tinge and is known in Calcutta as *Old Hard*. This trade description is, however, not as generally used as the former. In Madras the parboiled variety *Korangu Samba* grown in Tanjore and Trichinopoly may also be given the names *Kattai Samba* and *Drai Samba*. In Kistna and Guntur the fine raw milled variety *G. E. B. 24* is also termed *Khichili* or *Khichidi Samba* while in the same area the descriptions *Attragada* and *Ramasagar* refer to the same rice. In the Central Provinces the trade description *Hansa* is interchangeable with and includes the raw milled medium variety agriculturally known as *Budhiabako* and a number of other similar types. The hand-pounded *Hansraj* or *Tanda* (from the town of that name in Rampur State in the United Provinces) is known also as *Istimal*, a word of Arabic origin, meaning "use" ("*Istimal chawal*" means the best kind of rice). In Bombay, the fine raw milled *Kolamba* variety may be variously called *Zinia* or *Nawabi Kolomb*, *Surthi Zinia* or *Nawabi Zinia*.

The following are brief descriptions of some of the more important commercial varieties.

(i) *Fine rices*.—The fine rices fall into the two natural categories of "long (or large) fine" and "short fine". Fragrance is a much valued quality characteristic, which is more often than not closely associated with this group of rices. Other factors of importance are a fairly high degree of translucency and light or white colour. Typical of the fine long slender rices are the *Basmatis* grown in the Saharanpur and Dehra Dun districts of the United Provinces and in the Punjab and the *Mushkan*, *Hansraj* and *Parmal* varieties, also of the Punjab. The *Patnai* or *Kalambank* variety of Bengal and Orissa may also be included in this natural group although it lacks the natural fragrance of some of the others and possesses a bolder and larger conformation. Good examples of the short fine rices are the *Kolamba* or *Zinia* variety for which the *Kalyan* and *Bhiwandi* areas in the Bombay Presidency are noted and the *Banspatri* variety of the Central Provinces. *G. E. B. 24* (*Khichili* or *Khichidi Samba*) is another well-known short fine rice produced in the Madras Presidency.

**Punjab.**—The fine rices grown in this province have the unique distinction, shared with one or two similar types indigenous to the United Provinces, of being the highest priced of any variety produced either in India or Burma. The chief fine varieties are, as already stated, *Basmati*, *Mushkan*, *Parmal*, *Hansraj* and *Chahora*. Reference to Appendix XX will show that the average length and breadth ratios for these rices range from 3·27 for *Chahora* to 3·71 for *Parmal*, the longest being *Hansraj* with an average length of 6·76 millimetres and the shortest *Mushkan* with 6·45 millimetres. The slenderest of these five typical varieties is *Parmal* with an average breadth of 1·78 millimetres. In regard to the other physical features of these rices, *Basmati* is generally machine-milled to a moderate degree of polish and carries a very good white colour. If stored for a year or more, the colour darkens in shade or may turn slightly creamy. It has a translucent kernel and is not marketed in parboiled form in the Punjab. Its peculiar characteristics are a marked fragrance both in the raw and cooked states, elongation in cooking, and complete separation of each cooked grain. The latter features are shown very clearly in the plate facing page 47 which also illustrates how the cheaper medium and coarse rices swell all over and show a strong tendency to become mushy. Before making purchases of this and most other fine scented rices, consumers generally cook a small sample to see whether the fragrance persists, to what extent the grains elongate and retain their individuality after boiling. Merchants, both wholesale and retail, also make the same tests before finally passing wholesale orders to their suppliers. *Mushkan* is a scented variety closely resembling *Basmati* in all essential features. *Hansraj* and *Parmal* are non-scented rices similar in other respects to *Basmati* but they are not regarded as being in quite the same category as they do not cook as well. In some places in the Punjab, *Chahora* is a synonym for *Basmati* of the type first grown in Dehra Dun in the United Provinces where this rice is popularly supposed to have originated. About two-thirds of the production of fine rices in the Punjab are concentrated in the district of Gujranwala and in some of the surrounding villages in Sialkot and Sheikhpura.

**United Provinces.**—In the United Provinces some of the more important fine rices are *Dehra Dun Basmati*, *Hansraj (Istimal)*, *Saharanpur Sela Basmati*, and *Raimunia*. Of these only the first named has a marked fragrance. It is generally held to be the best of all the rices grown in the United Provinces and is on that account consistently the dearest. The length to breadth ratios of these rices are much the same as those of the Punjab fine types and range from 3·26 for *Raimunia* to 3·83 for *Saharanpur Sela*. The longest and slenderest grain is that of the latter with an average length of 7·11 millimetres and a breadth of 1·85 millimetres. *Dehra Dun Basmati* is very similar in outward appearance to its Punjab prototype. The grain may be white or creamy, is fairly translucent and moderately polished. Rice, which has been stored for over a year, may develop a somewhat darker greyish tint clearly perceptible only when the rice is viewed in bulk but somewhat hard to distinguish in individual grains. *Hansraj* or *Istimal (Tanda)* is a hand-pounded raw type. Its main distributing centre is the town of Tanda in Rampur

State and it is sometimes known by that name. Its colour may range from white to creamy, the kernels are semi-translucent, unpolished and it possesses a slight fragrance only. *Saharanpur Sela* is a very widely known commercial variety and, as the word *Sela* implies, is put on the market in parboiled form. The method of treating the paddy, from which this rice is milled, is somewhat unusual and is referred to in Chapter IV. The grain is always well polished and may often be glazed by the application under friction of wheat flour. *Saharanpur Sela* usually carries a light pearly translucency with, in some cases, a little abdominal white. It has no fragrance but cooks well as will be seen from the illustrations facing page 47. *Raimunia*, also known as *Lal Mati*, is an important variety in the Saharanpur market where it is handled both in the raw and parboiled forms. It has a good colour, is moderately polished and in some respects resembles *Saharanpur Sela* but contains, as marketed, a certain proportion of short squat grains of other varieties. Its value is lower than that of *Saharanpur Sela* and its similarity to the latter is sufficiently close to enable the two qualities to be mixed to some extent.

**Central Provinces.**—The fine rices of this province consist mostly of the short category. Some of these are *Banspatri*, *Jhini*, *Tulsi Amrit*, *Haradgundi*, *Laxmibhog*, *Motichura*, *Hiranaki*, *Kalikamod*, *Dhubraj*, *Barik*, *Kubrimohar*, *Chhatri*, *Chinoor* and *Bhagmuch*. The following are brief descriptions of a few of the best known qualities.

*Kalikamod* is a fragrant variety extensively grown in the Bhandara district. It is not generally polished but has a good white colour and is slightly translucent. *Chhatri* is grown largely in the Seoni area and is a scented variety. It is slightly finer than *Kalikamod* with an average length of 5.81 millimetres and an average breadth of 2.07 millimetres. *Chinoor* derives mainly from the Balaghat district and resembles *Chhatri* as it is also a semi-translucent scented variety of rather similar dimensions. It is, however, slightly more slender having a length to breadth ratio of 2.92, an average length of 5.58 millimetres and breadth of 1.90 millimetres. None of the rices described are parboiled and all are machine-milled.

**Bombay.**—*Ilaichi*, *Jirja*, *Jiresal* or *Jirasal*, *Kamod*, *Kolpi*, *Rajawal*, *Rajbhog*, *Saunabhata*, *Sannamaligi*, *Sukwel*, *Tamsal*, *Velchi* and *Kolamba* or *Zinia* are some of the types regarded by the trade as falling within the fine classification. All are short fine rices and none is parboiled. Descriptions need only be given of the well-known *Kamod*, *Kolamba*, *Jiresal* and *Kolpi* varieties each of which bears a fairly close superficial resemblance to the other. *Kamod*, a slightly scented type, derives from Gujarat and is a slightly polished, fairly translucent variety with a certain amount of abdominal white. Its average length and breadth is 5.50 and 1.96 millimetres respectively and the ratio of length to breadth is 2.80. *Kolamba* is probably the smallest grained variety of commercial importance in Bombay with its centre of production in Kalyan and Bhiwandi in the Thana district. It is generally well-polished, fairly translucent, possesses a bright white colour and is slightly scented. In certain cases, a glaze may be given by the application of a coating of white mineral oil, groundnut or other vegetable oil,

in others a fair proportion of wheat flour is mixed and in some instances *Kolamba* may also be artificially coloured yellow with powdered turmeric. This variety has an average length of 4.95 millimetres and a breadth of 1.73 giving a ratio of 2.79. *Jiresal* (*Jirasal*) is also a fragrant variety grown in the Poona area. The grain is translucent and carries a moderate polish. It is a trifle less slender than *Kamod*, having an average length of 5.06 millimetres, a breadth of 2.11 millimetres and a ratio of 2.40. *Kolpi* of Maval tract is a non-scented translucent, polished variety with an average length and breadth of 5.33 and 2.00 millimetres respectively and a ratio of 2.66. All the above rices are machine-milled.

**Madras.**—There are a number of fine varieties grown in Madras of which the following selection may be regarded as representative.

*Krishnakatukulu*, *Khichili* or *Khichidi Samba*, *Coimbatore Samba* (*G. E. B. 24*) *Gunupur Sannam*, *Chinna Samba* and *Karthigai Samba*. Unlike their counterparts of Northern India, which are generally long and slender, practically all the fine rices of South India are relatively short and small and have a low length to breadth ratio. An absence of any marked natural fragrance, and in many cases, of any fragrance at all is another characteristic of these fine rices. *Krishnakatukulu* is a semi-translucent grain with a good colour and it is put on the market with a fair degree of polish. Its production is concentrated in the West and East Godavari districts and in Vizagapatam. The average length and breadth of this variety is 5.37 and 2.10 millimetres respectively and the ratio works out at 2.57. *Khichili* or *Khichidi Samba* are the trade names given to the popular and successful improved variety *G. E. B. 24* grown in the West and East Godavari, Kistna, Guntur, Kurnool, Anantapur, North and South Arcot, Coimbatore and Chingleput districts. The kernels of this variety possess a fair degree of translucency, are usually of good bright colour and are fairly uniform in size, but there is no natural fragrance. The average length and breadth is 5.40 and 2.14 millimetres respectively and the length to breadth ratio is 2.59. All the fine rices of commercial importance grown in Madras are machine-milled.

**Bihar.**—A comparatively small proportion only of the production of Bihar consists of fine rices of which two typical examples are the *Kalamdan* and *Kalamkatti* varieties. Both are parboiled and are not usually given much polish. Their colours range is from a dull white to grey with moderate translucency. Of the two, *Kalamdan* is the more slender with an average ratio of 3.43 as compared with the 3.04 of *Kalamkatti*. Their conformation is such as to place them in the long fine category. *Kalamdan* derives mainly from the neighbourhood of Gaya and *Kalamkatti* from the districts adjoining the western border of Bengal.

**Orissa.**—*Kalambank* and *Sitasal* are two of the best known fine varieties of rice cultivated in this province and are the same as their botanical and commercial counterparts, *Patnai* and *Sitasal*, grown in the adjoining tracts of Bengal. The grains of *Kalambank* produced in the Balasore district of Orissa, however, appear to be rather larger than the average *Patnai* grown in Bengal, the average length of the former being 7.42 millimetres as compared with 6.96 millimetres of the latter and the

length to breadth ratio 3·38 as against 3·13 of *Patnai*. The *Sitasal* grown in Orissa is produced in the northern tracts of that province and so closely resembles the *Sitasal* of Bengal as to render any special description unnecessary since the variety is referred to under Bengal.

**Bengal.**—The province grows a large number of fine varieties estimated by the Economic Botanist at not less than about 500. As the approximate total production of fine rice in Bengal is below 900,000 tons it will be seen that many of these varieties are not of much commercial importance. A representative selection of fine rices is as follows.

*Patnai*, *Ballam*, *Chamarmoni*, *Rupsail*, *Kataribhog*, *Basamanik*, *Kataktari*, *Bashphul*, *Shimiala*, *Jota Bashphul*, *Joshwa*, *Badshahbhog*, *Kalijira*, *Kalamkatti*, *Sakkarkhora*, *Sitasal*, *Ramsal Govindbhog*, *Darkasal* and *Dadhkani*. Of these, probably the most important trade descriptions are *Patnai*, *Ballam*, *Kalamkatti*, *Sitasal* and *Kataribhog*, although some of the other rices mentioned above may have special local importance in their own areas of production.

*Patnai* known also as *Patna* on which account it is often erroneously regarded as deriving from Patna in Bihar—is the principal variety exported abroad from Bengal. *Patnai* is largely marketed as a machine-milled parboiled rice but it is also available as a hand-pounded, raw product known as *Seeta*. In its latter form it is shipped to Europe where, if the grade conforms to the fair average quality standard laid down each season by the London Rice Brokers' Association, it is known to the trade as *Supex*. In East Africa and Mauritius and in a number of Arabian, Persian Gulf and Red Sea ports, *Patnai* is known as *Durban Quality* or *Bengal Fine* and is sold under a large number of private trade marks. This variety is cultivated mainly in the 24-Parganas district in Bengal but it is also grown to some extent in Khulna, Midnapore and Hooghly. Its counterpart, *Kalambank* is, as already mentioned, cultivated largely in Balasore in Orissa. The average length and breadth of *Patnai* is 6·96 millimetres and 2·23 millimetres giving a mean ratio of 3·13. It has a large, long, well developed grain, is of light translucent colour when parboiled by the normal process and white to creamy if hand-pounded. A yellowish tinge may be induced in the parboiled quality by means of a slight variation in the normal parboiling process in order to cater for the specialised demand from certain East African ports, and to some extent, to meet Bengal, Orissa and Bihar consumers' requirements. The grain has no fragrance and is usually available in a fairly well polished form. *Ballam* is another popular parboiled variety, in some respects not greatly dissimilar from *Patnai* in conformation. Its length is rather less—6·47 millimetres—and it has a breadth of 2·13 millimetres giving an average ratio of length to breadth of 3·09. Its production spreads over the southern districts of Bengal. *Sitasal* is also a non-fragrant variety. It is parboiled and may have a light to greyish translucency. Production is fairly widespread in South Bengal. *Sitasal* is a comparatively small short rice averaging 5·96 millimetres in length and 1·85 millimetres in breadth with a mean ratio of 3·23. It has a good export market, second only to *Patnai*, in East Africa, Mauritius and

**Arabia.** The *Kalamkatti* grown in Bengal is similar to the Bihar variety but appears to be slightly longer and more slender. Its average length is 7.07 mm., breadth 1.97 mm., with a mean ratio of length to breadth of 3.62. This is a non-scented parboiled rice of good polish and fairly light translucency. The chief centres of production are the districts of Dinajpur and Bankura.

**Assam.**—Although the production of fine rice in Assam represents only 2 per cent of the total provincial outturn, there are a very large number of fine varieties some of which are named as follows.

*Assam Valley:* *Phulpakri, Sagarchini Daudkhani, Kataribhog, Tulsibhog, Kalajoha, Goalparia, Joha, Konjoha, Duari, Kalamdani Borjoha and Tilbora.*

*Surma Valley:* *Kalijira, Thakarbhog, Bashphul, Badshabhog, Metichikan, Rata, Ratai, Basantabaha, Harinarain, Sahebsahail and Goaroi.*

The commercial importance of these varieties is very limited as the total production of fine rices in Assam is only about 36,000 tons. A typical variety is the short fine non-fragrant parboiled *Phulpakri* with an average length and breadth of 5.07 and 1.89 millimetres respectively.

**Sind.**—*Sugdasi* is the principal fine variety grown in this province. It is in fact the only fine variety of any commercial importance indigenous to Sind. *Sugdasi* has a fairly long grain averaging 6.38 mm. and has an average breadth of 1.97 mm., the ratio being 3.24. The colour of this rice is white but a few creamy or under-milled grains may occasionally be found. A slight natural fragrance is perceptible.

(ii) *Medium rices.*—Conformation alone probably plays less part in determining the classification of medium rices than is the case with the other two categories of fine and bold and it is necessary in most instances to take into consideration the additional factors of price and general appearance of the grain. With one or two notable exceptions the length to breadth ratios of typical medium rices range within the limits of approximately 2 and 3 with a tendency to exceed 2.50 but the principal criterion lies in the appearance of the product. This is a factor difficult to define in precise terms but it may be taken as a general indication of the average medium rices that they are less attractive to the eye lacking the natural translucency of the fine varieties and tending in many instances to chalkiness or opacity. It should also be noted that the medium rices of commerce do not possess any fragrance. The following are some representative examples of this category.

**Punjab.**—The *Begami* or *Amritsari* variety is a typical medium variety grown in the Amritsar and Sialkot areas. This machine-milled rice tends to opacity and some of the kernels are very slightly translucent only. It is moderately polished and usually of good white colour. Its average length and breadth are 6.46 millimetres and 2.22 millimetres respectively with a mean ratio of 2.92. Another well-known medium variety is *Sone*, produced in the Sheikhpura, Gujranwala and Amritsar districts. It is marketed in a slightly polished form and in common with practically all the other Punjab medium rices it is not parboiled.

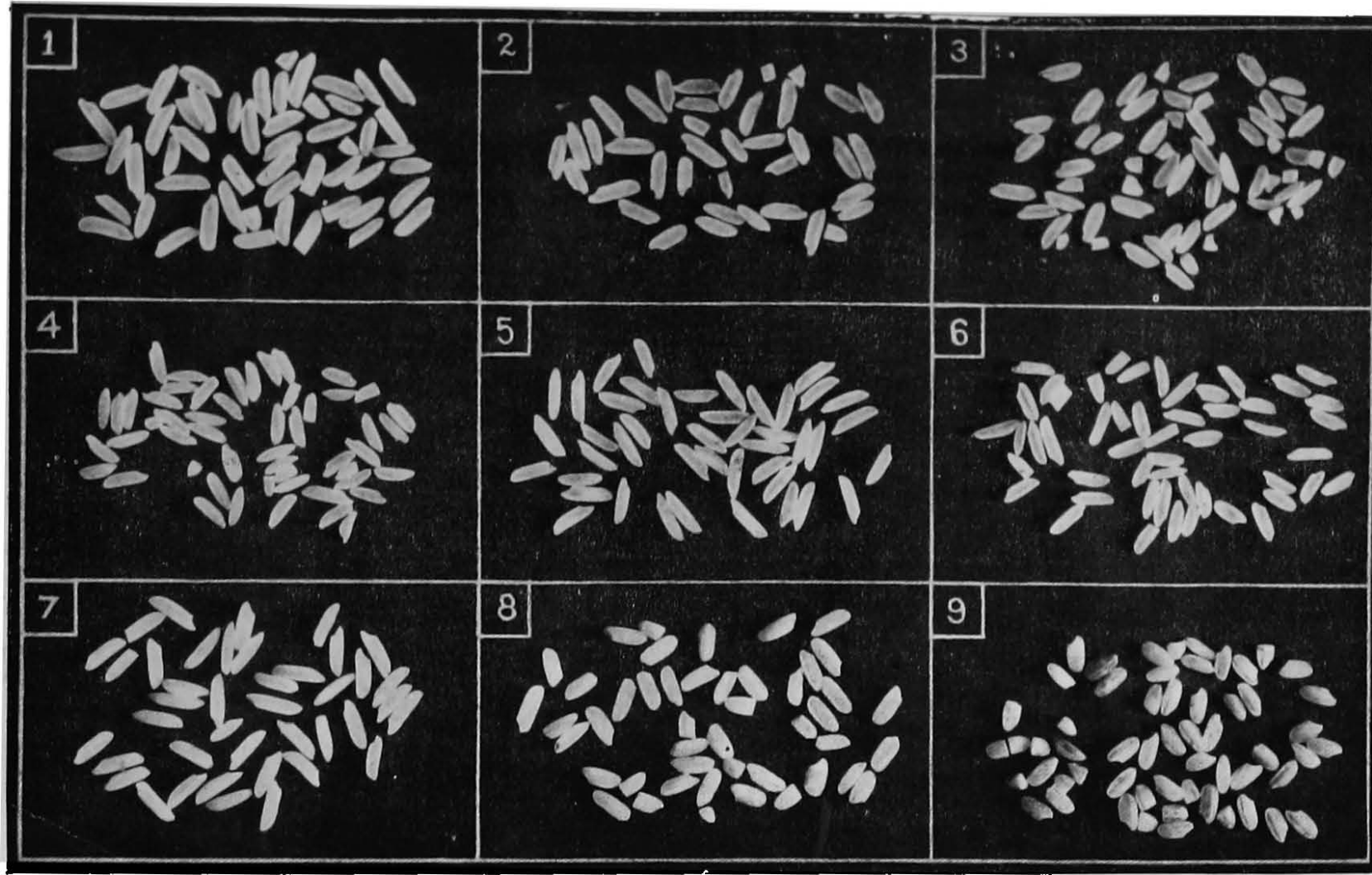


The average length and breadth of the grain are 5.48 and 1.99 millimetres respectively, giving a ratio of 2.76.

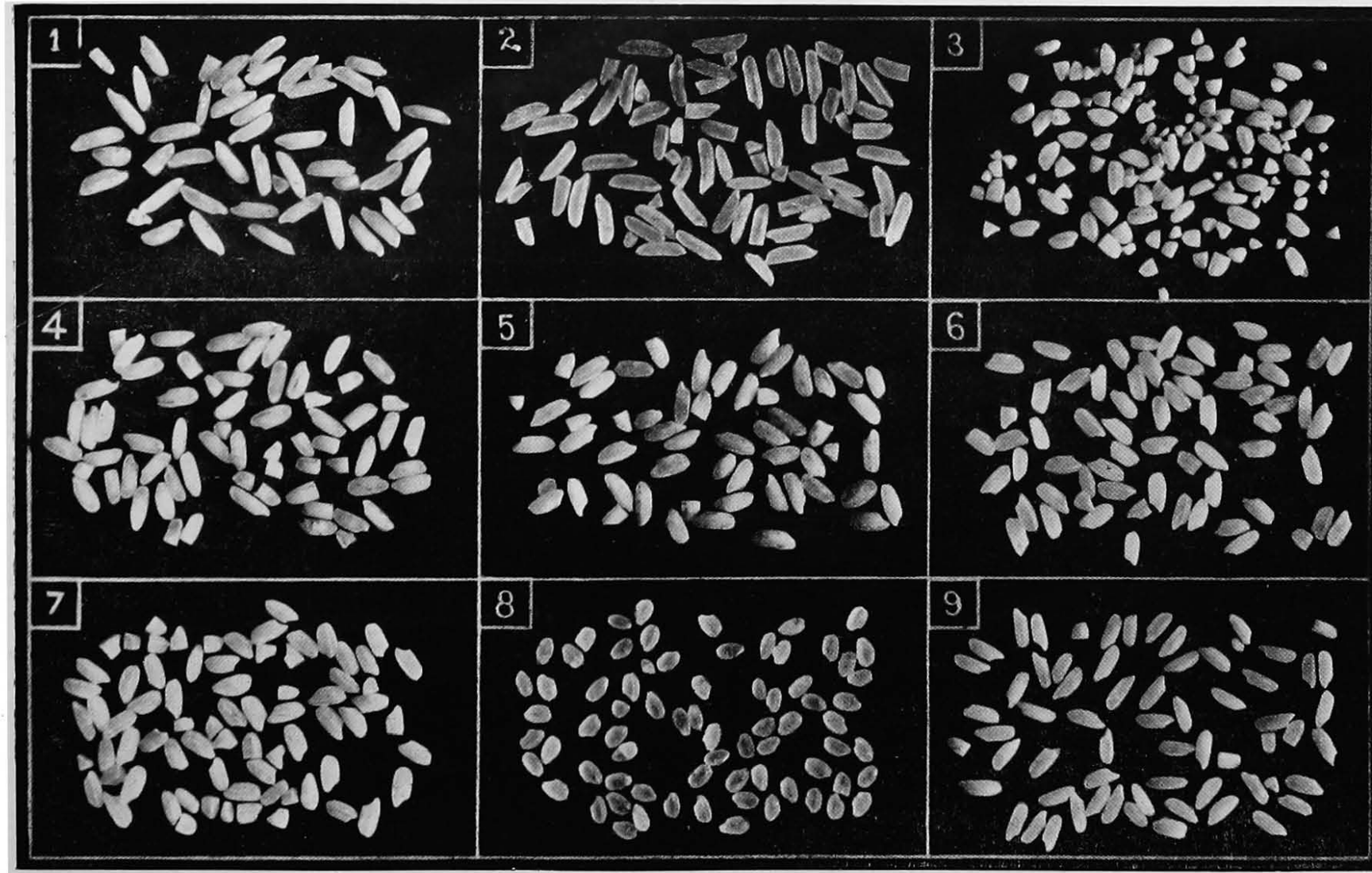
**United Provinces.**—In this province there are, as far as can be ascertained, more than fifty commercial varieties of medium rices of which *Anjana*, *Sondhi*, *Didai*, *Anji* and *Rambhog* may be taken as typical. None of these varieties have any outstanding physical characteristics.

*Anjana* is an unpolished raw variety of white to greyish colour and slightly translucent only. Its average length and breadth are 5.82 millimetres and 2.19 millimetres respectively with an average ratio of 2.65. It is largely cultivated in Rohilkhand, in the Moradabad and Bareilly tracts. *Sondhi* of the Etawah district consists of a short squat grain averaging 4.82 millimetres in length and 2.36 millimetres in breadth with a ratio of 2.04 only. It is unpolished and most of the kernels are opaque. *Didai* is grown mainly in and near the Basti district. It is a fairly long broad rice, with a rather opaque chalky structure. Its average length and breadth are 6.34 millimetres and 2.27 millimetres giving a mean ratio of 2.78. *Anji*, which is also grown in the Basti area, is a comparatively slender rice judged by the standards of the previously mentioned varieties. Its ratio averages 2.94 based on an average length and breadth of 5.74 millimetres and 1.95 millimetres respectively. *Rambhog* is grown in the Shohratgarh area near Basti and is also a raw type with an average length to breadth ratio of 2.88 based on an average length and breadth of 6.40 and 2.22 millimetres. All these varieties are machine-milled as a rule.

**Central Provinces.**—Some typical medium varieties grown in this province are *Hansa* (*Budhiabako*), *Luchai*, *Samundrasok*, *Tedibal*, *Tedibako*, *Dilpasand* and *Kankera*. The first three are the most important from a commercial point of view. The trade description *Hansa* is somewhat loosely applied to a number of rices which possess rather similar physical characteristics but which are not necessarily of the same botanical variety. For this reason there may at times be considerable variations in the size of the kernels found in *Hansa* rice. In the Raipur, Drug and Bilaspur markets, the *Luchai*, *Budhiabako* and *Tedibako* varieties are all sold under the trade name *Hansa*. At Nagpur, on the other hand, these varieties retain their respective identities and are sold under their own names. Bazar samples of *Hansa* showed an average length of 5.81 millimetres and an average breadth of 2.20 millimetres with a mean ratio of 2.67. The rices which pass under this trade description are machine-milled and semi-translucent although a number of kernels may contain a certain amount of abdominal white. Colour is generally good but no special polish is given. *Budhiabako* is the agricultural name of one of the varieties marketed under the trade description *Hansa*. Its maximum length is usually below 6.40 millimetres and its breadth not more than 2.10 millimetres, *Luchai*, another variety grouped under *Hansa*, is on the other hand, a comparatively shorter squat grain averaging 5.36 mm. in length and 2.11 mm. in breadth implying a length to breadth ratio of 2.56. In other main physical characteristics, as regard kernel structure, *Luchai* is similar to *Budhiabako*, both being semi-translucent.



- |   |   |                                  |
|---|---|----------------------------------|
| 1. PATNAI (PARBOILED)—BENGAL.           | 2. KALMA (PARBOILED)—BENGAL.                | 3. NAGRA (PARBOILED)—BENGAL.     |
| 4. SITASAL (PARBOILED)—BENGAL.          | 5. SAHARANPUR SELA (PARBOILED)—<br>(U. P.). | 6. RAIMUNIA (PARBOILED)—(U. P.). |
| 7. DEHRA DUN BASMATI (RAW)—<br>(U. P.). | 8. KERSAIL (RAW)—ASSAM.                     | 9. KHAIA BORO (RAW)—ASSAM.       |



1. KALAMDAN (PARBOILED)—BIHAR. 2. KALAMBANK (PARBOILED)—ORISSA. 3. RATHACHUDI (RAW)—ORISSA.  
 4. SALDHENTI (PARBOILED)—ORISSA. 5. MOTA (RAW)—ORISSA. 6. MOLAGOLUKULU (RAW)—  
 MADRAS.  
 7. NELLORE SAMBA (RAW)—MADRAS. 8. WHITE SIRUMANI (PARBOILED)—  
 MADRAS. 9. G. E. B. 24 (RAW)—MADRAS.

*Samundrasok* is usually sold under its own name and fairly closely resembles *Budhiabako*. It has fairly longish grain of an average length of 6.19 mm., an average breadth of 2.06 mm. and a ratio of length to breadth of 3.03. None of the rices mentioned above are parboiled.

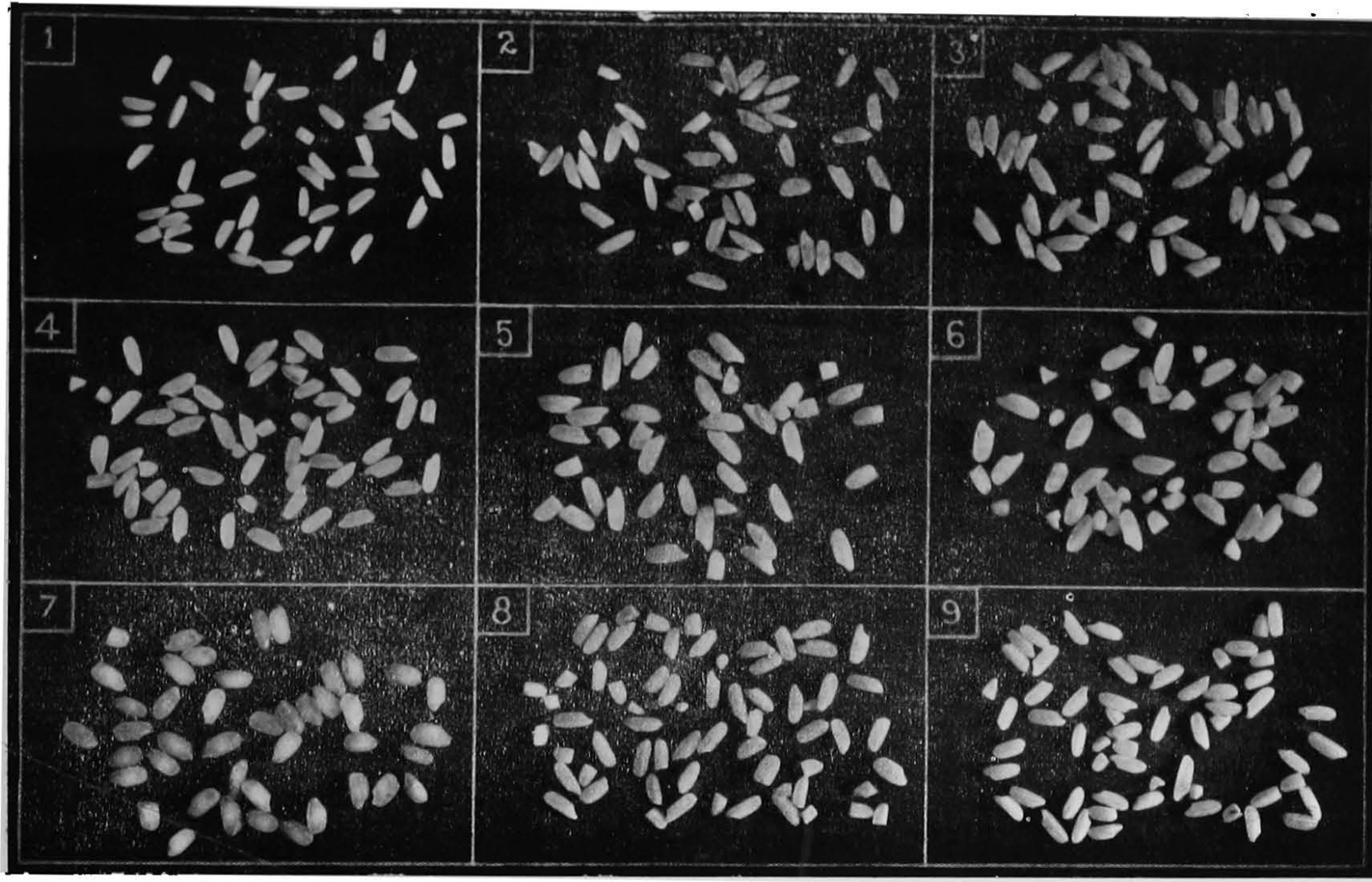
**Bombay.**—Some of the better known medium varieties are *Akali*, *Badas*, *Honsigyanbhatta*, *Jirbutti*, *Karkantaka Panwel*, *Puttbhatta*, *Sutarsal*, *Tamsal*, *Vaksal* and *Varangal*. Of these *Sutarsal* is a typical specimen with an average length and breadth of 5.70 mm. and 2.10 mm. respectively giving a ratio of 2.73. It is grown in the Gujarat tract, has a translucent kernel structure and is put on the market in a slightly polished machine-milled form. *Ambemohar* is regarded by some consumers as a fine rice and by others as a medium variety. For the purposes of this report, however, it is classed in the latter category although it possesses some degree of fragrance, which is a characteristic normally associated with the fine rices. *Ambemohar* is grown in the Karnatak in the south of the Bombay Presidency. It has a short rather squat translucent kernel with an average length and breadth of 4.42 mm. and 2.23 mm. respectively.

**Madras.**—Among the more important medium varieties grown in this province are *White* and *Red Sirumani*, *Akkulu*, *Attragada*, *Sadai Samba*, *Nellore Samba*, *Kothamali Samba*, *Anaikomban* and *Nellore Molagolukulu*. The *Sirumanis* are in some respects unique for Indian rices since the kernels are almost round in shape (see plate facing page 57). The two types of *Sirumani* are identical as regards conformation. Both are small and round, are usually marketed in parboiled form, although they are available as raw rices, and carry a good polish. Their translucency is of a high degree, while that of the white variety is light and pearly. *Red Sirumani* is rather darker or greyish. It is extensively grown in the Tanjore and South Arcot districts and also to some extent in Chingleput. The average dimensions of *White Sirumani* are 4.60 mm. in length and 2.32 mm. in breadth with a ratio of 2.10. The equivalent measurements and ratio of length to breadth of *Red Sirumani* are 4.40 mm., 2.60 mm. and 1.70 mm. respectively. A large proportion of the production of *Sirumani* rice is shipped to Ceylon where it enjoys a considerable measure of popularity. *Akkulu* is a semi-translucent variety grown mainly in the East and West Godavari districts and in Kistna. It is normally marketed as a raw rice and has a fairly good polish. The average length of kernel is 5.57 mm. and breadth 2.25 mm. with a ratio of 2.48. *Sadai Samba* is another variety of moderate translucency and good colour not greatly dissimilar from *Akkulu*. It is cultivated largely in the Trichinopoly, South Arcot, Coimbatore and Salem districts. The average length and breadth of typical kernels of this variety are 5.25 mm. and 2.20 mm. respectively with a mean ratio of 2.28. *Attragada* is probably the longest grained variety of all the medium rices produced in Madras. It has an average length of 5.69 mm., an average breadth of 2.33 mm. and a ratio of 2.50. It is grown mostly in West Godavari, Kistna and Guntur. *Molagolukulu* is produced in the Nellore district mainly and is marketed both in the machine-milled and hand-pounded form.

**Bihar.**—*Dudhraj* and *Dudkhani* are typical medium varieties grown and marketed in Bihar. Both are parboiled rices, slightly polished and have a fairly light translucent colour as indicated by the prefix *dudh* meaning milk, implying whiteness. The average length and breadth of the *Dudkhani* variety is 5.62 and 1.71 mm. giving a mean ratio of 2.78, while the dimensions of *Dudhraj* are 5.47 mm. length and 2.10 breadth with an average ratio of 2.50. Both are produced in the district of North Bihar.

**Orissa.**—*Saldhenti* and *Kankerbija* may be regarded as two representative medium varieties grown in Orissa in the Sambalpur district and in the adjoining states of Bamra, Raigarh, Sonpur, Patna, etc. Both are parboiled and are sold in hand-pounded form. They possess little real translucency and carry a good deal of abdominal white. Owing to the presence of a fairly large proportion of red grains these varieties have an unattractive appearance. The average length and breadth of *Saldhenti* is 6.05 mm. and 1.92 mm. respectively giving a mean ratio of 2.76. *Kankerbija* is a slightly larger grained type with an average length of 6.29 mm. and a breadth of 2.06 mm. and a ratio of 3.13.

**Bengal.**—The number of medium varieties of rice cultivated in Bengal is very large. Some well-known names are *Banktulsi*, *Bhasamanik*, *Elai*, *Lakshmi*, *Kajal*, *Nagra*, *Bankchur*, *Surjamukhi*, *Pathurkuchi*, *Matahari*, *Indrasail*, *Malbhog*, *Jhingasail*, *Parjot*, *Kojolsail*, *Dudsar*, *Latisal* and *Kartiksail*. Of these, it will suffice to describe *Kalma* (*Dudhkalma* and *Jatakalma*), *Nagra*, *Indrasail* and *Banktulsi* since these four varieties enter trade in fair quantities and are also known outside Bengal, whereas the majority of the other rices named are of purely local importance and are, moreover, mainly held for domestic consumption. *Kalma*, the trade name given to a well established variety is produced in Burdwan and the neighbourhood. It has a ready sale as far afield as Delhi and other North Indian markets where it is known popularly as *Burdwan Sela* (Burdwan parboiled). Two distinct types appear to be included in this trade description, one possessing a relatively longer grain than the other, both being frequently marketed as mixtures. The longer grained type is known as *Dudhkalma* and the shorter as *Jatakalma*. They may be sold individually but this is apparently not very common and the term *Kalma*, which is generally used, refers indiscriminately to mixtures of the two varieties. The two constituent varieties may be clearly distinguished in the illustration facing page 56. The average length and breadth of the ordinary *Kalma* found in the market is 6.13 mm. and 2.07 mm. respectively giving a ratio of 2.96, but owing to the presence of more than one type of rice there are differences between the maximum and minimum lengths of kernels found in such commercial samples. These range from an upper limit of 6.77 mm. down to 5.25 mm. *Kalma* rice is machine-milled to a good polish and has an attractive light translucent appearance. *Nagra* is somewhat similar to *Kalma* except that it is slightly broader and shorter and as normally marketed it contains a fair proportion of admixture of other varieties. *Kalma* is produced in the south-western



1. ZINNIA (RAW)—BOMBAY.

2. JIRI SAL (RAW)—BOMBAY.

3. KAMCD (R.W)—BOMBAY.

4. KHICHIDI (RAW)—HYDERABAD.

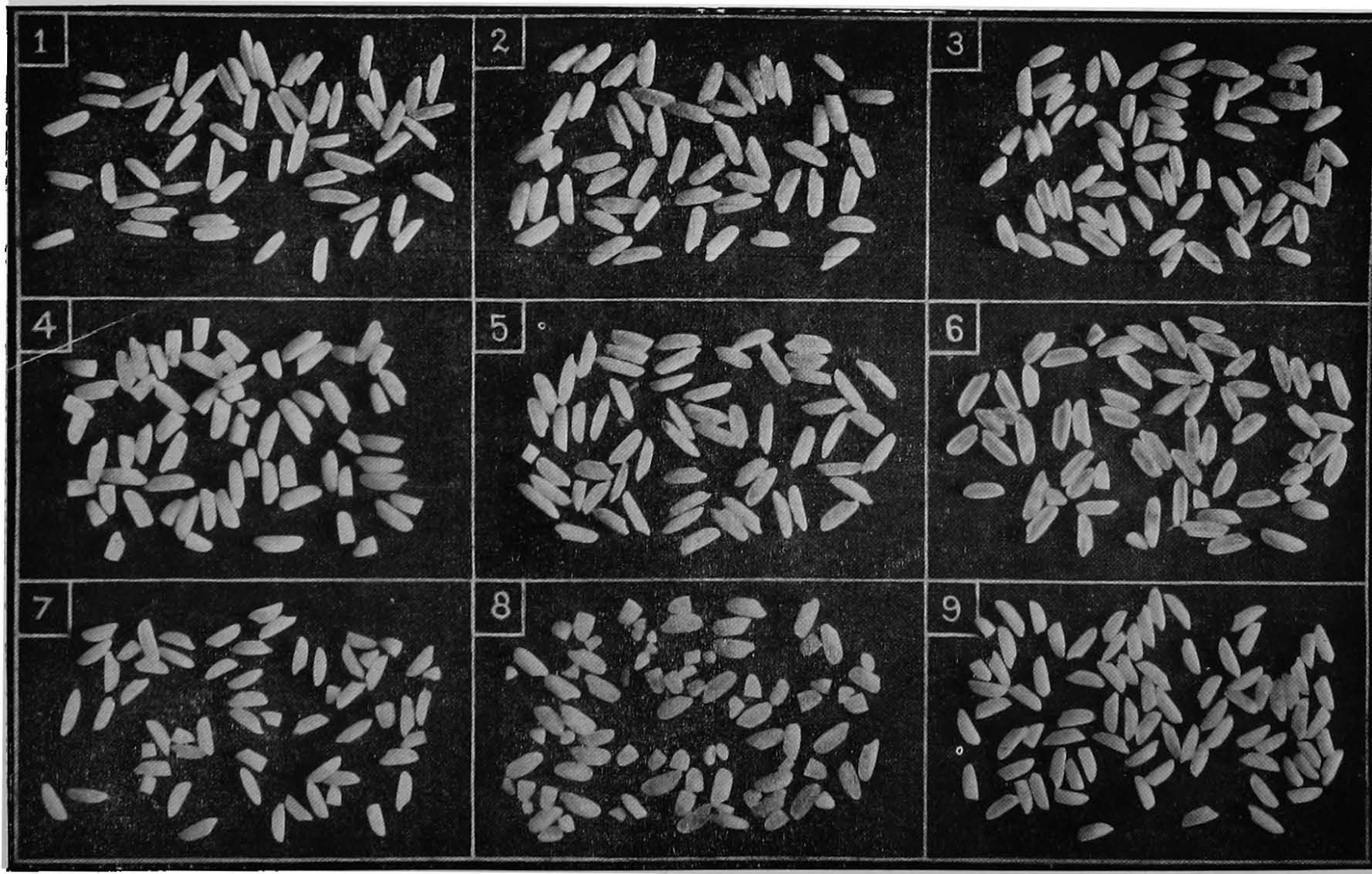
5. KASUMA OR RAMASAGAR (RAW)—  
HYDERABAD.

6. KADDY WHITE (RAW)—MYSORE.

7. SAMBA (PARBOILED)—TRAVANCORE.

8. KANGNI (RAW)—SIND.

9. SUGDASI (RAW)—SIND.



1. PARMAL (RAW)—PUNJAB.

2. JHONA (RAW)—PUNJAB.

3. SONE LATERA (RAW)—PUNJAB.

4. AMRITSAR MOTA (RAW)—PUNJAB.

5. GUJRANWALA BASMATI (RAW)—  
PUNJAB.6. DAUDZAI (PARBOILED)—(N.-W.  
F. P.).

7. CHINNOOR (RAW)—(C. P.).

8. GURMATIA (RAW)—(C. P.).

9. BASPATRI (RAW)—(C. P.).

districts of Bengal especially around Midnapore and Burdwan. The average kernel length is 6.12 mm. and breadth 2.15 mm. with a ratio of 2.85. *Indrasail* is also parboiled milled type possessing a relatively short squat grain. It derives mainly from the Dinajpur, Rajshahi, Pabna, Dacca and Mymensingh districts and is also grown in Murshidabad. Its average length is 5.88 mm., breadth 2.39 mm. and ratio 2.46. *Banktulsi* is a popular parboiled variety of light translucency, medium length and a certain amount of slenderness. It is cultivated in the 24-Parganas and Burdwan districts. Its average dimensions are 6.03 mm. in length and 2.03 mm. in breadth with a ratio of 2.96.

**Assam.**—The following are the names of some of the medium varieties produced in Assam.

*Holdharam, Chhotasaiamora, Moyamati, Mohnasail, Laki, Kartiksail, Dudsail, Julkata, Bogdar, Basiraj, Singra, Nekiradhan, Kersail, Malsira and Latisail.*

None of these are of any significance from the marketing point of view as the total quantity of locally grown rice put on the market in Assam is only about 100,000 tons and the number of varieties involved numerous. Of the four varieties taken as typical in Appendix XXI, *Nekiradhan* and *Kersail* are fairly large grained type. The length and breadth of the former average 6.72 mm. and 2.23 mm. respectively and those of the latter 6.96 mm. and 2.32 mm. The ratios of length to breadth respectively are 3 and 2.55. *Nekiradhan* is sold in parboiled form while the *Kersail* variety is marketed raw. *Malsira* and *Latisail* are both parboiled and both are comparatively short squat grained types, particularly the latter which has an average length of 5.52 mm., a breadth of 2.29 mm. and a ratio of length to breadth of 2.41. All these rices derive for the most part from the districts of Sylhet, Goalpara and Sibsagar.

**North-West Frontier Province.**—*Daudzai* and *Swati* are among the two best known rices of this province. Both are parboiled by a somewhat unusual method (see Chapter IV), the former being put on the market with a dressing of powdered rock salt which when removed reveals a well polished lightly translucent kernel. *Daudzai* enjoys a local reputation on a par with that of many fine rices in other provinces. It has a slight but quite perceptible fragrance and possesses a conformation rather similar to that of the Punjab medium types (see plate facing page 59).

(iii) *Bold (or coarse) rices.*—As the great bulk of the rice produced in India falling within this category is consumed directly in the villages and cultivators' holdings and does not enter commerce, the individual importance from the marketing stand point of the majority of such types is strictly limited. Precise definition of all the physical characteristics which place a rice in the bold (or coarse) category and the values given to each factor is impossible since considerations of price are in the ultimate issue frequently the main determining element. The coarse



varieties are rarely if ever possessed of a kernel structure other than soft, chalky and opaque. Thus they are incapable of taking a high polish and are usually marketed with large admixtures of broken grains of varying sizes, particularly when the paddy has not been parboiled before husking. The parboiled and hand-pounded rices, which constitute a considerable proportion of the production of bold rices, are unattractive in appearance, the colour varying from a dirty, greyish tint to a dark red. Such rices are, however, not actually marketed on a large scale and then mainly in comparatively circumscribed areas in the neighbourhood where they are grown. The machine-milled varieties have a better colour but they often contain an excessive proportion of broken grains. Many bold rices are known to the trade indiscriminately as *Mota* (fat or plump) and many comprise a large number of different botanical varieties. None of the bold rices were found to carry any natural fragrance.

**Punjab.**—*Jhona* is probably the best known of all the bold varieties grown in this province as it is of considerable commercial importance. Its main area of production is in the northern and north-eastern parts of the Lahore division. *Jhona* is always machine-milled and is usually given a light polish. The kernels are white and slightly translucent. It contains a certain admixture of other varieties. The average length and breadth are 6.23 mm. and 2.15 mm. respectively and the ratio of length to breadth 2.97.

**United Provinces.**—Of the numerous bold rices grown in the United Provinces, *Sathi* and *Banki* of the central districts, *Pahari* of Etawah, *Dhan* of Terai (submontane tracts), *Bhadain* of the eastern districts and *Dhani* of Saharanpur are some of the important varieties. All the above are marketed in hand-pounded forms. They are not polished and the kernels are mostly opaque and soft structured. The length of *Banki* averages 5.28 mm. and that of *Pahari* a long grained type, 6.58 mm., the average length to breadth ratio being 2.2 and 2.35 respectively.

**Central Provinces.**—In the Central Provinces the cultivation of bold rices is concentrated in the Chhatisgarh area, some of the chief markets for these types being Raipur, Drug and Rajnandgaon. The main varieties known to the trade are *Mota*, *Gurmatia*, *Surmatia*, *Chilakat*, *Bhijri*, *Kuraban*, No. 17, *Nimari* and *Sikia*. *Mota* is the commercial description applied to a group of seven other varieties namely, *Bhondu*, *Parewa*, *Nunga*, *Nunqi*, *Dhol*, *Pisso* and *Raibuta*. The following description of *Mota* and *Gurmatia* is typical of the general characteristics of the bold rices grown in this province. Both consist mainly of opaque kernels and where some translucency is present, this is often marred by abdominal white. On the whole, colour is good while the average length to breadth ratios of *Mota* and *Gurmatia* are about the same being 2.42 and 2.41 respectively. The former includes some of the broadest rices grown in India. The average breadth found in

an ordinary bazar sample of *Mota* was, for example, as high as 2.94 mm.

**Bombay.**—There are about twenty five commercial descriptions of bold rices in this province, most of which are grown in the southern districts of the presidency. They are not, however, of much importance from the marketing point of view as the total estimated marketable surplus of bold rices produced in Bombay is only about 33,000 tons. A few representative examples are *Pattani*, *Ajga*, *Antrasal*, *Dodki* and *Manjarwal*, all of which are put on the market in raw forms. The *Pattani* variety grown in the neighbourhood of Ratnagiri may be taken as typical of this group. The kernels are for the most part opaque and unpolished. *Pattani* has an average length of 5.63 mm. and an average breadth of 2.65 mm. giving a mean length to breadth ratio of 2.22.

**Madras.**—In this province some of the most important trade descriptions of bold varieties are *Kusuma*, *Konamani*, *Kodai* and *Kurvai*. The production of *Kusuma* rice centres round the northern districts of Kistna and Guntur, while *Konamani* is largely grown in the East and West Godavari districts in Vizagapatam and also in Kistna. The *Kudai* and *Kurvai* varieties are cultivated mainly in the Madura, Ramnad and Tinnevely districts, in the south of the presidency. All these varieties are machine-milled normally and possess semi-translucent kernels which are given a moderate polish. All excepting *Kurvai* which is parboiled are marketed as raw rices. The average length to breadth ratio ranges from 2.10 in the case of *Kurvai* to 2.50 for both *Kusuma* and *Konamani*. *Kusuma* is the longest of the four varieties mentioned having an average length of 5.70 mm. and *Kodai* the shortest with a length of 5.20 mm. *Konamani* has an average breadth of 2.20 mm., *Kodai* 2.40 mm. and *Kurvai* 2.50 mm.

**Bihar.**—*Satraj* and *Mota Chaudhana* are typical of the bold rices of Bihar. These trade descriptions include mixtures of all types of bold rices possessing similar physical characteristics. They are generally parboiled and hand-pounded. The predominating colour is towards a greyish white giving a poor appearance to these rices. The average length and breadth of *Satraj* are 5.70 mm. and 2.34 mm. respectively and that of *Mota* 5.57 mm. and 2.31 mm. The average length to breadth ratios of *Satraj* and *Mota* work out to 2.45 and 2.41.

**Orissa.**—A typical bold rice of Orissa is *Safi* with an average length of 5.38 mm. and average breadth of 2.45 mm. which works out to a ratio of 2.24.

**Bengal.**—Of the large number of bold rices grown all over Bengal, some well-known varieties are *Kajla* or *Kazla*, *Dharial*, *Shatia* or *Satia*, *Digha*, *Mundhia*, *Jamira*, *Kolay*, *Tilbazul*, *Lata* and *Ramsail*. Of these, a description need only be given of the first named as it is typical of the coarse rice produced and marketed in Bengal. *Kazla* is parboiled and possesses a fair degree of translucency but there is usually

present a certain amount of abdominal white, which the parboiling of the paddy cannot remove or modify. The average length of the grain is 6.12 mm. and breadth 2.15 mm., giving a mean length to breadth ratio of 2.26.

**Assam.**—As far as can be ascertained there are not less than fifty different trade names for different varieties of bold rice grown in Assam but these are of no real commercial importance, as the great bulk of the rice grown in this province is not marketed but is retained for domestic consumption. The *Hatisail* and *Badal* varieties, for which brief details are given, are typical of this somewhat non-descript class in general. *Hatisail* is a chalky opaque variety. It may be machine-milled or hand-pounded and is not parboiled. *Badal*, a soft structured opaque variety, is a red rice of the hand-pounded category. The average length to breadth ratios of *Hatisail* and *Badal* are 2.09 and 2.33 respectively.

**Sind.**—*Kangni* is the most important commercial type produced in Upper Sind, Larkana district being the chief centre. This rice is put on the market both in the parboiled and raw forms. The parboiled quality is largely exported to Persian Gulf ports, while the raw types are mainly in demand for the internal trade. The length and breadth of an average kernel are respectively 6.49 millimetres and 2.18 millimetres giving a ratio of 2.97. Although the dimensions of the grain suggest a medium conformation, the rice is regarded as falling within the bold category on account of its relative cheapness. The parboiled quality has the usual pearly translucency associated with rice thus treated before hulling, while the raw quality is semi-opaque and is of fairly bright white colour (see plate facing page 58).

#### D.—Imports.

Although India is the second largest rice producing country in the world there is a large import trade in rice. The great bulk of such trade is cleared through British India ports, only comparatively small quantities being handled by the ports in the Kathiawar States and in Travancore. The trade entering India through foreign possessions, such as Pondicherry (French India) and Goa (Portuguese India), is negligible. In addition to imports by sea there is a not inconsiderable volume of trade passing into India through land frontier stations, particularly in North Bihar and Bengal. This is referred to later.

The importance of India's import trade in rice, including paddy, may be gauged from the fact that the total declared value of imports by sea during the period 1935-36/1937-38 worked out at an average of roughly 13½\* crores of rupees or approximately £9,950,000 sterling, while in 1938-39 supplies of this cereal worth Rs. 11.84 crores or about £8,880,000 sterling were received at Indian ports.

#### (1) IMPORTS BY SEA.

(a) *Quantitative.*—The following table gives the total imports of paddy and rice each fiscal year (April to March) into India for the period 1920-21 to 1939-40.

\*Imports by land during the period may be valued at roughly Rs. ½ crore annually.

*Imports of paddy (rice in the husk) and rice into India\* by sea.*

(Thousand tons).

	Paddy.			Rice.		
	Total.	From Burma.	From other countries.†	Total.	From Burma.	From other countries.†
1920-21 ..	85	85	..	970	970	..
1921-22 ...	100	100	..	903	903	..
1922-23 ..	141	141	..	562	562	..
1923-24 ..	91	89	2	463	452	11
1924-25 ..	118	118	..	511	511	..
1925-26 ..	157	157	..	860	859	1
1926-27 ..	130	130	..	593	593	..
1927-28 ..	197	184	13	978	909	69
1928-29 ..	232	188	44	1,190	1,065	125
1929-30 ..	175	174	1	921	915	6
1930-31 ..	177	175	2	818	811	7
1931-32 ..	178	169	9	1,104	1,086	18
1932-33 ..	110	110	..	971	936	35
1933-34 ..	165	161	4	1,712	1,628	84
1934-35 ..	333	222	111	2,261	1,978	283
1935-36 ..	294	174	120	1,663	1,573	90
1936-37 ..	154	86	68	1,552	1,534	18
1937-38 ..	52	49	3	1,296	1,296	†
1938-39 ..	110	85	25	1,375	1,374	1
1939-40‡ (ten months).	314	43	271	1,603	1,514	89

\* Including ports in Kathiawar and Travancore.

† Mainly Indo-China and Thailand (Siam).

‡ Negligible.

§ Imports into Travancore and Kathiawar ports are for 9 months only.

Two main facts emerge from the figures given above. The first is that imports have risen in recent years as compared with the period

which followed the War of 1914-18. For example, average annual imports of paddy and rice in the decennium 1920-21/1929-30 amounted to nearly 143,000 tons in the former case and 795,000 tons in the latter, but had risen to 189,000 tons and 1,436,000 tons respectively in the ten years' period immediately following. The largest imports on record took place in 1934-35 and amounted to some 2,261,000 tons of rice and 333,000 tons of paddy making a total of 2,594,000 tons in all. The year preceding was also one of fairly large imports and the total volume of sea-borne trade touched some 1,877,000 tons including 1,712,000 tons of rice and 165,000 tons of paddy. Since 1934-35 imports have continued to maintain high levels averaging roughly one and three quarter million tons each year.

Secondly, Burma will be seen to account for most of India's imports. During the past ten years, 92 per cent of imports by sea into this country derived from Burma and the rest almost wholly from Indo-China and Thailand (Siam)\*.

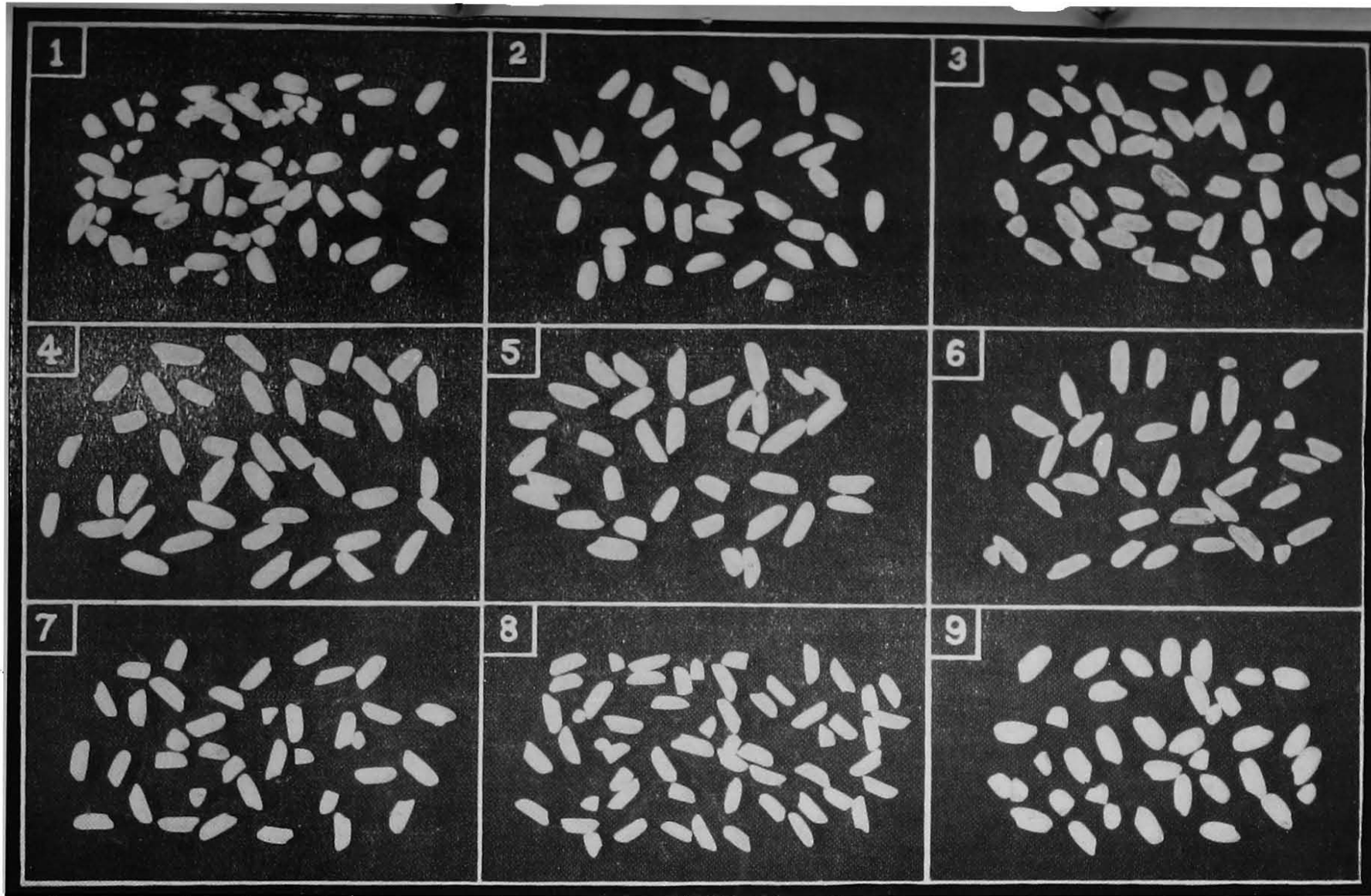
It is also interesting to observe that prior to 1927-28 there were only two years in which any imports of paddy and rice were received from overseas sources other than Burma, namely, 1923-24 and 1925-26. In the former year about 2,000 tons of paddy and 11,000 tons of rice were imported and in the latter only 640 tons of rice. Since 1927-28 imports of paddy and rice from Indo-China and Thailand (Siam) have featured quite regularly in India's sea-borne trade. Imports from these sources have often been on a relatively small scale involving a few thousand tons only as, for instance, between 1929-30 and 1932-33 and again in 1937-38 and in 1938-39, but there have been occasions on which importations have been fairly large as, for example, in 1934-35 when 394,000 tons were landed in India including about 111,000 tons of paddy and some 283,000 tons of rice. Imports have also been high in the first ten months of 1939-40. During this period 271,000 tons of paddy and about 89,000 tons of rice were received, mainly from Saigon (Indo-China). Although these figures appear to be not inconsiderable in themselves they represent only between 1 and 2 per cent of the output of this country.

There seems to be no very close or consistent relationship between India's domestic production, as officially estimated, and her imports although in occasional years a small crop may be followed by increased imports or, conversely, a bumper outturn may result in reduced takings from outside. For instance, the crop of 1932-33 which was about 2.59 million tons short of that of the previous season was succeeded in 1933-34† by imports nearly four-fifths as large again as in 1932-33, while the abundant crops of 1936-37 and 1937-38 were followed by comparatively smaller imports in 1937-38 and 1938-39.

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\* In 1927-28 and 1928-29 Japan exported 27,471 and 5,112 tons respectively to India. These imports were quite exceptional.

† A large part of the production of one crop year is marketed in the fiscal year immediately following.



- |                                  |                          |
|----------------------------------|--------------------------|
| 1. NGASEIN SMALL MILLS SPECIALS. | 2. NGASEIN SUPER.        |
| 3. MILCHAR No. 1.                | 4. SUGANDHI SUPER OILED. |
| 5. SUGANDHI SUPER.               | 6. LONG BOILED.          |
| 7. MADAYA (SHWEBO LONTHE).       | 8. KUNNI.                |
| 9. MEEDON BAZÁR.                 |                          |

SHARE OF MARITIME PROVINCES & STATES IN IMPORTS  
OF PADDY & RICE INTO INDIA.

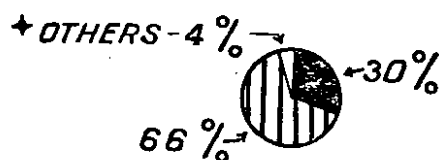
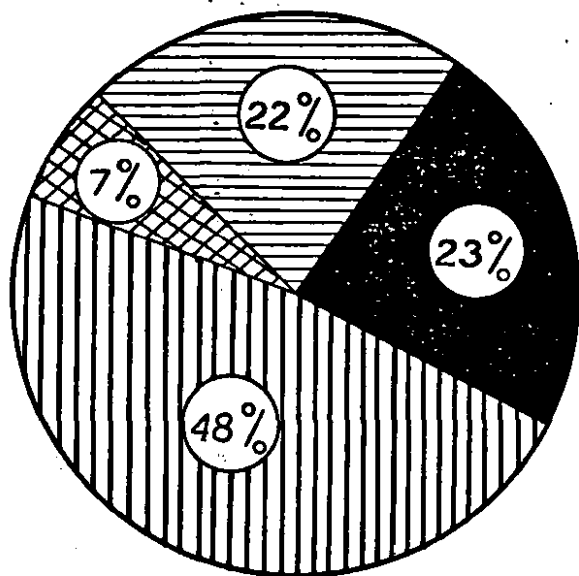
1935-36 / 1939-40.

(Drawn to scale.)

RICE

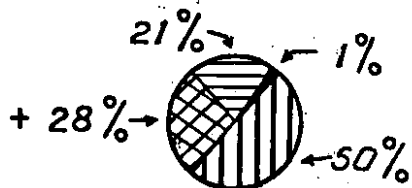
FROM BURMA

FROM  
OTHER COUNTRIES

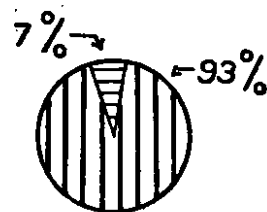
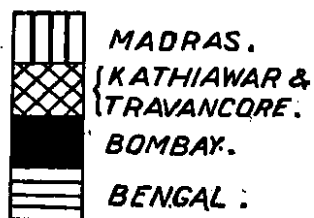


- + BENGAL --- 1%
- + KATHIAWAR & TRAVANCORE } 2%
- + SIND --- 1%

PADDY



+ TRAVANCORE ONLY.



(b) *Share of maritime provinces in sea-borne imports.*—The ports of entry situated in Madras\* handle a larger proportion of imports of paddy and rice from all sources than any of the ports in the other maritime provinces and the relative importance of Madras, Bengal and Bombay will be apparent from the tables given below and from the diagram facing this page. Sind's imports from Burma, it may be noted, are negligible and no shipments are received into that province from Indo-China or Thailand.

*Share of provinces in sea-borne imports of paddy (rice in the husk) from Burma and other countries.*

	Imports from Burma.			Imports from other countries.		
	Bengal ports.	Madras ports.	Bombay ports.	Bengal ports.	Madras ports.	Bombay ports.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
1935-36 ..	33	66	1	8	92	..
1936-37 ..	54	45	1	10	90	..
1937-38 ..	13	85	2	..	100	..
1938-39 ..	13	86	1	..	100	..
1939-40 ..	26	71	3	6	94	..
(ten months).						
Average ..	30	69	1	7	93	..

It will be observed that during the five years 1935-36/1939-40, Madras ports took 69 per cent, Bengal 30 per cent and Bombay only 1 per cent of Burma's exports of paddy to this country. In the same period, owing possibly to the comparative nearness of South Indian ports to the exporting countries of South-east Asia, 93 per cent of imports of paddy from other countries were received at Madras ports and the remainder through Bengal ports.

In regard to rice the relative extent of the trade passing through the various ports may be gauged from the abstract below :—

*Share of provinces in sea-borne imports of rice from Burma and other countries.*

	Imports from Burma.			Imports from other countries.		
	Bengal ports.	Madras ports.	Bombay ports.	Bengal ports.	Madras ports.	Bombay ports.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
1935-36 ..	19	60	21	..	81	19
1936-37 ..	28	46	26	..	57	43
1937-38 ..	12	57	31	11	70	19
1938-39 ..	22	53	25	3	91	6
1939-40 ..	37	41	22	1	57	42
(ten months).						
Average ..	24	51	25	1	68	31

\*The port of Cochin is always regarded as one of the Madras ports for the purpose of statistics of imports and exports.



The preceding table shows that Madras handles on an average 51 per cent of the total imports of rice from Burma into British India ports, Bengal 24 per cent and Bombay 25 per cent. The volume of sea-borne trade directed to each maritime province fluctuates from year to year and there appears to be no definite trend in the share of any individual province. On the whole Bombay's share of imports show less variation than the other provinces.

Imports from other countries are almost entirely divided between Madras and Bombay. Since 1937-38, however, Bengal has taken a very small proportion of this trade. As is the case with imports from Burma, each province's share varies considerably from year to year. Bombay, for example, took 19 per cent in 1935-36 and as much as 43 per cent in the following year. In 1938-39, however, Bombay's share had fallen to 6 per cent only but in the first ten months of 1939-40 it had again risen to 42 per cent.

(c) *Share of States in sea-borne imports—(i) Kathiawar.*—There is a relatively small but regular importation of rice into the Kathiawar States. The extent of this trade and its importance in relation to the total shipments of rice to India will be apparent from the following table.

*Imports of rice into Kathiawar.*  
(Tons).

	From Burma.	From foreign countries.	Total.	Proportion to total sea-borne imports into India.
				Per cent.
1931-32 .. .. .	24,108	8	24,116	2
1932-33 .. .. .	31,049	2	31,051	3
1933-34 .. .. .	52,904	1	52,905	3
1934-35 .. .. .	48,625	3,351	51,976	2
1935-36 .. .. .	43,463	1,592	45,055	3
1936-37 .. .. .	47,285	..	47,285	3
1937-38 .. .. .	39,795	..	39,795	3
1938-39 .. .. .	29,894	..	29,894	2
1939-40 .. .. . (ten months).	26,320	1,941	28,261	2

It will be observed that imports into Kathiawar represent between 2 and 3 per cent of the total sea-borne imports into India and that while there has been an almost progressive decrease in imports since 1933-34 the proportion borne by such imports to total Indian imports has not changed appreciably. It is probable that when the full figures for 1939-40 are available, imports in the year will be found to have exceeded those of 1938-39.

There are no imports of paddy.

(ii) *Travancore*.—A considerable quantity of paddy is handled by the Travancore ports. The extent of this trade varies but on an average amounts to about one-fourth of the total sea-borne imports of paddy into India.

The following table gives the particulars.

*Imports of paddy (rice in the husk) into Travancore.*  
(Tons).

Year.	From Burma.	From foreign countries.	Percentage of total imports by sea.
1931-32	35,472	..	20
1932-33	44,840	..	41
1933-34	50,530	..	31
1934-35	52,652	..	16
1935-36	45,190	..	15
1936-37	30,888	..	20
1937-38	15,780	..	30
1938-39	25,827	..	23
1939-40	3,528*	..	1

Importations of rice through Travancore ports are larger than imports of paddy and exceed the quantities entering the Kathiawar ports. The table below gives details of imports from Burma and from foreign countries and shows the proportion of their trade in the total sea-borne imports into India.

*Imports of rice into Travancore.*  
(Tons).

Year.	From Burma.	From foreign countries.	Total.	Proportion to sea-borne imports into India.
				Per cent.
1931-32	23,828	..	23,828	2
1932-33	36,987	..	36,987	4
1933-34	46,455	..	46,455	3
1934-35	50,111	..	50,111	2
1935-36	67,640	3,424	71,064	4
1936-37	53,985	..	53,985	3
1937-38	58,072	..	58,072	4
1938-39	63,246	..	63,246	5
1939-40 (ten months).	53,640	..	53,640	3

\*As the largest imports of paddy into Travancore occur in February and March, it may be anticipated that the full twelve months period of 1939-40 will show a much more normal relationship to the total Indian imports.

The significance of the preceding figures lies in the expansion of imports. The peak year was 1935-36, when imports were about three times as large as in 1931-32. In the succeeding years imports have declined slightly but they still average two and a half times those in 1931-1932.

(d) *Qualitative composition of sea-borne imports—(i) Imports from Burma.*—The quality of the rices imported into India from Burma may be conveniently discussed under two main heads, firstly under the main divisions of raw, parboiled and broken rice and secondly under trade descriptions.

The following table summarises the composition of imports from Burma and shows that on a six-year basis 44 per cent on an average consists of raw rice, 48 per cent of parboiled and 8 per cent of broken rice.

*Imports of rice from Burma into India.*

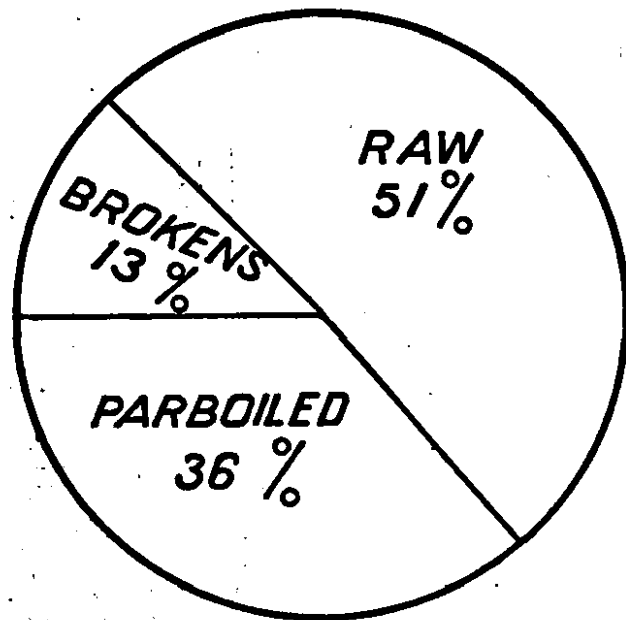
(Thousand tons).

	Raw rice.	Par-boiled rice.	Broken rice.	Un-classified.	Total.
1933-34 .. ..	842	658	113	15	1,628
1934-35 .. ..	932	939	103	4	1,978
1935-36 .. ..	603	845	122	3	1,573
Total .. ..	2,377	2,442	338	22	5,179
Average 1933-34 to 1935-36	792	814	113	7	1,726
Per cent .. ..	46	47	7	..	100
1936-37 .. ..	626	767	139	2	1,534
1937-38 .. ..	555	607	129	5	1,296
1938-39 .. ..	530	702	140	2	1,374
Total .. ..	1,711	2,076	408	9	4,204
Average .. ..	570	692	136	3	1,401
Per cent .. ..	41	49	10	..	100
Average from 1936-37/1938-39.	682	753	124	5	1,564
Per cent. .. ..	44	48	8	..	100

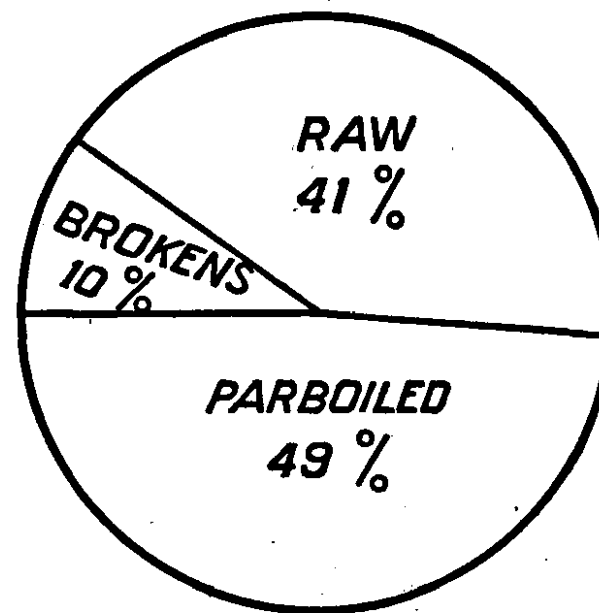
An important qualitative change has taken place of late in respect of India's imports from Burma. Formerly shipments to India consisted to

**CHANGE IN THE QUALITATIVE COMPOSITION OF IMPORTS OF  
RICE FROM BURMA INTO INDIA  
BETWEEN 1927-28/1931-32 & 1936-37/1938-39**

**AVERAGE  
1927-28/1931-32**



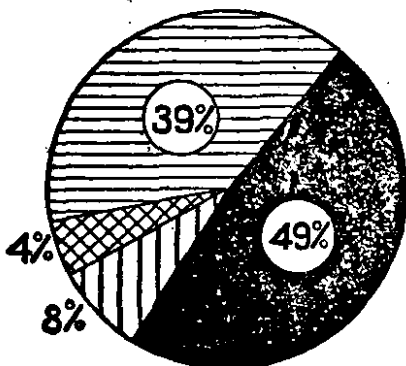
**AVERAGE  
1936-37/1938-39**



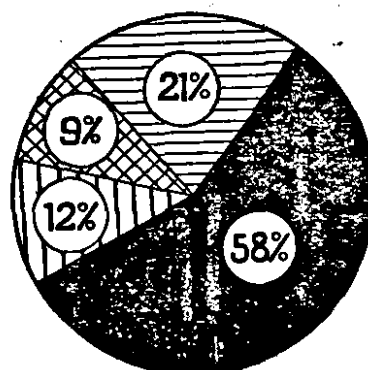
*Note:- Includes ports in Kathiawar & Travancore*

**CHANGE IN THE SHARES OF IMPORTS OF BURMA RICE  
TAKEN BY MARITIME PROVINCES & STATES  
IN INDIA**

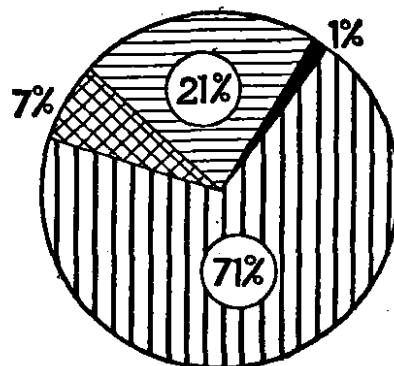
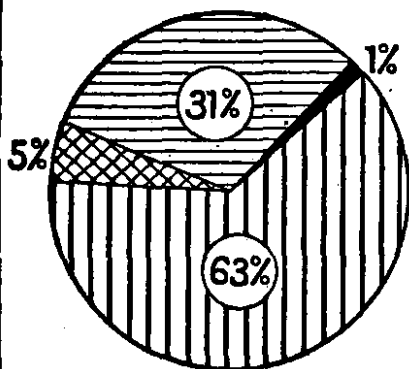
1927-28/1937-32



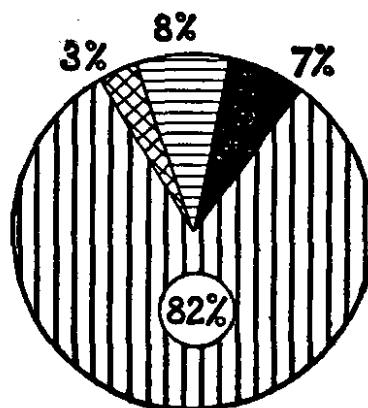
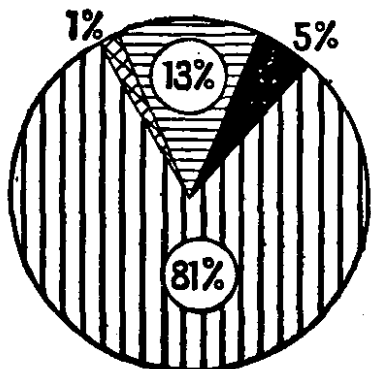
1936-37/1937-38



**RAW  
RICE**



**PARBOILED  
RICE**



**BROKEN  
RICE**



a great extent of raw rice. In recent years the tendency has been for imports of parboiled rice to increase largely at the expense of raw rice. The relative decrease in the Burma's trade in broken rice may be attributed to higher imports from other countries. The significance of the change is shown in the following table and illustrated in the diagram facing page 68.

*Proportionate composition of imports of rice from Burma into India.*

				1927-28 to 1931-32.	1936-37 to 1937-38.
Raw	..	..	..	51	41
Parboiled	..	..	..	36	49
Broken	..	..	..	13	10
				100	100

The distribution, by ports of entry, of imports of the main qualities of rice shipped from Burma to India and the changes which have taken place qualitatively in recent years are shown in the following table and illustrated in the diagram facing this page.

*Proportion of different qualities of rice imported by sea from Burma into India.*

	Raw rice.		Parboiled rice.		Broken rice.	
	1927-28/ 1931-32.	1936-37/ 1937-38.	1927-28/ 1931-32.	1936-37/ 1937-38.	1927-28/ 1931-32.	1936-37/ 1937-38.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Bengal ports ..	39	21	31	21	13	8
Madras ports ..	8	12	63	71	82	82
Bombay ports	49	58	1	1	5	7
Kathiawar and Travancore ports ..	4	9	5	7	..	3
	100	100	100	100	100	100

In regard to the trade in raw rice from Burma it will be observed that whereas in 1927-28/1931-32 Bombay used to take nearly half the total imports, the share of this province had risen to 58 per cent by 1936-37/1937-38. Both Madras and the ports in Kathiawar and Travancore have increased their takings of raw rice in the same period, in the former case from 8 to 12 per cent and in the latter from 4 to 9 per cent. The demand for imported raw rice appears to have declined appreciably

in Bengal since only 21 per cent of the total imports of raw rice found their way to the ports in this province in 1936-37/1937-38 as compared with 39 per cent in 1927-28/1931-32.

The trade in parboiled rice from Burma also shows some changes of importance. As between the two periods already mentioned, Bengal has reduced her takings from 31 per cent of the total imports of parboiled qualities to 21 per cent. The situation in Bombay has remained unchanged but in the intervening years both the Madras and the Kathiawar and Travancore ports have increased the extent of their participation on imports of parboiled rice from 63 and 5 per cent to 71 and 7 per cent respectively.

There has been no change in the broken rice position at the Madras ports where 82 per cent of the total Indian receipts of this quality were handled in 1927-28/1931-32 and the same proportion in 1936-37/1937-38. A reduction is noticeable in the case of the Bengal ports which dealt with 8 per cent of the total incomings of Burma broken into India in 1936-37/1937-38 as against 13 per cent in 1927-28/1931-32. The proportion taken by Bombay and the ports of Kathiawar and Travancore have increased in this period from 5 to 7 per cent in the former case and from practically nothing to 3 per cent in the latter.

(ii) *Imports from other countries.*—Until 1935-36, the greater part of shipments of rice from Indo-China and Thailand to India normally consisted of broken rice. These imports, together with paddy, secured free entry. Unusually large shipments of broken rice were received in 1934-35 when out of some 283,000 tons of rice imported from overseas countries other than Burma 82 per cent or 231,638 tons consisted of broken rice, 92 per cent of which came from Thailand (mainly Bangkok) and about 8 per cent from Indo-China (Saigon). As a result of the depressing effect on the rice markets in South India, the Government of India decided to impose a duty of 12 annas per maund on all imports of broken rice from foreign countries (excluding Burma). This duty became effective in April 1935 and soon brought about a marked change in the composition of imports from these countries. For example, the proportion of broken rice imported from foreign countries fell in 1935-36 to about 61,778 tons or 68 per cent of the total foreign imports of rice, while in 1936-37 only about 15 per cent or 2,758 tons of the 18,080 tons consigned to India from these sources represented broken rice. In 1937-38 and in 1938-39 there were no imports at all but in 1939-40 receipts increased to close on 89,000 tons of which 27 per cent or 23,641 tons consisted of broken rice. Thailand and Indo-China continue to dominate the foreign trade in this quality with India. In 1939-40, shipments from these two countries amounted to 16,935 and 6,553 tons respectively while the Straits Settlements consigned 152 tons and Japan 1 ton only.

The Madras ports not only handle the bulk of foreign rice imports but in most years almost the whole of the trade in broken rice from foreign ports enters India by the Madras coast, as for example in 1934-35, when out of the 231,638 tons of broken rice imported from the above sources as much as 229,991 tons entered through the Madras ports. In the

following year, 56,739 tons of broken rice out of the 61,778 tons imported were cleared through the Madras ports while in 1936-37 only 3 tons of broken rice went to Bengal and Bombay and 2,754 tons to Madras. No imports took place in the next two years but in 1939-40 all foreign shipments of broken rice consigned to India discharged in Madras ports.

(e) *Trade descriptions of imported rice and paddy.*—The great bulk of the rice imported into this country consists of relatively low qualities such as *Big* and *Small Mills Specials*—raw rices milled in Burma chiefly from the *Ngasein* and *Letywezin* paddies grown in the Delta areas of Lower Burma. Imports of parboiled rice are largely comprised of the *Milchar* and full-boiled qualities both derived from the same kinds of paddy as *Big* and *Small Mills Specials*. Hitherto the only quality market for Burma rice in India has been Bombay. The demand in the areas served by the Bombay ports is practically confined to raw rice and only relatively small quantities of parboiled or broken rices are imported. Shipments of broken rice are made principally to South India.

The commercial descriptions of the different qualities of Burma rice imported into India may be briefly described as follows.

**Bengal.**—Not less than 90 per cent of Bengal's imports of raw rice normally consist of *Small* and *Big Mills Specials*. Of the remainder, *Sugandhi* is the main type imported. The latter has a longish slender kernel with a relatively high length to breadth ratio and a good degree of translucency. The *Big* and *Small Mills* qualities are comparatively short and broad and contain a fair proportion of chalky or soft structured kernels. Shipments of parboiled rice are confined almost entirely to low grade *Milchar* much of which is consumed in the tea plantations in North Bengal and Assam. The type of broken rice mainly imported into Bengal is that which is known in Burma as *Broken Rice No. 3* deriving from the milling of the *Big* and *Small Mills* qualities.

Imports of paddy are comparatively small and originate chiefly from Akyab, the nearest port in Burma, and from Moulmein. Such imports are mainly of the type from which the *Big* and *Small Mills* qualities are manufactured but a proportion consists of the long slender grained variety known to the trade as *Ekarine (Emata)*. The latter is imported for parboiling and milling in Calcutta partly for the purpose of mixing with the local high grade *Pataai* variety.

**Madras.**—Imports of raw rice consist mainly of *Big* and *Small Mills Specials* to the extent possibly of 80 per cent of the entire local trade. The remaining 20 per cent is made up of *Bazar Quality* milled largely from *Medon* paddy, which yields a slightly rounder and chalkier grain than the *Ngasein* or *Letywezin* paddies used for *Big* and *Small Mills Specials*. As a general rule these rices contain a high proportion of broken grains which may range up to 40 per cent and over\*. A number of red grains are commonly found in *Big Mills Specials* but the pro-

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\*The tolerances accepted by the trade in Burma for broken grains found in the *Big* and *Small Mills Specials* qualities used formerly to be 42 per cent but this has now been reduced to 36 per cent. The tolerance permits fragments of all sizes in the *Big Mills* quality but excludes small pieces of kernels less than one-fourth of a whole kernel in the *Small Mills Specials* quality.



portion in *Small Mills Specials* is much lower. The latter standard of quality is the one most commonly produced in Burma and observed by the majority of up-country mills. The large and increasing quantity of par-boiled rice taken by Madras is all of low grade steam-dried *Milchar* and full-boiled. Both the qualities are similar in conformation to *Big* and *Small Mills Specials* but the steam-dried possesses a distinctly yellowish tinge, while the full-boiled is frequently discoloured and usually contains a high percentage of brokens. About 70 per cent of Madras imports of raw and parboiled rice from Burma come from Rangoon. The broken rice qualities imported from Burma are also shipped principally from Rangoon and consist largely of the grade known in Burma as *Broken Rice No. 3* produced from milling *Small Mills* and *Bazár Qualities*. The trade descriptions given in Madras to the broken rice qualities imported from Burma are *Office Quality* and *Brokens Ordinary* or *Bazár Quality*. The former referring to brokens produced from *Big Mills* and the latter to brokens from *Small Mills* quality.

Imports of paddy derive mainly from Akyab and Bassein, the qualities imported belonging largely to the *Ngasein* group from which a considerable proportion of the *Big* and *Small Mills* qualities are produced.

**Travancore.**—Imports of rice consist mainly of low grade parboiled *Milchar* as in the case of the Madras ports while receipts of paddy also comprise the same qualities imported into Madras.

**Bombay.**—Roughly two-thirds of Burma's total shipments to the Bombay coast consist of *Big* and *Small Mills Specials*. The latter predominates and is exported from Bassein and Moulmein, where the quality is comparatively superior to the usual run of this variety. In Bombay city and in some large centres in this province, *Small Mills Specials* is known as *Nani Mill*. The c. i. f. contracts for this quality made under the rules of the Bombay Rice Merchants' Association cover the output of certain specified mills only to ensure the best possible quality. The remaining one-third of the shipments of rice from Burma to Bombay consists of the long grained translucent *Sugandhi* and the small fine grained types such as *Madaya* and *Mandla* (Mandalay) milled from paddy grown in Upper Burma.

**Kathiawar.**—The qualities shipped to Kathiawar ports from Burma are much the same as those consigned to Bombay except that between one-half and two-thirds of the trade consists of *Sugandhi* and the balance of *Small Mills Specials* and small grained varieties in about equal proportions.

Imports of paddy and rice from Thailand and Indo-China are of low grade qualities. The former is referred to as "feeding paddy" in the market news publications of the countries of origin. The rice which is produced from this quality of paddy is mostly chalky and has a fairly large proportion of red grains and brokens. Imports of rice, as such, are also of this quality and for all practical purposes may be regarded as being generally slightly lower in respect of broken grain contents and red grains but in other essential features approximating the *Big Mills Specials* quality of Burma.

## (2) IMPORTS BY LAND.

The volume of trade in paddy and rice which enters India by land routes at various frontier points and the proportion such trade bears to total Indian imports from all sources is shown in the table below :—

*Imports of paddy (rice in the husk) and rice at stations adjacent to land frontier routes.*

—				Paddy.	Rice.	Total.	Proportion to total imports of paddy and rice into India from all sources.
				(Tons.)	(Tons.)	(Tons.)	
							Per cent.
1931-32	..	..	..	24,984	57,291	82,275	7
1932-33	..	..	..	24,522	65,453	89,975	9
1933-34	..	..	..	19,421	42,585	62,006	4
1934-35	..	..	..	20,124	52,955	73,079	3
1935-36	..	..	..	21,309	50,747	72,056	4
1936-37	..	..	..	15,958	43,552	59,510	4
1937-38	..	..	..	16,049	58,239	74,288	5
1938-39	..	..	..	15,170	62,567	77,737	5
1939-40	..	..	..	4,947	33,386	38,333	2
(seven months).							

Imports of paddy show a falling off as compared with 1931-32 and 1932-33 when imports were well over 24,500 tons. Between 1936-37 and 1938-39, for example, average receipts by land had declined to 15,726 tons, while during the first seven months of 1939-40 imports were only 4,947 tons. Imports of rice are well maintained if somewhat irregular. The lowest returns were those of 1933-34 when 42,585 tons were recorded and the highest 65,453 tons in the preceding year. In 1937-38 and 1938-39 imports of rice amounted to 58,239 and 62,567 tons respectively. Figures for 1939-40 are incomplete but, when the year's data are compiled, may be found to exceed 55,000 tons.

Imports of paddy and rice together account roughly for about 5 per cent of the total import into India from all sources.

Practically the whole of these imports derive from Nepal, Sikkim and Bhutan and find their way into the adjoining northern districts of the United Provinces, Bihar and Bengal, where they are normally consumed. Bihar's share of this trade is by far the largest and averaged 81 per cent of the total imports by land routes during 1934-35 to 1936-37. Other sources of supply on the borders of northern and north-western India account only for negligible quantities ranging from 300 to 1,000 tons annually.

The qualities imported are mostly short duration rices of bold or coarse character and chalky kernel structure. They have no great reputation and are frequently marketed in the areas into which they are imported mixed with locally grown rices.

## (3) TOTAL IMPORTS OF PADDY AND RICE FROM ALL SOURCES.

The following table summarises the position in this respect and indicates a considerable variation from year to year. The smallest imports between 1931-32 and 1939-40 were those of 1932-33 when 1,171,758 tons

were received and the highest—an all-time record—in 1934-35 when imports totalled 2,667,809 tons. When the final figures for 1939-40 are compiled imports will be found to have exceeded 2 million tons.

*Total imports into India from all sources (paddy and rice combined).*  
(Tons).

	Sea-borne.	By land frontier routes.	Grand total.
1931-32 .. .. .	1,282,060	82,275	1,364,335
1932-33 .. .. .	1,081,783	89,975	1,171,758
1933-34 .. .. .	1,877,319	62,006	1,939,325
1934-35 .. .. .	2,594,730	73,079	2,667,809
1935-36 .. .. .	1,957,972	72,056	2,030,028
1936-37 .. .. .	1,705,506	59,510	1,765,016
1937-38 .. .. .	1,347,723	74,288	1,422,011
1938-39 .. .. .	1,484,505	77,737	1,562,242
1939-40* .. .. .	1,935,518	38,333	1,973,851

\*Sea-borne figures are for ten months and land frontier figures are for seven months.

#### (4) PERIODICITY OF IMPORTS.

The monthly variations in imports of rice and paddy may best be seen by expressing each month's incomings as a proportion of the total year's receipts. The following tables are calculated from Appendices XXVII and XXVIII relating to paddy and rice respectively and are based on averages for the period 1935-36 to 1939-40.

*Monthly imports of paddy (rice in the husk) expressed as a percentage of the total annual receipts.*

	By sea.		By land.	All-India average.
	To British India ports.	To Kathiawar and Travancore ports.		
	Per cent.	Per cent.	Per cent.	Per cent.
April .. .. .	10	24	16	12
May .. .. .	18	26	12	19
June .. .. .	11	..	3	9
July .. .. .	12	..	2	10
August .. .. .	6	..	2	5
September .. .. .	7	1	2	5
October .. .. .	6	2	4	5
November .. .. .	3	..	2	3
December .. .. .	2	1	7	3
January .. .. .	6	6	11	6
February .. .. .	6	14	17	7
March .. .. .	13	26	22	16

It will be observed that the periodicity of imports of paddy is very marked. Sea-borne imports through British India ports are highest between March and July in which period 64 per cent on an average of the year's receipts are handled, the peak months being May with 18 per cent. Imports are lowest in November and December, the former recording 3 and the latter 2 per cent of the annual imports. Shipments to Kathiawar and Travancore ports are largely concentrated in March, April and May when as much as 76 per cent of the whole year's imports are received. Imports in February represent 14 per cent. The remaining 10 per cent is divided between four months, namely, September, October, December and January. Imports through land stations show marked seasonality from about February to May during which period 67 per cent of the total annual imports pass into India. In the six months, June to November, only 15 per cent of this trade is recorded, the months of least activity being July, August, September and November.

In regard to India generally an average of 47 per cent of the total annual imports of paddy take place in the three months, March to May, the latter showing the highest imports of the year (19 per cent). There is a sharp contraction in June and July although imports during this period are still fairly large as they account for 9 and 10 per cent respectively of the year's incomings. August to December receipts are small and aggregate 21 per cent only, November and December being the months of least activity (3 per cent each).

*Monthly imports of rice expressed as a percentage of the total annual receipts.*

	By sea.		By land.	All-India average.
	To British India ports.	To Kathiawar and Travancore ports.		
	Per cent.	Per cent.	Per cent.	Per cent.
April .. .. .	10	13	11	10
May .. .. .	11	3	8	10
June .. .. .	9	3	7	8
July .. .. .	9	3	4	8
August .. .. .	7	6	4	6
September .. .. .	6	8	6	6
October .. .. .	5	6	7	5
November .. .. .	5	4	9	4
December .. .. .	8	10	10	8
January .. .. .	8	16	11	10
February .. .. .	11	16	13	14
March .. .. .				
	100	100	100	100

In this case also the periodicity of imports is quite clearly marked irrespective of the route by which supplies reach this country although

in the case of sea-borne imports through British India ports this is rather less pronounced than in the case of imports into Kathiawar and Travancore ports or via land frontier stations. Imports by sea commence to rise by January and reach their height between March and June when on an average 43 per cent of the year's receipts are recorded. After July imports diminish gradually until November and December which jointly account for 10 per cent only of the annual figure. Imports into Kathiawar and Travancore have a very sharply defined periodicity as shown by the fact that on an average 67 per cent of the whole year's imports are received from January to May, February and March alone being responsible for 32 per cent. The period June, July and August records 9 per cent only of the year's receipts and is the low point of the year. Land imports begin to rise in December and reach a peak of 13 per cent in March declining thereafter until August and September when imports are only 4 per cent monthly. Between January and May, 55 per cent of the annual receipts are registered.

Taking India as a whole there is a steady upswing in imports from January until March in which monthly imports are normally heaviest (14 per cent). Thereafter a steady and almost progressive decline sets in until December when imports are least (4 per cent). This is illustrated in diagram facing this page.

#### E.—Exports.

Prior to 1937-38, the combined statistics of Burma and Indian exports obscured the actual position of India and tended to convey the impression that India's export trade in rice was very large. With the separation of Burma from April 1937, trade movements are now recorded and published for each country separately and India no longer appears as an important exporter of rice. Indeed for many years past exports from India have amounted to less than one per cent of her total production.

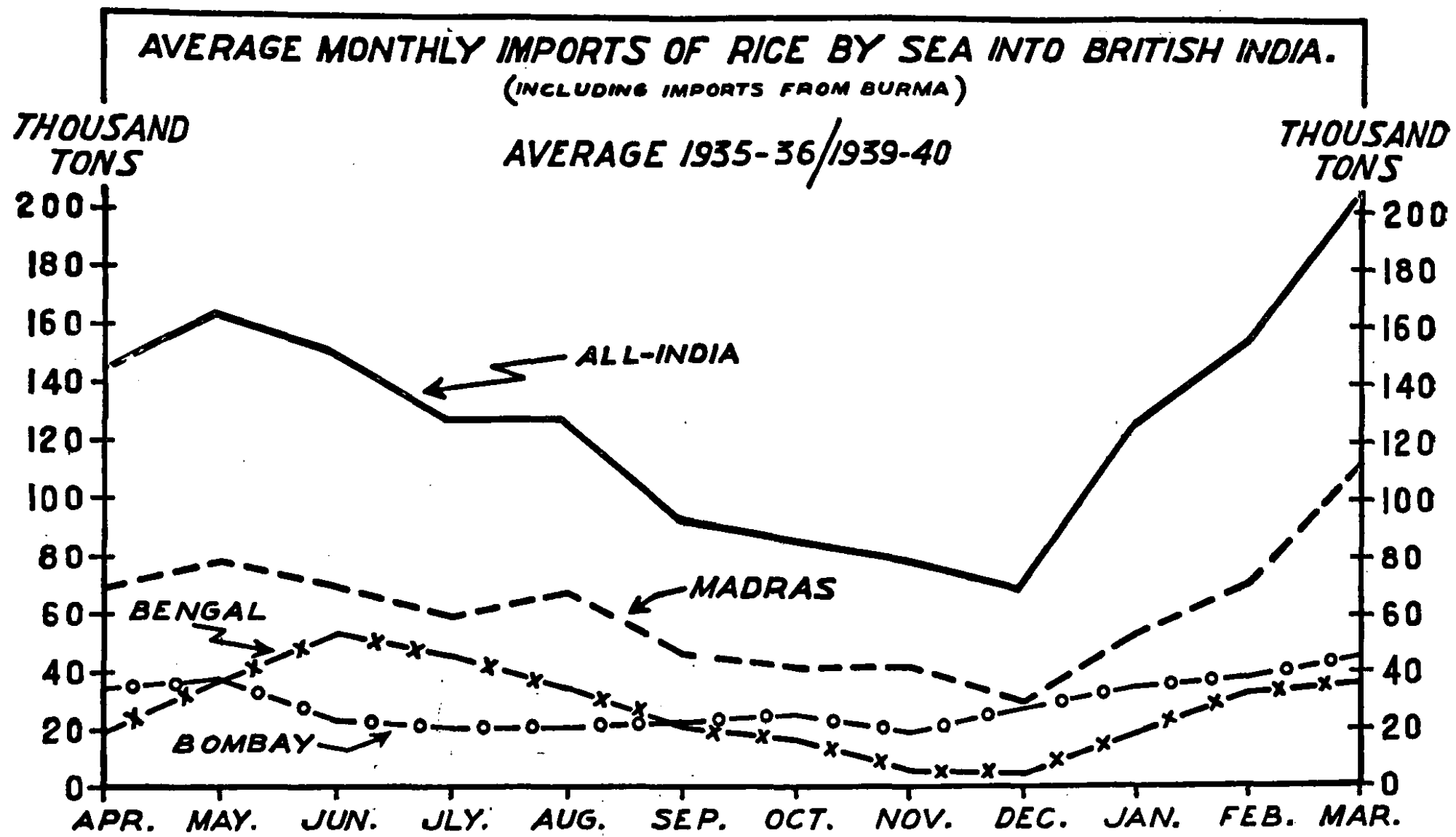
The greater proportion of India's rice export trade is maritime, passing through ports situated in British India. Calcutta, Bombay and, to a comparatively small extent, Karachi are the main centres from which shipments are made. A considerable proportion of exports from Madras are sent to Ceylon via Dhanushkodi, the terminus in India of the South Indian Railway, which connects by sea ferry with Talaimannar in Ceylon. There are no exports at all from Travancore ports while shipments from Kathiawar have since 1931-32 averaged about 53 tons annually.

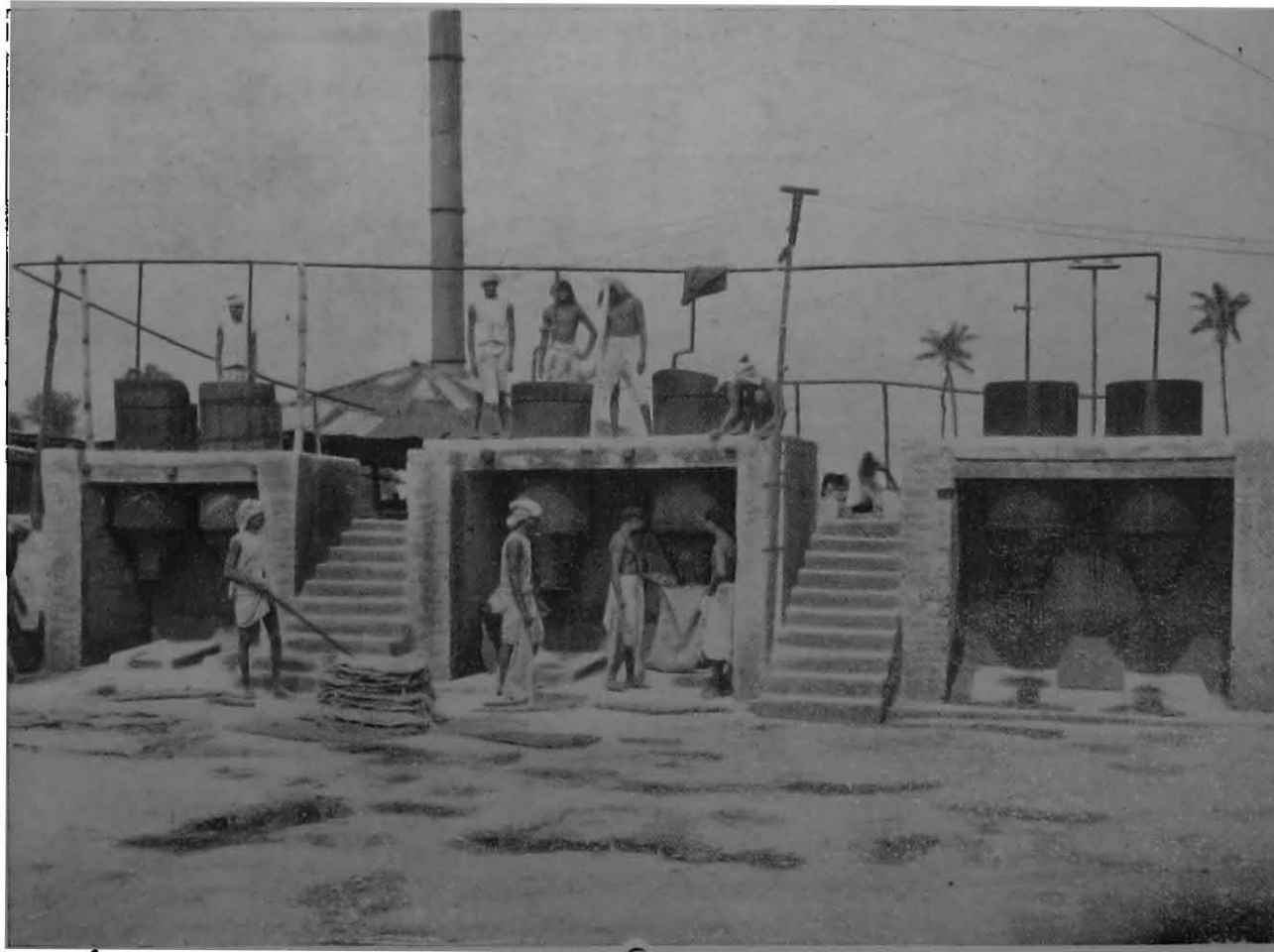
Exports of rice through land frontier routes average about 10 per cent of shipments by sea.

Exports of paddy by sea are comparatively insignificant and in some recent years have even failed to attain to the level of one per cent of the total shipments of rice.

There are no recorded exports of paddy by land routes.

Although exports of rice from India are relatively small quantitatively, the total value represented by this trade is not inconsiderable. For instance, on an average for the triennium ending 1937-38 India's





PARBOILING PADDY IN A BENGAL RICE MILL.

(Note the cast iron drums or cylinders into which the paddy is placed and the steam pipes leading into them. The steeping tanks are behind the drums).

exports of rice by sea were worth about Rs. 2½\* crores per annum and are reckoned to have been equal roughly to one-third of the total value of exports classified under " food grains and flour ".

(1) EXPORTS BY SEA.

(a) *Quantitative.*—The following table shows the exports of rice and paddy by sea from India between 1900-01 and 1919-20.

*Exports of paddy (rice in the husk) and rice by sea from British India ports.*  
(Thousand tons).

	Paddy.			Rice.		
	Average.	Minimum.	Maximum.	Average.	Minimum.	Maximum.
1900-01/1904-05	18	10	27	519	477	568
1905-06/1909-10	16	9	18	474	410	558
1910-11/1914-15	24	10	38	575	423	668
1915-16/1919-20	10	4	22	354	127	440

It will be observed that for the greater part of this period exports of rice stood at fairly high levels and averaged over the half a million ton mark until the end of 1914-15 after which shipments decreased to an average of 354,215 tons for the quinquennium ending 1919-20. Exports of paddy were relatively small throughout, ranging between 16,022 and 23,510 tons during the first fifteen years of the century. During the quinquennium ending 1919-20, average annual exports declined to about 9,842 tons only.

The following table shows the position of exports of paddy and rice, year by year, from 1919-20 to the present time.

*Exports of paddy (rice in the husk) and rice from India by sea.*

(In tons).

				Paddy.	Rice.
1919-20	..	..	..	73	126,209
1920-21	..	..	..	35	125,720
1921-22	..	..	..	2	204,620
1922-23	..	..	..	3,631	330,292
1923-24	..	..	..	10,330	406,194
1924-25	..	..	..	3,300	425,500
1925-26	..	..	..	2,932	378,568
1926-27	..	..	..	2,074	268,243
1927-28	..	..	..	6,479	291,026
1928-29	..	..	..	5,576	273,254
1929-30	..	..	..	4,277	273,239
1930-31	..	..	..	4,424	278,391
1931-32	..	..	..	2,371	235,655

\*Exports by land are estimated on an average to be a little less than Rs. ½ crore annually.



*Exports of paddy (rice in the husk) and rice from India by sea.—contd.*

(In tons).

					Paddy.	Rice.
1932-33	..	..	..	..	4,191	225,909
1933-34	..	..	..	..	1,091	216,190
1934-35	..	..	..	..	4,403	203,353
1935-36	..	..	..	..	4,082	188,362
1936-37	..	..	..	..	750	234,383
1937-38	..	..	..	..	831	227,312
1938-39	..	..	..	..	2,689	280,639
1939-40 (ten months)	..	..	..	..	3,071	210,496

Following the termination of the War of 1914-18, exports of rice suffered a sharp diminution largely as a result of government control measures at the time. With the removal of restrictions, export tended to increase again to something approaching pre-War figures. The highest level reached was 425,500 tons in 1924-25 but in the following year exports fell to 378,568 tons. Since 1925-26 shipments have fluctuated between a minimum of 188,362 tons in 1935-36 and a maximum of 378,568 tons in 1925-26.

Exports of paddy, never very large, further dwindled from 1919-20. Since 1931-32 such exports have averaged just over 2,600 tons annually.

The reduction in India's export trade in paddy and rice is due not only to an increasing population but also to the expansion of production in Burma, Indo-China and Thailand and the resulting competition from those countries. That Indian rice still maintains itself in the international trade is due primarily to the existence of large numbers of Indians, who have settled in Ceylon, Mauritius, Africa and the countries further afield in which the plantation industries are of importance as, for example, Cuba and who still retain a strong preference for the types and varieties of rice to which they have been long accustomed.

(b) *Share of provinces.*—Bengal and Madras are the two largest rice producing areas with direct access to the sea and export more rice than any of the other provinces. Exports from the ports situated in Bombay and Sind where the production is relatively small are much less. The following table shows the respective shares of the four provinces in the total annual exports of paddy and rice from India.

*Proportionate distribution of the export trade in paddy (rice in the husk) and rice by maritime provinces.*

				Bengal.	Madras.	Bombay.	Sind.
1934-35	..	..	..	46	37	6	11
1935-36	..	..	..	42	39	7	12
1936-37	..	..	..	47	36	5	12
1937-38	..	..	..	47	39	2	12
1938-39	..	..	..	49	36	2	13
1939-40	..	..	..	44	37	3	16

On an average about 46 per cent of the export trade is handled by the ports in Bengal (mainly Calcutta), roughly 37 per cent by the Madras ports, 5 per cent by Bombay and 12 per cent by Sind (mainly Karachi). A considerable proportion of Bombay's export trade, which it may be noted has diminished somewhat in recent years, consists of re-exports of rice received from Bengal and Burma.

There are no exports from Travancore ports and shipments of rice from Kathiawar are negligible.

(c) *Destinations of exports.*—Appendix XXX shows the destinations to which Indian rice has been exported annually since 1920-21 and the volume of trade taken by each country. Ceylon, Mauritius, South Africa, Aden and some of the areas bordering the Arabian Sea and the Persian Gulf are the chief buyers of Indian rice and, in fact, take more than half of the total exports from this country. The following abstract from the Appendix XXX shows how much of India's export trade is directed to her largest customers during the five years ending 1939-40. This is also illustrated in the diagram opposite page 80.

*Exports of rice from India by sea.*

	1935-36.	1936-37.	1937-38.	1938-39.	1939-40.	Average.	Percent- age share.
Straits Settlements	5	5	8	11	7	7	3
Ceylon .. ..	72	84	91	105	71	88	37
South Africa ..	19	23	23	25	25	24	10
Mauritius .. ..	14	26	20	39	25	26	11
Aden .. .. .	5	11	12	13	10	10	4
Bahrein Islands ..	14	14	9	8	9	11	5
Muscat Territory ..	19	..	18	..	..	8	3
United Kingdom ..	5	8	6	6	4	6	3
Netherlands .. .	3	9	6	3	1	4	2
Other countries ..	32	54	34	71	58	52	22
<b>Total ..</b>	<b>188</b>	<b>234</b>	<b>227</b>	<b>281</b>	<b>210</b>	<b>236</b>	<b>100</b>

Ceylon is consistently the largest importer of Indian rice and on an average takes 37 per cent of India's total exports. Mauritius and South Africa together account for 21 per cent in about equal proportions. Aden and Muscat absorb 7 per cent of India's rice export trade, the Bahrein Islands 5 per cent, the Straits Settlements 3 per cent and the United Kingdom and the Netherlands 3 and 2 per cent respectively. The remaining 22 per cent is split up among a large number of countries, each of which takes small quantities only.

Between 1931-32 and 1937-38 Ceylon bought 86 per cent of India's exports of paddy. In normal years Ceylon's takings of Indian paddies amount to about 98 per cent. Practically the whole of this trade is handled by the Madras ports. Shipments from Bengal and Bombay are both sporadic and insignificant. In some years no exports of paddy have been registered from these provinces.

(d) *Qualitative composition of exports.*—On an average during the period 1931-32/1939-40 some 87 per cent of India's exports of rice consisted of parboiled qualities, 12 per cent of raw varieties and only 1 per cent of broken rice. The position each year since 1931-32 will be readily apparent from the following table.

*Qualitative composition of exports of rice from India by sea.*

	Raw rice.		Parboiled rice.		Broken rice.		Total*.
	Thou- sand tons.	Pro- portion.	Thou- sand tons.	Pro- portion.	Thou- sand tons.	Pro- portion.	Thou- sand tons.
1931-32 ... ..	47	Per cent. 20	187	Per cent. 80	1	Per cent. ..	236
1932-33 .. ..	26	11	199	88	1	1	226
1933-34 ... ..	38	18	175	81	2	1	216
1934-35 ... ..	28	14	174	85	1	1	203
1935-36 .. ..	23	12	164	87	1	1	188
1936-37 .. ..	29	13	202	86	3	1	234
1937-38 .. ..	20	9	205	90	2	1	227
1938-39 .. ..	19	7	259	92	2	1	281
1939-40 (ten months).	15	7	194	93	1	..	210
Average .. ..	27	12	196	87	2	1	225

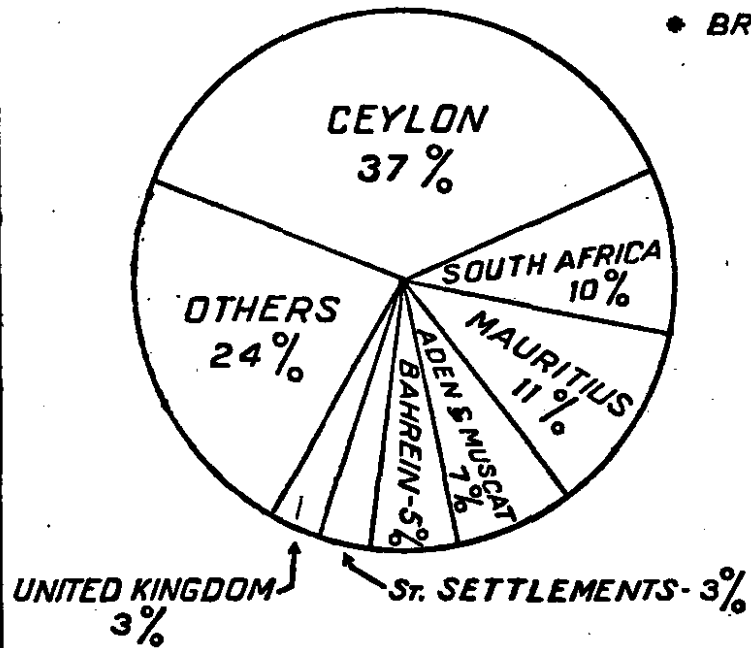
\*Includes each year a small quantity of unclassified qualities, e.g., from 173 tons in the first ten months of 1939-40 to 571 tons in 1931-32.

There is a tendency for proportion of raw rice shipments to diminish and for the trade in parboiled rice to increase. The former now constitutes about 7 per cent of the total annual export as against 20 per cent in 1931-32, since when there has been a steady decline. Shipments of parboiled rice which ranged below 80 per cent of the total in the period 1931-32 expanded to 90 per cent in 1937-38 and are still increasing. There is no significant change in the position of broken rice exports, which constitute less than 1 per cent of the total.

(e) *Trade descriptions of export rices—Bengal.*—Exports of rice from this province consist mainly of the parboiled qualities known to commerce as *Patnai*, *Kalma* and *Sitasal*. *Ballam* and *Banktuls* are also regularly shipped abroad but in comparatively small quantities. *Patnai*,

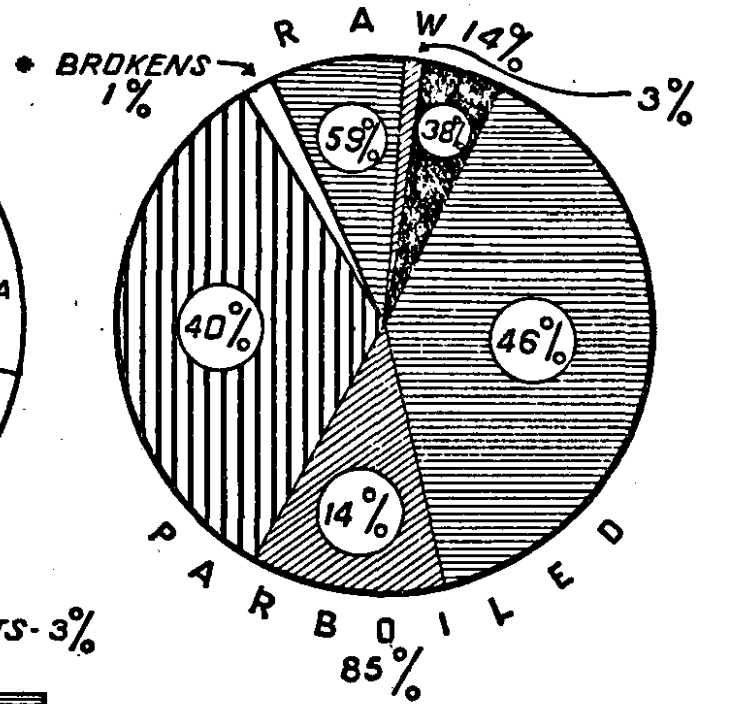
**DESTINATIONS OF RICE EXPORTS  
FROM INDIA BY SEA.**

AVERAGE 1935-36/1939-40.



**QUALITATIVE COMPOSITION OF  
EXPORTS AND  
SHARE OF PROVINCES.**

AVERAGE 1931-32/1937-38.



\* BENGAL-84%  
BOMBAY-4%  
SIND -12%

*Kalma* (and mixtures of *Patnai* and *Kalma* known as *Bengal Fine*) and *Sitasal* are shipped principally to East Africa, Mauritius and Arabian ports including those situated in the Red Sea. The best qualities of *Patnai* (or *Patna*, as it is generally called abroad) go to the United States and Canada in small lots. Buyers in those countries are mostly manufacturers of tinned foods, e.g., soups, etc., and insist on securing the highest and most carefully sifted grades containing no broken grains whatever. *Ballam* is consigned mainly to the Bahrein Islands, Muscat, Seychelles and also to other Arabian ports. The fine variety *Banktulsi*, the export of which is very small, is shipped to the Straits Settlements, Ceylon, the Maldivé Islands and occasionally to Hongkong.

Of the raw rices the only quality of any importance consigned to destinations outside India is *Seeta* deriving from *Patnai* paddy. This is a hand-pounded "semi-finished" grade taken by the United Kingdom and Continental Europe for re-milling and polishing.

**Madras.**—Ceylon takes the lion's share of the exports of rice from Madras and the quality which figures most largely in the export trade of this province is that known as *Sirumani*—a small round parboiled variety—produced mainly in South Arcot and Tanjore.

**Bombay.**—Bombay's relatively small exports are directed chiefly to the African sea-board and the Persian Gulf and consist to a very large extent of raw rices. Much of this trade, as already observed, is composed of re-exports of rice received from Burma. Among the qualities involved are *Small Mills Specials* (Burma) of superior grades and the locally produced *Kolamba* or *Zinia* and *Jirasal*. A small quantity of parboiled *Patnai* from Calcutta, of the grade known as *Bombay Sifted*, is also re-shipped out of Bombay.

**Sind.**—Exports from this province consist almost wholly of parboiled rice, of the variety known to the trade as *Kangni* grown in Upper Sind. The Persian Gulf, Bahrein Islands and South Africa are the principal destinations.

(f) *Shares of maritime provinces in the different qualities of rice exported from India.*—The different qualities of rice shipped from the various maritime provinces and States from 1931-32/1937-38 are mentioned in Appendix XXXI. Bengal, it will be observed, ships much larger quantities of raw rice than any other province although relative to her exports of parboiled rice the extent of the raw rice export trade from Bengal amounts only to about 16 per cent of the total. An average of 59 per cent of the total exports of raw rice from India were despatched from Bengal ports (mainly Calcutta) during the seven years 1931-32/1937-38. In the same period Bombay's share came to 38 per cent and that of Sind to 3 per cent. There is a good deal of variation in the relative size of each province's share. Bengal, for instance, shipped 41 per cent of the total annual export in 1935-36 and as much as 69 per cent in 1931-32; Bombay shipped 25 per cent in 1937-38 and 56 per cent in 1935-36.

Exports of parboiled rice are rather more evenly distributed. Bengal's share in the period 1931-32/1937-38 amounting to an average of

46 per cent and that of Madras to 40 per cent, while Sind accounted for 14 per cent. Bombay's exports of parboiled qualities are negligible. Broadly there is not so marked a tendency for the proportionate share of each province to vary from year to year. For example, Bengal's share of the whole year's exports was lowest in 1935-36 with 43 per cent and highest in 1932-33 with 54 per cent. Comparable lows and highs for Sind were 10 per cent in 1933-34 and 19 per cent in 1931-32 and for Madras 32 per cent in 1932-33 and 44 per cent in 1933-34.

Broken rice shipments are comparably small and are very largely monopolised by Bengal whose average share between 1931-32 and 1937-38 amount to 84 per cent of the total. If the exceptional year of 1932-33 is left out of reckoning when exports fell to 62 per cent (the quantity was only 707 tons), Bengal's share has been close on the 87 per cent mark.

## (2) EXPORTS BY LAND.

Exports of rice by land frontier routes since 1931-32 are given in the table below and will be seen to represent, in different years, from 6 to 12 per cent of the total exports from India.

### *Exports of rice by land.*

				Tons.	Percentage of total exports.
1931-32	..	..	..	24,644	9
1932-33	..	..	..	24,369	10
1933-34	..	..	..	25,627	11
1934-35	..	..	..	26,373	12
1935-36	..	..	..	22,717	11
1936-37	..	..	..	22,291	9
1937-38	..	..	..	22,587	9
1938-39	..	..	..	19,012	6
1939-40 (ten months)	..	..	..	13,230	6

Exports by land, which averaged about 23,450 tons between 1931-32 and 1938-39, have shown comparatively little variation from year to year on the whole although the recent tendency has been one of slight contraction. More rice is exported from Bengal by land than from any other province. In 1934-35 about 50 per cent of land exports went through frontier stations in Bengal to Sikkim, Bhutan and Tibet, some 12 per cent through Bihar and 8 per cent through the United Provinces, in both cases mainly into Nepal. In the following year the respective proportions taken by the three provinces were 43, 13 and 10 per cent and in 1936-37 the latest year for which incomplete data are available were 38, 11 and 8 per cent. Some rice is also exported to Afghanistan and also through Afghanistan to Turkistan and Central Asia.

**(3) PERIODICITY OF EXPORTS.**

The following table shows the percentage share of each month in the average total annual exports of paddy and rice from India based on Appendix XXIX.

*Monthly exports of rice and paddy (rice in the husk) expressed as percentage of the total annual exports.*

(1935-36/1939-40).

	By sea.		By land.
	Paddy.	Rice.	Rice.
April .. .. .	7	12	11
May .. .. .	4	8	9
June .. .. .	6	8	6
July .. .. .	10	8	7
August .. .. .	10	7	6
September .. .. .	14	8	5
October .. .. .	13	8	7
November .. .. .	6	7	9
December .. .. .	2	6	9
January .. .. .	4	7	11
February .. .. .	8	8	10
March .. .. .	16	13	10
	100	100	100

The small and somewhat irregular shipments of paddy from India are consistently high in the four months, June to October, when on an average 47 per cent of the total annual exports take place. The month of largest shipment is, however, March which is responsible for 16 per cent of the year's exports. For the rest of the year, periodicity is variable. December shipments are least and amount on an average to 2 per cent only.

As regards rice there are only two months in which exports are outstandingly large, namely, March and April. In March, 13 per cent on an average of the year's exports are recorded and in April 12 per cent. During the remainder of the year shipments are comparatively steady ranging between 6 and 8 per cent, the former occurring in December which, as in the case of paddy, is the month of least activity in the export trade.

Exports of rice by land show a tendency to be largest between January and April and least in August and September. In the former period 42 per cent of the whole year's exports are exported and in the latter 11 per cent. January and April normally account for the heaviest outward movement, 11 per cent of the annual exports being recorded in each month.

### F.—Imports and exports of rice products.

*Imports.*—Rice bran is the only rice product imported into India. The source of supply is Burma and the quantity is comparatively insignificant. The great bulk of this trade passes through Bengal ports. Between 1928-29 and 1930-31 average annual shipments totalled 2,148 tons, of which Bengal's share was 95 per cent or 2,029 tons, Madras received 5 per cent or 115 tons and Bombay 4 tons only. In the triennium 1931-32/1933-34, total shipments from Burma to India had risen on an average to 4,126 tons annually, Bengal's share in this period working out to 3,068 tons or 74 per cent of the year's imports, those of Madras to 785 tons or 19 per cent while Bombay took 273 tons or 7 per cent. Between 1934-35 and 1936-37 average annual imports of bran fell to 3,013 tons divided into the proportions of 62 per cent or 1,870 tons to Bengal, 30 per cent or 895 tons to Madras and 8 per cent or 248 tons to Bombay. In 1937-38 there were only 1,110 tons of rice bran imported, all of which went to Bengal ports.

*Exports.*—Rice flour and ground rice are the two rice products shipped abroad from India. The quantities involved have since 1931-32 only twice exceeded 100 tons, namely, in 1933-34 and 1938-39, when exports amounted to 101 tons and 113 tons respectively. In 1935-36 only 33 tons were exported. On an average 94 per cent of this trade belongs to Sind and the remainder to Bombay. The principal destination of such exports is Muscat which takes 94 per cent of India's shipments from Sind.

### G.—Total and net available supplies of rice—approximate value per capita consumption.

The net quantities of rice retained for consumption in India since 1919-20 are shown in Appendix XXVI. The total and net available supplies in 1937-38, the last year for which comprehensive figures of production are available, are given below:—

				(Tons).	(Tons).
	Reported production (1937-38)	..	..	..	29,530,000
<i>Imports</i> —					
	By sea .. .. .	..	..	1,330,000	
	By land .. .. .	..	..	68,000	
				<hr/>	1,398,000
<i>Exports</i> —					
	By sea .. .. .	..	..	228,000	
	By land .. .. .	..	..	22,000	
				<hr/>	250,000
	Net available supplies .. .. .	..	..	..	<hr/> 30,678,000 <hr/>

The estimated value of the net available supplies reckoning a weighted average price of approximately Rs. 3-8 per maund (82-2/7 lb.) based on the respective productions of fine, medium and bold (or coarse) varieties would be Rs. 292 crores and as expressed in sterling £220 millions.

Reckoning the population of India in 1937 to be 359 millions the net available supplies less seed, i. e., 29,066,000 tons would provide for a *per capita* consumption of 181 lb.



## BURMA.

### A.—Burma production.

#### (1) ACREAGE.

Rice is Burma's main cash crop and her most valuable export commodity. As will be seen from Appendix III the area sown to rice in Burma during the period 1927-28/1936-37 ranged between 12·38 and 13·05 million acres with an average of 12·71 million acres which represents about 71 per cent of the total cultivated area of the country and 88 per cent of the total area under food grains. The areas under rice in 1937-38, 1938-39 and 1939-40 were only slightly larger than the previous 10 years' average and amounted to 12·94, 12·84 and 12·85 million acres respectively.

The cultivation of rice is widespread except in the extreme north of the country, but the density of rice acreage increases progressively southward and is greatest in the delta region of the Irrawaddy. The districts of Akyab in the extreme west and Thaton in the south-east also contain a fairly high concentration of rice acreage. Altogether about 62 per cent of the total area under rice in Burma is located in eleven\* of the nineteen districts in Lower Burma.

(a) *Irrigated and unirrigated area.*—The total irrigated area under all crops, between 1927-28 and 1936-37, averaged just over 1·5 million acres of which nearly 93 per cent of some 1·4 million acres were sown to rice (Appendix IV). In the decennium ending 1936-37, the area under irrigated and unirrigated rice was reported at 1·45 and 11·3 million acres respectively. On an average the irrigated area under rice in Burma represents about 11 per cent of the total rice acreage of the country.

(b) *Trend of acreage.*—Variations in acreage are so small as to be of no special significance and depend primarily on natural conditions at the time of sowing. Since 1927-28, the rice area in Burma has remained at a relatively constant level, although there would appear to be a very slight expansion in recent years. The average area for the three years ending 1939-40 is 12·88 million acres as compared with 12·71 for the previous ten years.

(c) *Cultivation—times of sowing and harvesting.*—As in India, three rice crops are also grown in Burma. They are known as the *kankkyi* (winter), *mayin* (spring) and *kankkyin* (autumn) crops and derive their names from the times of harvesting. The winter crop constitutes the great bulk of Burma's rice production and occupies about 98 per cent of the total rice area. The autumn crops cover the rest of the area, the latter having relatively more acreage under it.

The winter crop is normally sown in June and harvested in November and December.

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\*Henzada, Hanthawaddy, Bassein, Akyab, Pyapon, Pegu, Myaungmya, Maubin, Thaton, Tharawaddy and Insein.

## (2) PRODUCTION.

(a) *Methods of estimation.*—The official estimates of the rice crop in Burma are compiled originally in terms of paddy. In estimating the production in a particular year the district authorities first arrive at the seasonal condition factor for each district by making observations on a representative scale. The production for the district is then calculated by the usual formula, *viz.*, acreage  $\times$  normal yield per acre  $\times$  seasonal condition factor.

The normal yields applied to different districts vary from 1,000 to 1,700 lb. of paddy per acre, the average for Burma being 1,500 lb. or approximately 1,000 lb. of rice including edible brokens. The district figures of normal yield are subject to revision periodically at the instance of the Commissioner of Settlements and Land Records.

(b) *Yield per acre.*—The average yield of rice per acre in Burma, as shown in the Estimates of Area and Yield of Principal Crops, is as follows.

*Average yield of rice per acre.*

	(lb.).		(lb.).
1927-28 .. .. .	886	1932-33 .. .. .	866
1928-29 .. .. .	863	1933-34 .. .. .	897
1929-30 .. .. .	868	1934-35 .. .. .	800
1930-31 .. .. .	885	1935-36 .. .. .	895
1931-32 .. .. .	752	1936-37 .. .. .	831

(c) *Total outturn.*—The estimates of production, which are in terms of paddy, are for the purposes of trade statistics converted into rice (including derivatives) at a flat rate of 74 per cent. This ratio, although seemingly on the high side, is justified on the ground that commercial milling practice has established that 100 units of paddy yield, on hulling, an average of 74 units of saleable products (consisting of rice, broken rice and bran), 23 to 25 units of husk, which is regarded as having no market value and a balance of 1 to 2 units representing admixture of impurities or foreign matter. The proportions of rice, broken rice and bran resulting from the milling of the paddy vary according to the type or variety of paddy, the degree of milling and the amount of brokens allowed to remain in the rice. The latter two factors are capable of a wide range of control and depend upon the grade or quality of rice to be turned out. For example, actual milling outturns supplied by a large mill showed that when producing the high grade *Europe Super Quality* (raw) 28.2 per cent consisted of whole or "head" rice, 34.19 per cent of brokens of various sizes, and 10.85 per cent of bran, making a total of saleable produce of 73.24 per cent. At the other end of the scale the yields obtained in the milling of low grade *Milchar No. 2* quality (par-boiled) were 71.6 per cent of rice, 0.50 per cent of brokens and 2.45 per cent of bran giving a total recovery of saleable products of 74.55 per cent.

In spite of the wide variations in the outturns of rice, which paddy is capable of yielding, depending upon milling treatment and whether the grain is parboiled or not before milling, the basic conversion ratio of 74 per cent adopted in Burma would seem to be the most appropriate one particularly as the country has an important export trade in rice products such as brokens and bran. Any ratio which ignored these products would necessarily fall below 74 per cent and would not give a sufficiently comprehensive picture of the supply position. For the purpose, however, of estimating the production of "cleaned" rice, *i.e.*, rice which includes commercially acceptable proportions of broken grains, the conventional ratio of 66·6 per cent is adopted to convert paddy into rice.

The following abstract from Appendix VI shows Burma's production of rice since 1927-28.

*Production of rice in Burma.*

(Million tons).

Year.					Production.
1927-28	..	..	..	..	4.90
1928-29	..	..	..	..	4.91
1929-30	..	..	..	..	4.99
1930-31	..	..	..	..	5.15
1931-32	..	..	..	..	4.21
1932-33	..	..	..	..	4.92
1933-34	..	..	..	..	5.17
1934-35	..	..	..	..	4.53
1935-36	..	..	..	..	5.00
1936-37	..	..	..	..	4.79
Average 1927-28/1936-37	..	..	..	..	4.85
1937-38	..	..	..	..	4.59
1938-39	..	..	..	..	5.38
1939-40	..	..	..	..	4.68
Average 1937-38/1939-40	..	..	..	..	4.88

Thus on an average during the ten years ending 1936-37, Burma produced annually 4·85 million tons of rice, which is equivalent roughly to 17 per cent of the India's average annual production for the same period.

(d) *Trend of production.*—It cannot be said that during the past thirteen years there has been any definite or consistent tendency for the production of rice in Burma to contract or expand. The average production during 1937-38/1939-40 was 4·88 million tons as compared with 4·85 million tons in the decennium 1927-28/1936-37. The acreage sown

remains fairly constant so that fluctuations in outturn from year to year depend on natural conditions during the growing period and on the area harvested. The area destroyed may in certain years be quite considerable as the following table shows.

Year.	(Million acres).		
	Area sown.	Area matured.	Area destroyed.
1936-37	12.63	12.22	.41
1937-38	12.94	12.53	.41
1938-39	12.84	12.53	.31
1939-40	12.85	12.02	.83

### (3) VILLAGE RETENTION AND MARKETABLE SURPLUS.

About 17 per cent of the total production of rice in Burma is estimated to be retained by the grower for domestic use, seed, etc., leaving a balance of 83 per cent to constitute the marketable surplus. Taking the average annual production for the triennium 1934-35/1936-37\* as 4.75 million tons, village retention would, therefore, amount roughly to .83 million tons and the marketable surplus to 3.92 million tons.

The quantities retained by the growers are utilised approximately as follows.

	(Per cent).	(Tons).
Seed..	4	185,000
Domestic consumption	11	536,000
Payment of wages for services in connection with the harvesting of the rice crop	2	107,000
<b>Total</b>	<b>17</b>	<b>828,000</b>

The proportion of the crop retained on the holding and in the villages in Burma is much lower than in India, the average retention for the latter country as a whole being 59.5 per cent. Conversely, Burma's marketable surplus is relatively greater and amounting on an average to 83 per cent of her production as compared with India's 40.5 per cent. The commercial importance of the rice crop in Burma can, therefore, hardly be exaggerated. It is interesting to observe that nearly 75 per cent of the marketable surplus, or 2.96 million tons on an average, represents the exportable surplus of rice further particulars of which are given later.

\*This period has been adopted for the sake of convenient comparison with the Indian statistics which are similarly based. Complete data were not available for later years.

## (4) SEASON OF MARKETING.

As already noted, the area under winter rice covers about 98 per cent of the total rice acreage in Burma. The crop is harvested in November and December and, as might be expected, supplies normally begin to reach the market in large quantity shortly thereafter. This is borne out by the figures quoted in the following table which shows the average monthly arrival into Rangoon during 1934-36 of paddy by boat and rail, of rice by rail and proportionate share of each month relative to the annual total.

*Imports of paddy and rice into Rangoon.*

	Paddy.		Rice.	
	Thousand tons.	Per cent.	Thousand tons.	Per cent.
January .. .. .	129	6	83	13
February .. .. .	304	14	101	15
March .. .. .	334	16	88	13
April .. .. .	214	10	79	12
May .. .. .	218	10	69	10
June .. .. .	190	9	49	7
July .. .. .	143	7	41	6
August .. .. .	154	7	37	6
September .. .. .	157	7	28	4
October .. .. .	130	6	29	4
November.. .. .	90	4	28	4
December .. .. .	77	4	40	6
Total ..	2,140	100	672	100

It will be seen that 50 per cent of the total annual receipts of both paddy and rice take place from February to May, the balance of 50 per cent being spread over the remaining eight months of the year, from June to January.

The months of heaviest arrivals into Rangoon are March in the case of paddy and February for rice. This is due to the fact that the rice mills in the producing tracts up-country have access to supplies of paddy before the mills located in Rangoon and consequently start milling rather earlier. Thus consignments of rice reaching Rangoon commence to increase after November whereas the flow of movement of paddy is less in December than in November. November and December show least activity in the movement of paddy, while similar conditions obtain from September to November in respect of rice.

## (5) TYPES, QUALITIES AND TRADE DESCRIPTIONS.

(a) *Classification of production according to conformation (grain size).*—Burma rices have been conveniently classified by the local agricultural authorities into five main groups based on conformation. The paddies forming these groups are known collectively as *Emata*, *Letywezin*, *Ngasein*, *Medon* and *Byat*. Each is composed of a number of botanical varieties falling within a specific range of length, breadth and length to breadth ratio. The following table gives the relative dimensions of the rice kernels of the five groups.

	Dimensions of the rice kernels.	
	Length in millimetres.	Length/Breadth ratio.
<i>Emata</i> .. .. .	Over 7·00	Over 3·00
<i>Letywezin</i> .. .. .	6·00 to 7·00	2·40 to 3·00
<i>Ngasein</i> .. .. .	5·60 to 6·40	2·00 to 2·40
<i>Medon</i> .. .. .	5·00 to 6·00	1·60 to 2·00
<i>Byat</i> .. .. .	6·40 to 7·30	2·10 to 2·50

Plate facing page 64 gives a general idea of the physical characteristics of the main commercial varieties. The physical characteristics of each of the five main groups and the more important trade descriptions milled therefrom are briefly as follows.

*Fine rices*—(i) *Emata*.—The varieties comprised in this group constitute about 15 per cent of the total rice crop. They are characterised by long slender hard grains over 7 millimetres in length, having a length to breadth ratio of more than 3. The kernels are translucent and capable of taking a high polish but are liable to considerable breakage in milling. These rices mainly derive from the Prome and Tenasserim areas, the former being noted for its superior quality. Long grained *Ematas* are also grown in the Henzada district.

Rices from the varieties of paddy included in this group are prepared both in the raw and parboiled form. Among the former are to be found the *Europe* and *Small Mills* qualities not all of which, however, are milled from *Emata* paddy. On the other hand, the entire production of *Long Boiled* and *Boiled Sugandhi* is derived from this group.

(ii) *Letywezin*.—The thin grained *Letywezins* are regarded as short fine rices and the proportion of these qualities to the total crop is about 9 per cent. Thus the production of fine rices in Burma may be put at 24 per cent of the entire crop (*less* seed) or a little more than 1·04 a million tons. The varieties included in this group possess smaller grains generally than the *Ematas*, the lengths of kernel ranging from 6·00 millimetres to 7·00 millimetres and length to breadth ratios from 2·40

to 3·00. The kernels found in *Letywezin* group are translucent but susceptible to breakage in milling though to a less extent than the *Ematas*. Cultivation is distributed over Upper and Lower Burma, the former region producing the small grained varieties which are mostly used for internal consumption and contribute very little to the export trade of the country as a whole.

Both raw and parboiled rices are milled from the *Letywezin* paddies. In the raw category, the entire supply of the *Big Mills* and *Small Mills Specials* qualities and a large proportion of the *Small Mills* and *Straits* (Straits Settlements) *Qualities* are produced from the above group but in many instances apart from the use of *Emata* paddy mixtures of *Letywezin* and *Ngasein* (referred to in the next paragraph) are milled to produce these qualities. The whole output of the parboiled qualities, *Milchar* and *Full Boiled* is derived from similar mixtures of *Letywezin* and *Ngaseins*.

*Medium rices—Letywezin.*—Most varieties of the *Letywezin* group do not fall within the category of short fine but should properly be classed as medium rices. These account for about 15 per cent of the total production of rice in Burma.

*Bold rices—(i) Ngasein.*—This important group, comprising several varieties of paddy, typifies the bold rices of Burma and constitutes about 42 per cent of the total production. The length of the husked grain is between 5·6 millimetres and 6·4 millimetres with a particularly low length to breadth ratio ranging from 2·00 to 2·4. The kernels are, therefore, somewhat short and squat in appearance. They are fairly translucent and in many cases stand up to milling well although some varieties have a good deal of abdominal white which impairs their milling quality. These rices are cultivated in both Upper and Lower Burma but whereas the produce of the former tract is only of local importance the major portion of the total export trade of the country is made up of *Ngaseins* grown in the southern districts.

The various trade descriptions produced from this group are the same as those referred to under the *Letywezins*.

(ii) *Medon.*—The *Medon* type represents about 15 per cent of the total production and is short plump and chalky or opaque, with a relatively higher milling outturn than is possessed by the paddies of the three preceding groups. The kernel length varies from 5·00 millimetres to 6·00 millimetres and the ratio of length to breadth from 1·60 to 2·00. With the exception of small shipments to the Far East and to India *Medon* figures mainly in the trade for home consumption.

(iii) *Byat.*—The area under these rices is comparatively small and the production is only some 4 per cent of the total crop. The part played by this group in the internal and export trade is, therefore, relatively unimportant. The produce is largely retained by the cultivators for home consumption. The grain is large, but very thick or plump and chalky in structure with a length/breadth ratio of 2·10 to 2·50 millimetres.

Altogether, therefore, bold rices constitute approximately 61 per cent of the total production of Burma.

*Broken rice.*—In contradistinction to practice in India, the rice trade in Burma is sufficiently well organised to recognise a number of clearly defined qualities and grades of broken rice most of which are standardised and are known by certain letters and numbers. The production of raw rice as given in Appendix XXIII includes well defined grades of broken rice—in so far as Burma is concerned—which are described in trade statistics as *Broken Cleaned*. These grades are produced as a by-product of milling raw rice only and not parboiled rice. They are classified into *Grades A, B, C* and *Nos. 1, 2* and *3*. *Grade A* is produced in milling the *Europe Qualities Super, No. 0, 1* and *2*. *Grade B* results from the milling of *Europe No. 3* and *Straits Quality* rices. *Grade C* is derived from the *Big Mills* quality, while *Nos. 1, 2* and *3* are obtained from milling *Small Mills* and *Bazár Qualities*. These grades may be further subdivided, according to size, into sometimes as many as five or six sub-groups.

There is also another type of broken rice known as *Rough Broken Rice* obtained during the preliminary hulling of paddy. In contrast to *White Broken Rice* which is obtained during the pearling process and is, therefore, polished white, *Rough Broken*s have the bran layers in tact. The production of this quality is, however, small.

(b) *Classification by raw and parboiled.*—Of the total production of rice (excluding seed requirements) approximately 75 per cent or 3·27 million tons of rice are available in raw form and the balance of 25 per cent or 1·09 million tons are parboiled.

The quantities and proportions of raw and parboiled rices and their classification under the heads of “fine”, “medium” and “bold” are shown in Appendix XXIII from which it will be observed that out of approximately 1·09 million tons of parboiled rice produced in Burma about 72 per cent consist of the bold varieties, some 6 per cent of medium and roughly 22 per cent of fine. It will also be apparent that out of some 3·27 million tons of raw rice produced in Burma, the bold varieties account for approximately 1·88 million tons, the fine 0·8 and the medium about 0·59 million tons.

The most important raw varieties produced from the *Letywezin*, *Ngasein* and *Medon* groups are *Big* and *Small Mills Specials*, *Small Mills* quality, *Bazár Quality*, the various *Europe Qualities* and *Straits Quality*.

The principal qualities of parboiled rice are known as *Milchar* and *Full Boiled*, when derived from the *Letywezin* group of paddy mixed with *Ngasein* and *Long Boiled* and *Sugandhi* when derived from *Emata* paddy.

(c) *Classification by machine-milled and hand-pounded.*—The production of hand-pounded rice in Burma is small and is estimated at 0·36 million tons or about 8 per cent of the total production (less seed). The remaining 92 per cent equivalent to 4·00 million tons is machine-



milled. Reference to Appendix XXIV will enable the quantities and proportions appertaining to the machine-milled and hand-pounded types as well as those of the raw and parboiled qualities to be assessed and comparisons made with similar data in respect of India. It will be observed that while the hand-pounded qualities consist wholly of raw rice, the machine-milled qualities are made up of 67 per cent (2·91 million tons) of raw rice and 25 per cent (1·09 million tons) of parboiled.

(d) *Summary of qualities put on the market.*—On the basis of an average annual total production of 4·75 million tons of rice in 1934-35/1936-37, the marketable surplus may be estimated at 83 per cent or some 3·92 million tons, almost all of which consisted of machine-milled qualities. As far as can be ascertained little, if any, hand-pounded rice is actually put on the market. It is also noteworthy that practically all the production of parboiled qualities, viz., 1·09 million tons, enters commerce. The balance of the marketable surplus, amounting to 2·83 million tons, represents raw rices.

Apart from a small quantity retained for seed, for payment of wages in kind and for home consumption, the greater proportion of the production of fine and medium qualities is disposed of by sale. On the basis of estimates made during the survey it was found that 1·63 million tons or approximately 92 per cent of the fine and medium rices produced in Burma entered trade. The balance of the marketable surplus (2·29 million tons) comprised bold rices milled from *Ngasein* and *Medon* paddy groups. Virtually the entire production of the *Byat* group is retained for home consumption.

#### B.—Imports.

Burma's imports of paddy and rice are small. In recent years sea-borne imports of paddy have ranged from nil in 1938-39 to 481 tons in 1936-37 and imports of rice, mostly from India, from 1,046 tons in 1936-37 to 1,249 tons, in 1938-39. Imports from foreign countries are negligible.

Imports of paddy through land frontier stations averaged 666 tons only between 1931-32 and 1936-37, while average imports of rice in the same period amounted to 3,961 tons. During the six years referred to the lowest and highest importations of both paddy and rice occurred in 1933-34 and 1935-36 respectively, the relative figures for paddy being 392 tons and 826 tons and those for rice being 3,048 tons and 4,960 tons.

#### C.—Exports.

(a) *Quantitative.*—Burma is the world's largest exporter of rice. During the period 1931-32/1938-39 annual shipments of paddy and rice averaged close over 1·6 million tons and 2·93 million tons respectively, their joint total constituting roughly 63 per cent of Burma's annual production and about 78 per cent of the marketable surplus. The

following table shows the quantities of paddy and rice exported each year during the period 1931-32/1938-39.

*Exports of paddy and rice from Burma by sea.*

(Thousand tons).

Year.					Paddy.	Rice.
1931-32	..	..	..	..	237	3,152
1932-33	..	..	..	..	165	2,538
1933-34	..	..	..	..	171	3,144
1934-35	..	..	..	..	232	3,367
1935-36	..	..	..	..	187	2,766
1936-37	..	..	..	..	95	2,757
1937-38	..	..	..	..	66	2,777
1938-39	..	..	..	..	101	2,926
Average 1931-32/1938-39	..	..	..	..	157	2,928

(b) *Share of ports.*—The chief ports from which shipments of rice (including paddy) are made are Rangoon, Bassein, Akyab and Moulmein in that order of importance. On an average about 73 per cent of the export trade is handled at Rangoon, 12 per cent at Bassein, 9 per cent at Akyab and 6 per cent at Moulmein. Shipments from minor ports are negligible.

(c) *Destinations of exports.*—During the period 1931-32/1938-39, India took as much as 86 per cent of Burma's exports of paddy and Ceylon about 6 per cent. The shares of Germany and the Netherlands although of some magnitude during the two years 1931-32 and 1932-33 have been negligible thereafter and are thus in common with those of other countries whose trade in Burma paddy is negligible.

India is also Burma's largest customer for rice and on an average some 49 per cent of the total shipments from Burma between 1931-32 and 1938-39 were consigned to Indian ports. The quantum of trade with India and with other destinations during this period and the proportionate share of each country's takings of Burma rice are shown in Appendix XXXII and illustrated in the diagram opposite this page. It will be noted that Ceylon absorbs 12 per cent of Burma's exports and ranks immediately after India. Next in importance, Germany and the Straits Settlements hold equal place with 6 per cent each, while China's share amounts to 5 per cent. Of the remaining countries, the Netherlands, the United Kingdom, Sumatra and Malay States are the only ones worthy of note and between them account for a total of 8 per cent of the export trade from Burma.

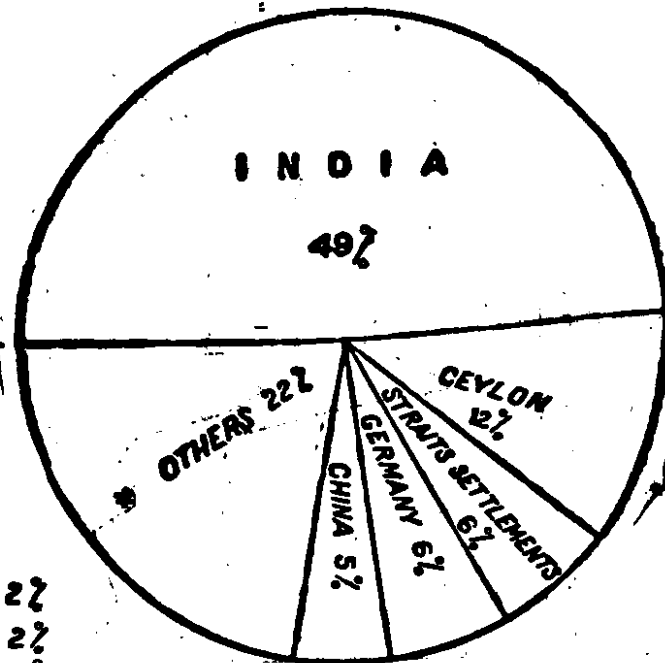
It is significant that Burma's exports to a number of countries other than India have on the whole showed a tendency to decline. This contraction of trade has been confined mainly to Continental Europe, China and Cuba. In Europe, Germany and the Netherlands, formerly two of the principal European buyers of Burma rice, both reduced their takings considerably and as a result of the War these markets together

**DESTINATIONS OF RICE & PADDY (RICE IN THE HUSK)  
EXPORTED FROM BURMA BY SEA**

**AVERAGE 1931-32/1938-39**

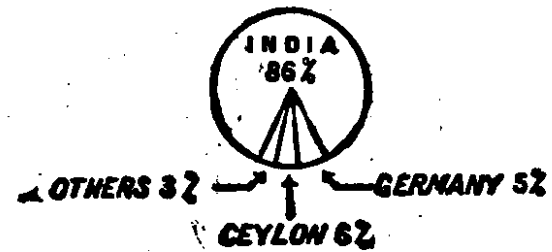
*Drawn to Scale*

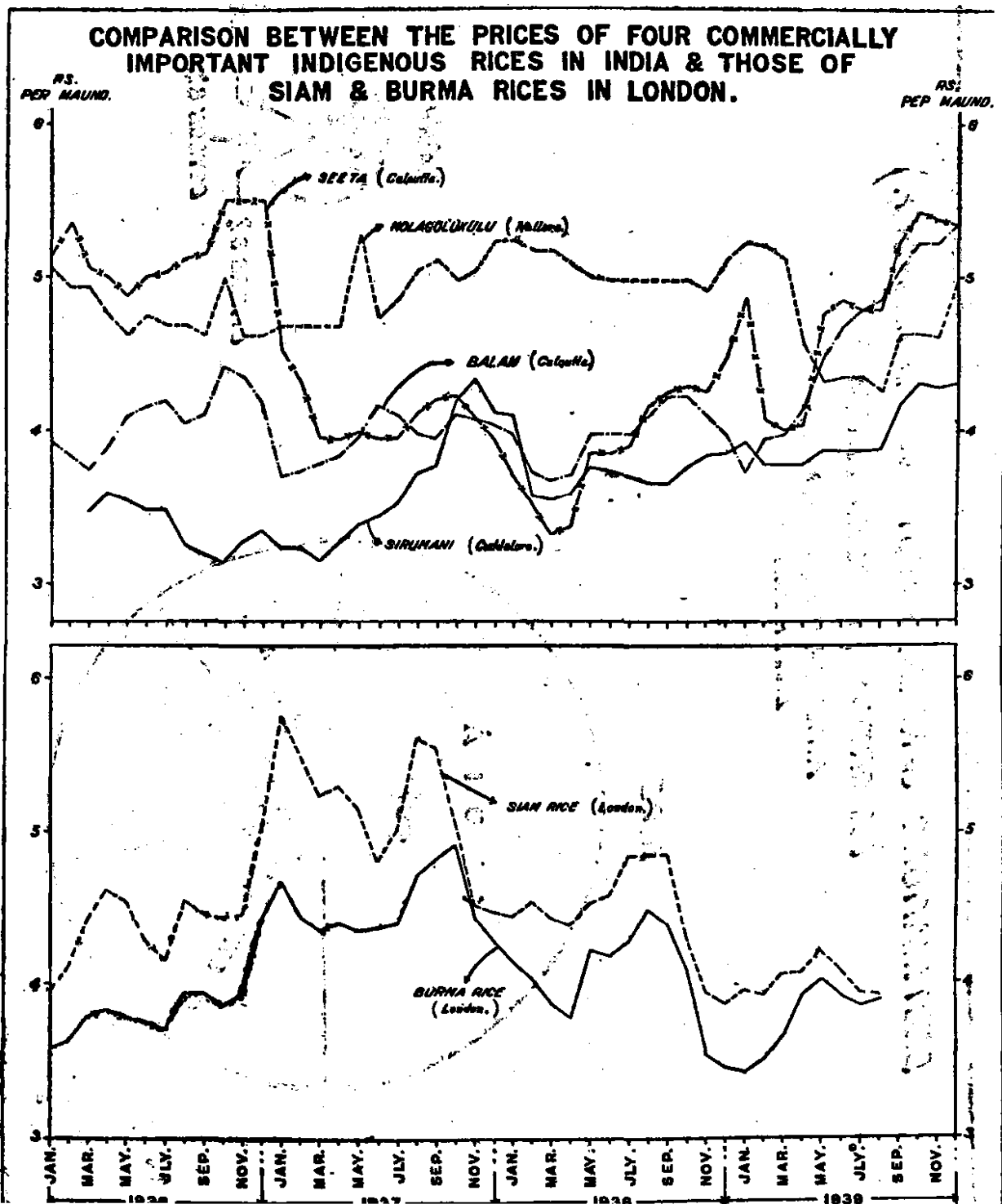
**RICE**



\* SUMATRA 2%  
 FEDERATED MALAY STATES } 2%  
 UNITED KINGDOM 2%  
 NETHERLANDS 2%  
 OTHERS 14%

**PADDY**





with Austria, Czechoslovakia, Poland, Denmark and to a large extent, Norway and Belgium may now be regarded as lost, if only temporarily.

It will, however, be noted that the diminishing outlets in Europe have to a large extent been compensated for by some increase in India's takings and by a slight if somewhat irregular expansion in the demand from Ceylon, Aden, the Federated Malay States and the British West Indies. For instance, prior to 1931-32 only about one-third of the Burma crop went to India and two-thirds to other countries. In recent years India's share has expanded to close on one-half and the importance of the India market to Burma may be gauged from the fact that India takes on an average no less than Rs. 11.5 crores worth of rice out of total exports from Burma valued at some Rs. 22 crores.

(d) *Qualities exported.*—Annual sea-borne exports of rice from Burma for the period 1933-34/1938-39 sub-divided into the categories of raw parboiled, broken rice and unclassified are given in the table below :—

*Exports of rice from Burma by qualities.*

(Thousand tons).

Year.	Raw rice.	Parboiled rice.	Broken rice.	Unclassified rice.	Total.
1933-34	1,821	1,090	194	39	3,144
1934-35	1,817	1,383	153	14	3,367
1935-36	1,300	1,324	134	8	2,766
1936-37	1,351	1,241	150	15	2,757
1937-38	1,444	1,139	167	27	2,777
1938-39	1,432	1,274	201	19	2,926
Average	1,528	1,242	166	20	2,956

Of the average annual exports of 2.96 million tons, raw rices comprise 51 per cent or nearly 1.53 million tons, parboiled rices 42 per cent or 1.25 million tons and broken rices 6 per cent or about 0.17 million tons, the balance of 1 per cent or some 19,000 tons being unclassified.

The changes which have been taking place from year to year in the qualities exported will be readily apparent from the following table.

*Proportions of different qualities of rice exported from Burma.*

Year.	Raw rice.	Parboiled rice.	Broken rice.	Unclassified rice.	Total.
1933-34	58	35	6	1	100
1934-35	54	41	5	Neg.	100
1935-36	47	48	5	Neg.	100
1936-37	49	45	5	1	100
1937-38	52	41	6	1	100
1938-39	49	43	7	1	100
Average	51	42	6	1	100

It may be noted that there has been a general tendency for shipments of raw rices to decrease and those of the parboiled qualities to increase. Exports of broken rice relative to total shipments alone seem to show a slight expansion in recent years but this has no special significance as the quantities involved are not large.

(e) *Trade descriptions.*—The various trade descriptions of Burma rices exported to India are dealt with in the section dealing with imports into India (see pages 71 and 72). It may be recalled that the bulk of Burma's exports to India consists of inferior qualities such as *Big* and *Small Mills Specials* (raw) and *Milchar* (parboiled). There is a relatively small trade in *Sugandhi*, a long grained type and one or two of the smaller grained fine types such as *Madaya* (Mandalay).

The bulk of Ceylon's imports from Burma consist of parboiled qualities in which low grade *Milchar* figures prominently.

The European countries mainly take raw rice of qualities known as *Europe Super*, and *Nos. 0, 1, 2* and *3* grades milled principally from *Ngasein* and to a small extent from *Medon* paddies. *Super Sugandhi* and *Special Sugandhi* qualities produced from the *Ematas* are also popular. All these qualities are put on the market in well polished form and with a comparatively low proportion of broken grains.

Burma's shipments to the Far Eastern markets consist mostly of the *Big* and *Small Mills Specials* qualities deriving from *Ngasein* type paddy, and the *Bazar Quality* milled from *Medon* paddy. As is the case with India and Ceylon, the Far Eastern market is a cheap market and the qualities exported from Burma are the low grade rices.

(f) *Periodicity of exports.*—Appendix XXXIII, of which the following table is an abstract, gives the monthly shipments of paddy and rice from Burma during the period 1935-36/1938-39 and the average proportion borne by each month to the annual total.

						Paddy.	Rice.
January	..	..	..	..	..	12	8
February	..	..	..	..	..	14	11
March	..	..	..	..	..	17	15
April	..	..	..	..	..	21	11
May	..	..	..	..	..	16	11
June	..	..	..	..	..	4	8
July	..	..	..	..	..	4	8
August	..	..	..	..	..	4	7
September	..	..	..	..	..	2	6
October	..	..	..	..	..	2	6
November	..	..	..	..	..	Negligible.	5
December	..	..	..	..	..	4	4
						100	100

It will be observed that the periodicity of shipments is much more marked in the case of paddy than rice, for while the low and high of paddy exports range from something negligible to 21 per cent those of rice are 4 per cent to 15 per cent respectively.

Shipments of paddy rise steeply in January as compared with the preceding month and reach a peak of 21 per cent in April. The five months, January to May, record 80 per cent of the total annual exports of paddy. During the rest of the year exports of paddy are comparatively insignificant and fall to a negligible quantity in November. As with paddy but in somewhat less measure, shipments of rice take a spurt upward in January but attain the highest point of the year in March. The rate of export is maintained at a fairly high level until the end of May by which time 56 per cent of the entire year's shipments have been registered. Shipments diminish thereafter until the lowest point of the year is reached in December. There is no significant difference between the periodicities of exports to India and those to other countries. The periodicity, however, of shipments to Indian ports differs.

#### D.—Imports and exports of rice products.

There are no imports of rice products into Burma worthy of mention but a comparatively large export trade is carried on in rice bran.

##### *Exports of rice bran.*

(Thousand tons).

Average 1931-32/1933-34	..	..	..	244
1934-35	..	..	..	270
1935-36	..	..	..	251
1936-37	..	..	..	271
1937-38	..	..	..	310
Average 1931-32/1937-38	..	..	..	269

India's share of these exports is insignificant and amounts on an average to only 1 per cent of the total. The United Kingdom is the main taker of rice bran and absorbs as much as 88 per cent of the shipments. The Straits Settlements rank second with 5 per cent and all other countries combined account for the remaining 6 per cent.

Monthly shipments show no marked periodicity on the basis of statistics covering the triennium 1935-36/1936-37 and range from 6 per cent in April to 11 per cent in March. In nine months the year exports maintained at a remarkably steady level of either 8 or 9 per cent of the annual total.

#### 2.—Total and net available supplies of rice—approximate value per capita consumption.

Burma's supply of rice consists almost wholly of her own production which as pointed out earlier, averages 4.85 million tons per annum. Of this quantity about 60 per cent is exported abroad leaving 40 per

cent for internal consumption. The total and net available supplies for 1937-38, the latest year for which complete figures are available, are as follows.

						(Tons).
	Reported production of rice 1937-38	..	..	..		4,590,000
<i>Imports—</i>						
	By sea	..	..	..	..	1,208
	By land	..	..	..	..	4,603*
						<u>5,811</u>
<i>Exports—</i>						
	By sea	..	..	..	..	2,800,000
•	By land	..	..	..	..	799*
						<u>2,800,799</u>
	Net available supplies	..	..			1,795,012
					or	<u>1,795,600</u>

The estimated value of the net available supplies on the basis of Rs. 2-6-0 per standard maund (82 2/7 lb.) which may be regarded as a fair average all-Burma price would be Rs. 11·60 crores or £ 8·7 millions.

Reckoning Burma's population in 1937 at 15·6 millions the *per capita* consumption based on net available supplies *less* seed, *i.e.*, 1·61 million tons would amount to be 231 lb. per annum.

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\*Average for 1934-35/1936-37.



## INTER-CHAPTER ONE.

The world output of rice has increased substantially in the past thirty years, the average production having risen by nearly 28 per cent between 1909 and 1937. During 1936 and 1937, the total world output (including China), amounted to 89·9 and 95·9 million tons of rice respectively, of which India's share was 25·7 and 30·9 million tons, representing an average of about 31 per cent of the world's crop. During the same period, China averaged about 34 per cent of the total world production.

In recent years, rice has become the third most important food-grain in international commerce and ranks next to wheat and maize. The chief importers of rice are the densely populated Asiatic countries which grow insufficient quantities of this food-grain to feed their inhabitants. For instance, although India and China account for practically two-thirds of the entire world production of rice, both are obliged to import on a large scale every year to supplement their domestic supply. During the last 10 years India has imported from one and a half to over two and a half million tons of rice every year.

The three principal exporters of rice are Burma, Siam and Indo-China. Of these, Burma is by far the most important with an average annual export amounting to some 3 million tons, equivalent to about 30 per cent of the total world trade. At least two-thirds of Burma's production of rice is shipped abroad and roughly half normally goes to India. The great importance of the rice trade in the economic life of Burma may be gauged from the fact that the value of Burma's rice exports constitutes some 40 per cent of the total value of her exports and the greater part of the population is directly concerned in the cultivation, transport and milling of this cereal.

The forecasts issued by the Department of Commercial Intelligence and Statistics in respect of the Indian rice crop do not take into account several important rice growing areas and thus omit something over six and a half million acres actually sown with the crop.

In point of acreage (and total value of production) rice is the largest single crop grown in India. The total area under this cereal is reported to be, on an average, not less than 76·26 million acres annually, *i.e.*, about 18 per cent of the total cultivated area and about 36 per cent of the entire acreage under food-grains in this country. Nearly 90 per cent (67·35 million acres) of the total acreage is located in British provinces and the rest in Indian States. The crop is grown mostly in Bengal, Madrás, Bihar, Orissa, the Central Provinces and Assam. The largest rice growing unit is Bengal with over 21 million acres. Taking India as a whole, there is no evidence of any definite or consistent trend either towards an expansion or contraction of the area under rice.

While the crop is harvested as paddy (rice in the husk) the statistics of production as published by the Department of Commercial Intelligence and Statistics relate to rice, estimates of which are supplied by provinces and States. The conventional ratios adopted by the latter for converting paddy figures into rice are in most cases on the low side, with the result that the production figures for India are found to be subject to an under-estimate of 10 per cent annually. This is apart from the inaccuracies of the primary data especially in the permanently settled areas like Bengal and Bihar, where a large proportion of the Indian production is concentrated.

According to the available statistics, the average total production of rice in India amounted to 29 million tons annually between 1927-28 to 1936-37. This quantity

reckoned on an average price of, say, Rs. 3-8-0 per maund would represent a value of Rs. 276 crores. Of the total production, 88 per cent was produced in British India and 12 per cent in Indian States. Bengal is the largest producer, Madras and Bihar are next in order of importance. The Feudatory States of Bihar and Orissa produce easily two-fifths of the total production of Indian States. As in the case of acreage, no consistent expansion or contraction of production has occurred, fluctuations of a minor character being attributed to the effect of seasonal conditions.

The yield per acre of rice depends on a number of factors, *e.g.*, rainfall, irrigation, soil and the variety of paddy grown. It is particularly important to note that transplanted rice normally gives a higher yield than when the crop is sown broadcast. The yield per acre in India does not compare unfavourably on the whole with that of certain other countries in south-eastern Asia, but falls far short of the yield in the Mediterranean countries, the United States and Japan.

The proportion of the rice crop retained in the villages and holdings for domestic consumption, barter, seed and payment of wages in kind varies enormously from one area to another. Taking India as a whole, the total retention in villages amounts roughly to sixty per cent of the crop and the balance of forty per cent may be considered as the marketable surplus. Where more than one type of rice is grown, the cultivator almost invariably retains the coarse inferior varieties for his own use and sells the finer rices which give a better cash return.

In most parts of India there are three rice crops in the year, *viz.*, the *aus* (autumn), *aman* (winter) and *boro* or *dalua* (summer), according to the season in which they are harvested. Winter rice is by far the most important crop. The sowing time of this crop varies

according to locality and normally falls between June and August, while harvesting usually commences about November and is over by the end of January. The autumn crop is sown in May and June and is harvested in September. The summer crop, the least important of the three crops, is sown between January and March and harvested during May and June.

As is the case with most other agricultural commodities the supplies of paddy and rice put on the market show a marked seasonality, the heaviest arrivals taking place between January and May. The seasonality is much more pronounced in the case of paddy than in rice, large quantities of the former being hurried forward for sale as soon as threshing has been completed. This, as will be shown in Chapter III, is responsible for a greater harvest depression in the price of paddy than of rice.

Of the seven thousand known botanical varieties of rice (paddy), about four thousand have been identified in India. It is not surprising, therefore, that there are considerable physical variations in the different types and qualities cultivated in this country. From the commercial and marketing point of view, however, these varieties may be classified under the three broad heads according as they are (a) fine, medium or bold (coarse), (b) raw or parboiled and (c) machine-milled or hand-pounded rice. In determining the quality of rice particularly in respect of requirements of consumers and for cooking purposes, the most important factors are the size and shape of the grain. Other things being equal, fineness or slenderness is indicated by a fairly high length to breadth ratio and small size and these, singly or in combination, are the two main physical characteristics which place rice high in the quality range. In accordance with the criteria of size and shape of grain, rices in India may be divided into the three categories of fine, medium and bold (or coarse) rice.

From a marketing point of view, it is necessary to note the highly localised nature of the market for certain types of rice, which is due to the fact that the degree of importance attached to each quality factor varies widely in different parts of the country. For instance, a long, slender, fragrant rice, such as the highly priced *Basmati* variety grown in the United Provinces and the Punjab, would not be appreciated by the main body of consumers in South India, while a parboiled hand-pounded rice of yellow or reddish colour, popular in Bengal, Orissa or Bihar, would hardly be considered fit for edible purposes by the people in other parts of Northern India. Natural translucency (which is not the same as the translucency imparted by parboiling) is, however, almost everywhere accepted as a desirable characteristic. As a rule, the whiter the colour, the better the quality and the higher the price of the product. Natural fragrance or aroma is also a much valued quality, particularly if the fragrance persists after the rice has been cooked. Other qualities which are looked for are uniformity of size and shape, age or maturity and freedom from impurity or foreign matter.

Most of the fine rices have an average length/breadth ratio of well over 3, many being over 3.25 and some as much as 3.75 and above. The length/breadth ratio of the average medium rice ranges from about 2 to approximately 3, the more common ratio being 2.5. Bold and coarse rices have a range of length to breadth ratios similar to the medium rices, but the more common ratio is below 2.5. Of the total rice production in India, it has been estimated that some 3.39 million tons or roughly 13 per cent consists of fine varieties, 8.70 million tons or 32 per cent are medium varieties and 14.65 million tons or 55 per cent are bold or coarse varieties.

The greater proportion of the rice grown and consumed in India is parboiled. On the basis of the average triennial production during 1934-35 to 1936-37,

about 57 per cent of rice is parboiled before sale and the remaining 43 per cent is sold raw. Further, approximately, 73 per cent of the rice production in India is hand-pounded and only 27 per cent is turned out by power operated rice mills.

As already stated, although India is the second largest rice producing country in the world, she has a large import trade in rice, and during the period 1935-36 to 1937-38, her imports of rice (including paddy) average about 1½ million tons annually valued at roughly Rs. 14 crores. Of the total imports, about 96 per cent come by sea and the rest through land frontier routes. Most of India's imports of rice by sea (94 per cent) come from Burma and the rest almost wholly from Indo-China and Thailand (Siam). India also exports a certain quantity of rice mainly to Ceylon, Mauritius and East Africa, but the amount exported is less than 1 per cent of her total production.

In Burma, rice is the main cash crop and the most valuable export commodity. As in India three rice crops are grown but the winter crop constitutes the bulk. On an average, during the 10 years ending with 1936-37, Burma produced annually 4·85 million tons of rice. About 17 per cent of the total production is retained by the grower in Burma for domestic use, seed, etc., and the balance of 83 per cent constitutes the marketable surplus. Burma is the world's largest exporter of rice. During the period 1931-32 to 1938-39, the annual shipments of paddy and rice averaged over 0·16 million tons and 2·93 million tons respectively.

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## CHAPTER II.—UTILISATION AND DEMAND.

## INDIA.

## A.—Utilisation.

## (1) PADDY (RICE IN THE HUSK).

(a) *Seed*.—The seed rate per acre varies in different areas according to the nature of the soil and cultural practices such as the methods of sowing, *e.g.*, transplantation, broadcasting or drilling.

The quantity of seed required for transplanting is relatively small in comparison with that needed for sowing broadcast and varies from 10 lb. per transplanted acre in the Punjab to 120 lb. in Chota Nagpur and Santhal Parganas in Bihar. Broadcasting implies a higher seed rate, the minimum being 20 lb. per acre in the Punjab and the highest 160 lb. in Coorg. Having regard to the areas under transplanted and broadcast rice and the respective seed rates in different provinces and States, the total quantity of paddy required to sow 77·43 million acres of land (average for three years ending 1936-37) is estimated at 2·41 million tons. Expressed in terms of rice on the conventional basis adopted in the official statistics, this would be equivalent to about 1·61 million tons, representing 5·7 per cent of the total average production. Full details of seed requirements in various provinces and States are contained in Appendix XXXIV. For comparison, it may be observed that in the case of wheat the quantity required for seed works out to an average of 13 per cent of the total production.

(b) *Stockfeeding*.—As already mentioned in the preceding chapter the quantities of paddy retained for stockfeeding are quite negligible. In Bengal, Bihar, Orissa, the Central Provinces, the United Provinces and the Punjab, paddy is very rarely, if ever, used as cattle feed. The only area in which small quantities of paddy are given to stock are apparently in the West Godavari district of Madras, in Sind and in Assam. In the first and last named tracts paddy is given to cattle, while in Sind it is occasionally fed to riding horses belonging to large *zamindars*. It may be reckoned that at the outside about 2,000 tons are utilised for stockfeeding.

(c) *Manufactured products*.—As a result of special enquiries made in the various provinces and States a rough estimate has been arrived at in regard to the quantity of paddy involved in the manufacture of the three main products known as *murmura* (parched rice), *kheel* (parched paddy) and *chura* (beaten rice). The first two are really counterparts of the pop-corn or pop-rice of Western countries which they resemble in many respects. The methods of manufacture are described in Chapter X.

Full details of the estimates are given in Appendix XXXV. The total quantity of paddy thus utilised may be put at 1·5 million

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NOTE.—The names *murmura*, *kheel* and *chura* are common in most parts of India. In some tracts, however, different synonyms are in vogue. For instance, *murmura* is known as *muri* in Bengal, *pori* in Travancore and *bhunja* or *phari* in Bihar and Orissa. *Chura* is called *chira* in Bengal, *churva* in Hyderabad, *pohe* in Bombay and *aval* in Travancore. The synonyms for *kheel* are *khoi* in Bengal, *phulian* in the Punjab, *lahi* in Hyderabad and *malaru* in Travancore.

tons equivalent to about 1 million tons of rice. This does not include a further 350,000 tons of parboiled rice used for parching in certain areas by professional parchers (*bharbhunjas*), who manufacture *murmuras* directly not from paddy but from parboiled rice.

The regions in which paddy is utilised for the manufacture of parched products on a comparatively large scale are Bengal, the United Provinces, Bihar and Orissa. In Bengal, parboiled paddy is the base for making parched paddy and beaten rice, but for the preparation of parched rice the parching industry uses parboiled rice as the raw material. In the United Provinces all the three products are manufactured direct from paddy. In Bihar and in Orissa the general practice is much the same as in Bengal, with the exception that parched rice is not exclusively made from parboiled rice as in Bengal, but also to some extent from parboiled paddy. The four provinces mentioned above account for nearly three-fourths of the total demand for paddy in India for processing into parched products. Detailed references to the utilisation by areas of paddy for these purposes will be found in Chapter X.

(d) *Conversion into rice.*—The demand for paddy for conversion into rice is represented by the requirements of the milling industry and by the quantities dehusked by manual labour. Reference to Appendix XXIV will indicate the approximate quantities and proportions of machine-milled and hand-pounded rices produced in the different provinces and States. It will be seen, for example, that the total output of rice by the power-driven rice mills in India is estimated at roughly 7.3 million tons annually, equivalent to 10.9 million tons of paddy. The principal areas in which the demand for paddy for machine-milling is comparatively large are the provinces of Madras, Bombay, the Punjab and the States of Hyderabad and Mysore. As the position in each of the main tracts has been discussed in the preceding chapter (see pages 45 and 46) it is unnecessary to go into further details here.

The quantity of rice which is estimated to be produced by hand-hulling or by hand-pounding is somewhere in the neighbourhood of 19.4 million tons, which, expressed in terms of paddy, works out to about 29 million tons. This figure includes approximately 1.5 million tons of paddy which, as mentioned on page 105, are manufactured into various products such as parched paddy. Thus the net quantity of paddy, which is actually converted into rice for consumption in the every day fashion, *e.g.*, to be eaten as boiled rice and kindred preparations, is 27.5 million tons or, in terms of rice, some 18.4 million tons. As far as can be ascertained, the professional dehushing class handled about 2 per cent of this latter quantity and the balance is dehusked into rice in the producers' homes by hand-pounding.

The export demand is practically negligible. There has never been much demand from countries outside India for Indian paddy. The relatively small trade which existed prior to 1914-15 (see pages 77 and 78) has contracted on an average to about 2,600 tons only or one-eighth of what it was between 1900-01/1914-15.



## (2) RICE.

(a) *Domestic use.*—Rice is the most important single article of food in this country and some 27 million tons of rice are estimated to be consumed in various cooked preparations, the great bulk as plain boiled rice.

Throughout the main rice producing provinces of Bengal, Bihar, Orissa and Assam, in many districts of Madras, in the dense rice areas of the United Provinces and the Central Provinces and in scattered parts of Bombay and Sind, rice constitutes the staple food of the great majority of the rural population throughout the year. A very large proportion of town dwellers in the areas mentioned above also use rice as their staple diet. In other parts of India the consumption of rice is more seasonal in character and may be described in a general way as tending to rise in summer and to fall in the winter. In addition, this cereal is commonly used on social and religious occasions such as marriages, religious ceremonies and the like.

Rice is prepared for the table in a number of ways of which by far the commonest and the most important is to boil it in water. The grains are usually first washed in two or more changes of cold water and then put on to boil. The amount of water used for boiling varies according to personal taste and local custom. In South India, for example, much more water is used than the rice can absorb. The excess of water after the rice has been fully cooked is decanted and generally thrown away although in some cultivators' homes the *kanji*, as it is called, is given to cattle to drink. In many parts of North India, the rice is boiled in just about as much water as experience shows it to be capable of absorbing.

The rice prepared in the above manner may be eaten in combination with curry, cooked pulses, butter-milk or with milk and sugar.

A favourite dish in Northern India particularly during the winter months is *khichiri*, literally a "mixture", which is prepared by boiling together rice and lentils or other pulses, the whole seasoned with salt to taste.

*Kheer*, another well-known preparation, considered something of a delicacy, is made by boiling rice in water and/or milk with the addition of sugar to taste. *Kheer* is not partaken of every day. Muslims, for example, generally prepare it on the eleventh day of every lunar month as this day is regarded as auspicious. Among the Hindus, *kheer* is eaten during certain ceremonies preceding the

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NOTE.—Recent research at the Indian Institute of Science, Bangalore, as part of a scheme of investigation on "Quality in Rice" financed by the Imperial Council of Agricultural Research, has established the fact that when rice is repeatedly washed and then boiled in an excessive amount of water, so that there is an excess of water to be drained off after the rice has been cooked, there is a considerable loss of mineral ingredients and all the water soluble antineutric vitamin B<sub>1</sub>.

*Dussehra* festival in the autumn. *Firni* is a somewhat similar product and differs from *kheer* only in the respect that ground rice is used in its preparation.

*Pulao*, a dish known the world over as *pillau* or *pilaf*, and *zarda* are other favourites particularly among the Muslim community. *Pulao* is a rich preparation of rice cooked in ghee (clarified butter) usually with mutton or lamb, with or without vegetables of which peas are the most popular. Spices such as cardamom, cinnamon and cloves are often added and sometimes a *pulao* may contain a sprinkling of almonds and raisins. *Zarda* on the other hand is a sweet dish prepared with ghee and sugar and coloured yellow with saffron. Where no colouring matter is used the preparation is known as *sufeda* (white).

*Rice chapatis*—thin unleavened cakes—are made of rice flour ground from *Bold* or *Coarse* soft textured rices or from *Brokens*. The consumption of rice in this form is fairly common in many parts of the Rohilkhand division of the United Provinces, in the Muzaffargarh district of the Punjab and in Sind.

In addition to the above-mentioned preparations there are a number of others peculiar to South India. Some of these are *puttu*, *dosai*, *iddli*, *uppuma* or *sojji* and *appam*.

*Puttu* is made of ground rice steamed and eaten with sugar and coconut scrapings. *Dosai* is prepared by first soaking in water rice (or *Brokens*) and pulse (*urad*). The mixture is then ground with a little water and steamed. *Iddli* is similar to *dosai* except that the mixture is not ground very fine. *Uppuma* is prepared from broken rice by boiling it in water with spices. *Appam* is made by kneading rice flour into a dough with water, adding leavening and then baking it. *Appam* is generally eaten in the morning with the milk of fresh coconuts.

(b) *Industrial or non-edible uses—Starch*.—As far as can be ascertained no rice starch is made on a commercial scale in India\*, although the possibilities of manufacture have been explored at different times.

The use of rice as starch by laundrymen (*dhobis*) is common in urban areas and it was also observed that in the cottage weaving industry a certain amount of rice was used for sizing purposes by some weavers of cotton fabrics. The quantities consumed by the latter cannot be assessed with any degree of accuracy but are considered to be small. The average annual requirements of a typical laundryman's family are estimated at about 1.75 maunds. This would mean that between 3,000 and 4,000 tons are utilised annually for laundry purposes in India.

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\*A small quantity of wheat starch is made on a commercial scale in India, while there are at least four recently established concerns producing or about to produce maize starch. A concern sponsored by the Indian industrialists is understood to be operating in Burma.

Taking into consideration the extent to which rice appears to be used as a sizing material by the cottage weaving industry, the total consumption under these two heads in an average year can hardly exceed 5,000 tons in all.

(c) *Manufactured products*.—As already mentioned, the total quantity of rice directly involved in the preparation of parched *murmura* in India is estimated at some 350,000 tons. This is in addition to the 1.5 million tons of paddy bought as such for the express purpose of manufacturing into products including parched rice. The chief areas in which parched rice is made from grains ready milled into rice are Bengal, Bihar and Orissa.

The only other product manufactured from rice on any appreciable scale is rice flour stone-ground in hand or power-driven *chakkis*. Its commercial importance is not great as the total quantity of rice used for this purpose is probably not more than 50,000 tons at a very rough estimate. Rice flour is mainly used for making *chapatis* and the consumption of this product is limited to Sind where it has a considerable popularity, the south of the Punjab and the Rohilkhand districts of the United Provinces. In the latter two regions producers usually have the rice ground for their own domestic consumption and the quantities actually put on the market are insignificant.

There is also a small outlet for rice flour in the indigenous cosmetic trade. Very finely ground flour is sometimes used as a base for face powder. This is a comparatively new line of industry in India and few details are available. In any event the utilisation of rice flour for this purpose is insignificant.

The export demand as reflected by the quantities of shipments made to other countries and by the extent of the trade by land frontier routes is relatively small when compared with India's production and for many years has amounted only to about one per cent of the total output of rice in this country. Average shipments between 1931-32 and 1938-39 were 226,475 tons, while land frontier exports averaged 23,450 tons in the same period making a grand total of 249,925 tons. The era of comparatively substantial exports passed with 1925-26 and the tendency until 1935-36 was on the whole one of progressive contraction, the respective shipments of these two years being 378,568 tons and 188,362 tons. There has since been a slight improvement in the demand, shipments having risen to 280,639 tons in 1938-39. In the first ten months of 1939-40, exports totalled 210,496 tons. The demand through land frontier trade routes has shown some signs of falling off slightly having decreased in 1938-39 to 19,012 tons as compared with an average during 1931-32/1934-35 of some 25,250 tons. Apart from the question of India's large domestic requirements one of the reasons for the comparatively small export trade is that for the most part this trade consists of good quality rices for which the demand abroad is necessarily limited.

## (3) SUMMARY OF UTILISATION.

The approximate utilisation of the rice crop may be conveniently summarised in the following table. No allowances have been made for carry-overs or wastage.

*Summary of utilisation expressed in terms of rice.*

Supplies (excluding carry-overs).		Utilisation.	
(Tons).		(Tons).	
Production 1934-35/1936-37 ..	28,377,000	Seed .. .. .	1,612,000
Imports (all sources) ..	2,079,000	Stockfeeding .. ..	2,000
		Manufactured into products .. ..	1,350,000
		Industrial use (sizing, etc.) ..	5,000
		Exports .. ..	235,000
		Domestic consumption ..	27,252,000
<b>Total ..</b>	<b>30,456,000</b>	<b>Total ..</b>	<b>30,456,000</b>

**B.—Demand.**

## (1) DISAPPEARANCE AND PER CAPITA CONSUMPTION.

Human consumption of rice in India is comparatively inelastic and does not seem to vary according to its relative value as compared with other food crops. In the case of wheat, for example, the chief food grains complementary to wheat and influencing the consumption of that cereal are gram and barley but there are no similar counterparts in regard to rice, the demand for which remains on the whole practically unaffected by price changes in other cereals, pulses or millets.

The *per capita* consumption for 1937-38 already referred to in respect of India as a whole shows the average consumption per head in India to be 181 lb. There are, however, wide variations from this figure in the rate of consumption in different tracts and frequently as between rural and urban areas. In Calcutta, for example, disappearance amounts to about 175 lb. per head per annum whereas Bengal's *per capita* consumption is as high as 344 lb.

Consumption and the net available supply position in important areas given in Appendix XXXVI are discussed below. The map facing page 370 illustrates this and shows directional movements.

In Bengal, the largest rice growing province in India, this cereal is the main subsistence crop. As might be anticipated, therefore, the rate of disappearance is high and in fact amounts to about 344 lb. per head per annum. Assam, however, records the largest *per capita* consumption in the country of 382 lb. This is in consonance with local conditions as 94 per cent of Assam's production is retained on the holdings and in the villages for domestic consumption and the crop, to a greater extent even than in Bengal, forms the staple diet of the people. Bihar, Orissa and the Indian States within and adjacent to the borders of these two provinces may, for convenience, be regarded as one unit, owing to the great similarity of conditions prevailing over the entire region. The average annual disappearance in these areas attains the comparatively high level of

259 lb. per head. Practically all the inhabitants of this large tract are rice-eaters but the districts of heaviest consumption lie along the coastline of Orissa and in some of the States in the immediate hinterland. Consumption is also considerable in North Bihar and in the districts bordering the United Provinces.

In Madras and the Central Provinces annual disappearance reaches the considerable proportions of 230 lb. and 210 lb. per head respectively. Although rice may be regarded as the staple food of the greater number of the inhabitants in Madras, large quantities of millets are also produced in this province for subsistence purposes. Rice is, however, the main article of food in the coastal areas stretching from the East Godavari district down to Tanjore on the Coromandel Coast and along the Malabar Coast. In the Central Provinces the consumption of rice is greatest in the eastern districts where the bulk of the rice grown in this province is produced and enquiries have shown that the average yearly disappearance in the Chattisgarh area is probably well over 300 lb. per head. In Berar and in the northern wheat zones the consumption of rice falls to an average range of between 50 and 100 lb. and in some parts even below 30 lb.

It is interesting to observe that Sind with its comparatively small crop of about 450,000 tons ranks next in importance from the view point of rice consumption. The annual disappearance here is 158 lb. *per capita* and is in strong contrast to the neighbouring province of the Punjab where only 28 lb. are consumed per head or less than perhaps in any other part of India. The main rice area in Sind is distinct from that devoted to wheat and is located mainly in Upper Sind in and around the district of Larkana. Owing, however, to the seasonal inundations caused by the Indus, conditions are favourable for growing rice in small plots in many riverine tracts. While, therefore, rice is not necessarily the staple food throughout Sind, it forms a not unimportant item in the dietary of the inhabitants of the Indus Valley where the greater part of Sind's population is to be found.

Kashmir and Bombay are the remaining two areas in which the yearly disappearance of rice is over the hundred pound mark per head for the *per capita* consumption in Kashmir averages 112 lb., while that of Bombay is 107 lb. In both regions large quantities of other food crops are produced and rice is the staple food of only a portion of the local population. Maize, for example, is of importance in Kashmir while millets are cultivated in abundance in Bombay. The latter province also grows a fair amount of wheat. In Kashmir the consumption of rice is greatest in the Jhelum Valley where the bulk of the crop is produced. In Bombay, rice figures largely in the diet of the people of Ratnagiri and the southern coastal districts in general as well as parts of Gujarat in the north. Rice is also eaten in large quantities in industrial centres such as Bombay itself, Sholapur and Ahmedabad by those employed in the textile mills.

In the United Provinces, the *per capita* consumption averages about 94 lb. per annum. This, however, gives no idea of the wide range of disappearance between the eastern and sub-montane tracts

*Kalma* rice from Bengal is, for instance, in steady demand as far afield as Delhi.

Raw fine rices newly harvested or only several months old are rarely consumed as they do not cook so well as older more mature rices. For this reason fine rices which have been stored for a year or more command a premium ranging from several annas per maund to as much as one to two rupees in the case of the *Basmatis* of Northern India. Ordinarily, fine rices less than 6 months old are not much in demand, while fine scented varieties of Northern India are preferred not less than one year old. In the case of the *Basmatis* and *Hansraj* of the United Provinces and the Punjab some consumers look for rice which has been stored for two or three years and are generally prepared to pay a commensurate premium. Parboiled fine rices, on the other hand, do not require to be stored for any great length of time since the parboiling treatment gelatinises the starch and for all practical purposes brings about a characteristic of cooking quality, which is acquired by raw rice only if stored for considerable periods, *viz.*, the ability of the grains to cook without disintegrating into a pasty glutinous mass.

Rather more than 61 per cent of the consumption of fine rices consists of the raw varieties and about 39 per cent of the parboiled.

Fine rices are mainly used for *pulao* (meat and/or vegetables and rice cooked in ghee) in Northern India and in many other parts of the country where this dish is known and appreciated. They are also used for ordinary boiling and for the preparation of sweetened rice.

(ii) *Medium rices*.—Commercially this is the most important group, as it constitutes nearly half of the total market requirements for rice in India. Being comparatively cheap, medium rices are consumed largely by the middle and professional classes in towns and cities as well as in the villages. The very large communities possessing only small means, such as growers, artisans, labourers and others cannot normally afford such rice for regular consumption but use it on festive occasions.

Medium rices are, as a class, shorter and less slender than the fine varieties. Translucency is less marked and where natural fragrance exists the characteristic is confined to a very few varieties and then only to a limited degree. When cooked the grains of medium rices do not retain their individuality to the same extent as fine rices. The same importance is not attached to age as in the case of fine rices, although there is a preference for rices not less than six months old. The question of age in the parboiled types is not regarded as important.

Medium rices are consumed mainly in the form of plain boiled rice, *pulao* (meat and/or vegetables and rice cooked in ghee), sweet rice and *khichiri* (mixture of pulses and rice cooked together), the last named being a dish eaten largely in the winter season in Northern India. As with the fine rices, *pulao* is more often than not made with parboiled rice owing to the fact that rice in this form is able to stand up to the cooking necessary to make this dish without disintegrating.

As regards the consumption of raw and parboiled qualities, it is estimated that approximately 55 per cent of the total consumption of medium rices in India consists of parboiled rice and 45 per cent of raw. The demand for parboiled medium rices is a particular feature of the trade in Bengal, Bihar, Orissa and the States of Orissa, Cochin and Travancore.

(iii) *Bold rices*.—This is the staple quality consumed by practically all growers, artisans and most manual workers. From the marketing point of view bold rices are not as important as the medium and fine types as only about 20 per cent of the total production is actually put on the market, while the proportion of the total marketable surplus represented by bold rice is less than 26 per cent as compared with the 47 per cent of the medium rices and 27 per cent of the fine rices. The rices which fall into this category are generally short, thick or squat, devoid of any fragrance and often of poor colour.

The kernels are predominantly chalky or opaque indicative of softness and the tendency is for such rices to cook into a glutinous mushy or pasty mass. Most red rices are included in this category. Bold rices are not stored for the express purpose of attaining maturity as no premiums are paid for age in this category. The low price of the great bulk of bold rices would in any case make commercial storage an uneconomical proposition.

Bold rices are used for plain boiling and to some extent for *khichiri* and for *kheer* (rice pudding). Owing to the soft starchy structure of the average rice in this group they are particularly suitable for the last named preparation\*. Of the total consumption of bold rices grown in India raw rices constitute about 37 per cent and parboiled the remaining 63 per cent.

(iv) *Raw and parboiled*.—The precise nature of the demand for raw and parboiled qualities is difficult to analyse owing partly to the complexities of consumer-preference and partly to the widely varying economic and social conditions which prevail throughout the country. It was found, for example, in the course of this survey that the likes and dislikes of rice eaters were not only strongly defined but that no cogent reasons could be given by consumers to account for their tastes. The universal reply given to enquiries on this point was that the variety of rice to which they had become accustomed agreed with them and that any other kind of rice was indigestible. Since the majority of consumers are rice growers themselves, the natural tendency is for the local varieties, regardless of their quality, to be used and preferred for all edible purposes.

It is sometimes thought that parboiled rice is not acceptable to orthodox Hindus on account of their religious susceptibilities being offended by the process to which the paddy is subjected prior to milling. The fact is that the number of orthodox Hindus who really object to eating parboiled rice is relatively small. In Madras,

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\* On account of their relative cheapness and soft structure bold rices are also suitable for conversion into rice flour. In Hyderabad (Sind), for instance, where rice flour is produced in fairly large quantities, *Ganja*, a typical bold variety, is utilised for grinding into flour.

for example, the stronghold of Brahminism, where one-third of crop is converted into parboiled rice, many orthodox Hindus have no insuperable objection to eating parboiled rice. In Bengal, where fully nine-tenths of the local production is parboiled, this type of rice is freely used by all classes save, possibly, by an insignificant few. Broadly speaking, therefore, where any objection to parboiled rice prevails, it occurs only in those parts where rice is not the staple food grain and that only to a relatively limited extent. Such prejudices are, however, difficult to reconcile since all classes of Hindus, regardless of degrees of orthodoxy, consume *chura* (beaten rice), *lahi* (parched rice) and *kheel* (puffed rice) with complete indifference. These cooked and semi-cooked products are all subjected to treatment at others' hands and are prepared by possibly unorthodox Hindus or even by non-Hindus.

As a general rule, parboiled rice is cheaper than untreated rice of the same variety for the reason that the parboiling hardens the kernel and enables a greater extraction of what may be termed "head rice", i.e., whole grains. Apart from other price-lowering factors, the presence of broken grains seriously detracts from the value of the rice and, in this respect, parboiled rice has a decided superiority as it generally contains a relatively small proportion of broken grains. It is for this reason that parboiled rice can usually be sold rather cheaper than untreated rice of the same variety and quality.

Some of the other advantages\* of parboiled rice are briefly that it stores better than raw rice in the uncooked state and that when

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\* The results of certain studies on quality in rice with reference to the chemical composition of different types of rice which have been carried out at the Indian Institute of Science, Bangalore, in the past 4 or 5 years seem to have clearly established the following main facts.

- (i) Parboiled rice in an unpolished or moderately polished state is very similar in composition to the corresponding variety of raw or untreated rice.
- (ii) A number of commercial samples of raw and parboiled milled rice collected in South India have shown, on analysis, that the parboiled varieties are somewhat richer in protein and minerals than raw milled rice. This is stated to be due possibly to the lesser degree of polishing given to the parboiled type.
- (iii) Storage experiments to determine the keeping quality of raw and parboiled rices have also demonstrated the superiority of the parboiled article.
- (iv) During the course of preparation for cooking it is normally the custom to wash the rice in one or more changes of fresh water. Experiments at Bangalore have shown that parboiled rice, even on being repeatedly washed, loses less nitrogen or phosphorus than raw rice polished to the same extent. It is proved that less water-soluble constituents passed out of parboiled rice on being cooked than raw rice.
- (v) With regard to the relative distribution of nitrogen and phosphorus in raw and parboiled rice investigations have shown that at least 50 per cent of the phosphorus and about 20 per cent of the nitrogen are localised in the germ and the bran and are, in consequence, lost to a very large extent during the course of milling. On parboiling, a proportion of the nitrogen and phosphorus originally present in the germ and in the bran diffuse into the interior of the grain.



cooked it retains its freshness for a longer period than raw rice especially when kept steeped in water. Parboiled rice does not turn sour and is in fact quite palatable after 36 hours keeping and, particularly, if heated up. It is significant that where conditions of labour are such as to preclude cooking more than once a day as, for example, in the tea gardens and rubber plantations, parboiled rice is favoured on account of its characteristic feature of keeping well.

Formerly, the main drawback of parboiled rices lay in the inferior colour of the treated product as compared with "white" or raw untreated rice. These differences were possibly fairly marked in the past when the practice of parboiling was in its early stages of development but this does not hold good to-day for a number of machine-milled rices and, particularly, for the "quality" rices of the parboiled type produced, for instance, in Bengal, Bihar and elsewhere.

Another factor formerly associated with parboiled rice was an unpleasant sour or acid odour. Although this defect still occurs in certain types, it has largely been eliminated by improved technique. It should be noted, however, that after boiling the cooked rice generally shows no signs of any unpleasant odour which may have been present in the uncooked state.

These two defects in regard to physical appearance and odour do not in any way detract from the nutritional value of the rice but they are undesirable in so far as the vast majority of consumers prefer a white good coloured so called "sweet rice".

An indication of the extent of the demand for raw and parboiled rices of the *Fine*, *Medium* and *Bold* categories has already been given in the preceding paragraphs. Detailed estimates are contained in Appendix XXIII and an abstract is for convenience given in the following table which also shows the composition of imports from Burma.

(Thousand tons).

	Total.	Raw.	Percent- age.	Par- boiled.	Percent- age.
<i>Indian production :</i>					
Average 1934-35/1936-37—					
<i>Fine</i> .. ..	3,390	2,086	62	1,304	38
<i>Medium</i> .. ..	8,700	3,888	45	4,812	55
<i>Bold</i> .. ..	14,655	5,450	37	9,205	63
<i>Import from Burma :</i>					
1934-35/1936-37—					
Mainly <i>Bold</i> ..	1,691	841*	49.7	850	50.3

\*Including 121,000 tons of *Broken*s mostly from raw milled rices.

As a rule, parboiled rices are preferred for the making of *pulao* and other preparations such as *zarda* which necessitate cooking for longer periods than is required for plain boiling, particularly among the very large body of consumers of moderate means who cannot afford to buy the comparatively costly long matured fine rices. Only parboiled rice is used for the manufacture of parched rice (*murmura*) as it has been found to "puff" or expand more than raw rice.

The consumption of parboiled rice has increased considerably in the past fifteen or twenty years. An indication of this is obtained from the publication, "Large Industrial Establishments in India" issued by the Department of Commercial Intelligence and Statistics, which shows that while the number of large mills in India (those employing 20 persons or more) has risen from 499 in 1921 to 1,009 in 1937, the provinces largely responsible for the expansion are those in which the production of parboiled rice far exceeds that of raw or untreated rice. For example, in Bengal, Bihar and Orissa the output of parboiled qualities constitutes 90 per cent of the entire local production of rice and since almost every concern possesses parboiling equipment, an increase in Bengal from 202 to 351 mills and in Bihar and Orissa from 13 to 99 mills between 1921 and 1937 indicates the rate at which parboiling has developed. In Madras where the extent of the increase in the number of rice mills has been even greater—from 173 to 404—a considerable proportion of the 231 new mills erected since 1921 are equipped with parboiling facilities.

(v) *Machine-milled and hand-pounded*.—The fact that research has established the superiority, from the nutritional aspect, of lightly or under-milled rice as compared with the highly polished article, has in recent years and in some quarters led to the somewhat indiscriminate recommendation to consumers to use under-milled or hand-pounded rice. The Government of Mysore has for instance in 1939 sponsored the floatation of a company designed to produce and market hand-pounded rice in the State. The suggestion has even been made that mills should be restricted to turning out very lightly milled rice only or in the alternative be compelled to shut down. Those responsible for such proposals seem to overlook the fact that something like 73 per cent\* of the rice produced and consumed in India is hand-pounded—very largely by the growers themselves by whom or by whose family members the paddy is husked manually in the household for their own domestic requirements. Thus in view of the very considerable proportion of the crop consumed in a form which cannot well be bettered in respect of nutritional value, it may not be unreasonable to assume that the peoples of the wide tracts in which the practice of eating hand-pounded rice prevails are in fact taking in about as much of nitrogen, phosphorus and the antineuritic principle B<sub>1</sub> as it is possible to obtain.

The position shows itself in a rather different light when viewed against the background of the marketable surplus which will be recalled as constituting only 43 per cent of the Indian production less seed or the equivalent of some 11.5 million tons. For instance,

\*This proportion is based on production less the quantity reserved for seed and includes products such as parched rice, much of which is made from the hand-pounded raw material.

over 87 per cent of the milled rice turned out in this country is put on the market whereas only 26 per cent or thereabouts of the hand-pounded output is disposed of by sale. This points to the fact that there is greater demand for the milled article, on the part of those—largely non-producers—who have to buy their rice, than for the hand-pounded varieties.

In spite of the fact that so large a proportion of the rice consumed in India is hand-pounded the tendency for a number of years past has been and continues to be for machine-milling to increase. The publication, "Large Industrial Establishments in India" already referred to, confirms this since the 499 large mills recorded in 1921 had been more than doubled by 1937, the latest period for which data are available. Bengal, Madras, Bihar, Orissa and the Central Provinces are the areas mainly affected. In Bengal, the number of mills rose from 202 to 351 in the period in question, in Madras from 173 to 404, in Bihar and Orissa from 13 to 99 and in the Central Provinces from nil to 44. Large increases are particularly to be noted in areas in or comparatively near important urban centres of consumption as, for example, at Howrah, a suburb of Calcutta, where the number of large rice mills had risen from 3 to 17, at Hooghly an adjacent district where the 13 mills recorded in 1921 had become 20 in 1937 and in Burdwan, an important milling centre, some 60 miles north of Calcutta where the number of mills had increased from 24 to 43 in the same period. In addition there were in all probability not less than about 9,000 small mills driven by electric power and in a few instances by steam and oil engines, operating in various parts of India in 1937-38. (See Chapter IV). Comparable data for earlier years are not available but information obtained from one of the largest international oil distributing organisations operating in India indicates that there has been a considerable increase in recent years. This is partly the result of the modern tendency to replace manual operations of a tedious and time-wasting nature by labour saving machinery, which was also noted in the case of the grinding of wheat into *ata* (Report on the Marketing of Wheat in India—Marketing series No. 1). Another important factor, however, is that of price. Milled rice is generally cheaper than hand-husked rice and to those who have to buy rice—and the majority of the rice-eating population possess limited means—this is an urgent consideration.

Taking India as a whole, the tendency to switch over from hand-pounding to machine-milling has comparatively until recently been fairly pronounced. During the last two or three years, however, the expansion of the rice milling industry has been less in evidence and there is reason to believe that further development in this industry is not likely to be very large or rapid. It must be borne in mind that not all the mills of which records are given in "Large Industrial Establishments in India" work every year. A number are closed for various reasons, some for the whole season and others for long or short periods. Secondly the small oil driven mills are often equipped with one or possibly two hullers and have a limited output only. Many operate for a few months in the year when paddy arrivals are sufficiently large to enable them to work. Of the total

increase of 510 in the number of large mills, probably not more than 400 at a conservative estimate are in full time operation. Reckoning the average annual turnover of a medium sized mill to be 2,000 tons the additional yearly output given by 400 mills in 1937 as compared with 1921 would amount to 800,000 tons. In regard to the small mills, about 500 tons of rice seem to be a fair average estimate of turnover. Reckoning that roughly 3,000 new mills came into operation between 1921 and 1937 this would account for 1,500,000 tons more machine-milled rice being available for consumption in the latter year. Altogether, therefore, the expansion of the rice milling industry in the sixteen years ending 1937 may be regarded as being responsible for something like 2,300,000 tons or about 31 per cent of the average production of machine-milled rice in 1934-35/1936-37. In rural tracts remote from large towns and poorly served by communications the majority of rice growers and agricultural labourers still eat their rice in hand-pounded form. In the plantation industry (tea gardens, etc.), and in urban areas, particularly among the labouring and artisan communities there has been a more rapid swing over to milled rice (a large proportion of which is par-boiled) for the reasons already given.

On the other hand, it has been observed among the educated and professional classes that hand-pounded rices are beginning to find increasing favour particularly in South India. The tendency has not so far developed to any significant scale and seems to be confined mainly to urban centres. It may, however, be doubted whether this will have any marked effect on the character of rice consumption in India since the communities referred to form a very small proportion only of the total population of India. There would, however, appear to be some scope for the development of the production and marketing of hand-pounded rices through properly organised co-operative agencies.

To sum up, therefore, indications of the past two decades lead to the conclusion that under the stimulus of modern social and economic re-orientation the rice milling industry has grown fairly rapidly. The rate of expansion has, however, slowed down with the result that any future change in the present rice eating habits of the Indian people as a whole is likely to be so gradual as to be perceptible only when making very long-term comparisons.

(vi) *Coloured rices.*—Clear distinction must be made between rice artificially coloured by the external application of colouring matter which may be removed by washing and rice which has colour induced into the kernel itself by means of a variation in the normal process of parboiling the paddy prior to husking or milling. The demand for artificially coloured rices of the former category is confined mainly to a few areas, principally in the south of India. These are the Ceded Districts of Madras comprising Kurnool, Bellary, Anantapur and Cuddapah and the Nizam's Dominions and Bombay city. Coloured rices are also available for sale in a number of markets all over the country but the demand outside the regions specifically mentioned is strictly limited. No records are available

to show how much coloured rice enters trade but the enquiries made during this survey seem to point to about 50,000 tons as a safe estimate. More than four-fifths of this quantity is estimated to be consumed in South India. It is noteworthy that where rices are given an artificial colouring, this is done solely to commercial raw varieties destined for sale. As far as could be ascertained none of the rice which constitutes village retention receives this treatment. It is also significant that parboiled rices are not given an external coating of artificial colour although they may have imparted to them a yellowish tinge by extending the time of the parboiling process by a few minutes. Such rices have a vogue only in Bengal, Orissa and in part of Bihar and Assam, while the majority of Indian consumers in East Africa, many of whom emigrated from these provinces prefer yellow tinted parboiled rice of the quality known and fully described elsewhere as *Durban Quality* (see page 37).

The demand for yellow parboiled rice is rigidly confined to north-eastern India. In other parts of the country and especially in northern, western and central India where white colour is an important quality factor, rice of this type would be regarded as hardly fit for human consumption even by the poorest. The precise reasons for the colouring of rice and how the demand originated cannot be stated. Thus, it is debatable whether the incentive to colour rice first came from consumers or whether suppliers initiated the vogue. There seems at all events to be no special religious significance attaching to the use of coloured rice. However, those familiar with the rice trade and the quality factors of rice will not be at a loss for reasonable explanation. It is well-known, for example, that colour reflects age or maturity in many rices and especially those which possess some degree of translucency. The difference in colour between a rice several months or a year old and that newly harvested is difficult to describe and is not noticeable in individual grains so much as in the bulk. As old matured rice is preferred and is more costly than newly harvested produce, the simple expedient of colouring, therefore, makes both old and new rices appear identical superficially. It is true that where an external coating of colour is given the colouring matter comes off in the invariable washing process to which the rice is subjected prior to cooking, but after contact with the water it is not possible to distinguish between new and old rice. Similarly, damaged or defective rice can be effectively disguised by the external application of colouring matter. There is in fact evidence to show that this is regularly done by unscrupulous dealers.

In the absence of factual data, it is impossible to say definitely whether the demand for coloured rices is on the increase or is diminishing. Trade opinions were conflicting. Some held that the demand was expanding slowly, others that there was no appreciable change while a minority asserted that their business had declined as compared with ten or fifteen years ago. With the steady increase in population, however, it may not be unreasonable to assume that there has been at least a proportionable increase in the demand.

(c) *Broken rice*.—The generally accepted definition of a broken grain is one which is less than three-fourths of a whole kernel. Broken rice is ordinarily the cheapest kind of rice obtainable and is on that

account (including the preparation of rice flour) almost entirely used in India for edible purposes by the poorer people in contrast with industrialised countries where broken rice is largely used for the manufacture of starch, for distilling, etc. Small quantities of brokens only are utilised in India for poultry feeding and for sizing purposes by laundrymen and the cottage weaving industry. For this purpose, the cheapest and smallest size brokens derived from soft textured bold rices are most suitable. Most consumers of broken rices are of strictly limited means and are unable to exercise any choice when making their purchase. Consequently quality requirements are relatively simple. Buyers of broken rice for edible purposes endeavour to obtain a quality which contains as large sized brokens as their means will allow\*. Those who are able to afford least have to be satisfied with brokens consisting of the smallest fragments.

There is another type of consumer who is prepared to buy broken rice sifted from high grade fine rices, provided the brokens are of good size. For all practical purposes such grades are of the same eating quality as the sifted article from which they have been obtained. In Northern India, for instance, there is a special demand for the *Brokens* of fine scented *Basmati* at prices exceeding those of good quality medium rices. (See later).

It is impossible to assess the extent of the demand for broken rice with any accuracy as no records are available to show either the production or the volume of rail and river-borne trade† in this type of rice. The following rough approximations based on observations made during this survey may be regarded as giving a general idea of the position. Of the 3·1 million tons of fine rices marketed, a maximum of about 15 per cent., i.e., 465,000 tons may be regarded as consisting of brokens, which are sifted out after milling and disposed of separately. The medium rices as marketed contain a larger proportion of *Brokens* and the quantity of *Brokens* available for marketing separately is correspondingly smaller, say, 10 per cent or about 540,000 tons. The *Bold* varieties, as generally available in the market contain large proportions of *Brokens* which may range up to 50, 60 or even 70 per cent in exceptional cases. The relatively low prices obtained render it hardly worth while to screen off broken grains other than possibly the smallest fragments. It may be assumed, therefore, that less than 5 per cent of *Bold* rice is disposed of separately as *Brokens*. This would represent about 148,000 tons.

On the basis of these figures the total quantity of broken rice produced in India and marketed as such works out at about 1·15 million tons or roughly 10 per cent of the entire marketable surplus.

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\* The price of broken rice varies not only according to the variety of rice from which it is derived but according to size. *Brokens* of large size are more expensive than small fragments of the same variety.

† The statistics published in the "Accounts relating to the Inland (Rail and River-borne) Trade of India" do not show rice and broken rice separately as is done in the "Accounts relating to the Sea-borne Trade and Navigation of British India".

In addition there are regular imports of broken rice from Burma and spasmodic, but sometimes fairly large imports of this quality from Thailand and Indo-China. Since 1934-35, imports have averaged about 186,000 tons with the largest receipts of 335,000 tons in that year and the smallest 129,000 in 1937-38. The normal market requirement for broken rice may, therefore, be estimated as somewhere between 1.25 and 1.5 million tons.

(d) *Exports*.—The demand for Indian rices in foreign markets is mainly for parboiled varieties of the fine and medium categories. Ceylon, to which about 37 per cent of India's exports are shipped takes the small round grained *White* and *Red Sirumanis* from the Tanjore area in Madras while Mauritius, East Africa and the Arabian ports in general are mainly buyers of parboiled *Patnai* and to a relatively smaller extent of *Sitasal*, both of which derive from Bengal and North Orissa and are shipped through Calcutta.

The demand in Mauritius is mainly for a quality of rice which possesses a light pearly translucency such as shown by the better grades of parboiled *Patnai*. Well developed, uniform grains with as few brokens as possible are other quality characteristics desired by the majority of consumers in Mauritius who can afford to pay good prices.

In many East African markets on the other hand, consumers prefer a yellow tinted parboiled rice and this demand is catered for by the *Patnai* shipped to Durban and other ports on the coast as far north as Mombasa, having a yellowish tinge imparted to it by a slight lengthening in the process of parboiling in paddy.

The parboiled variety *Sitasal* shipped to Arabian ports is mostly of good colour and high quality.

With the possible exception of *Sitasal*, much of the inferior qualities of *Patnai* consigned to the above destinations contains some admixture of the *Kalma* variety sown around Burdwan, north of Calcutta and are known as *Bengal Fine*. The presence of the relatively shorter grained *Kalma* tends to lower the quality of the *Patnai* with which it may be mixed.

Very high grade parboiled *Patnai* containing uniformly large long grains, no admixture of other varieties and no *Brokens* at all, is in demand in the United States and in Canada by manufacturers of canned foods. The quality requirements of consumers in north America are of a more exacting nature in this respect and good prices are offered for suitable quality. The extent of the demand is limited by the special use to which rice of this quality can be put.

There is also small trade with the United Kingdom, and with certain countries in Continental Europe in the hand-husked raw *Seeta* type, which is produced from *Patnai* paddy. It is important to note that *Seeta* is not sold in the form in which it is exported but is imported by European countries for remilling and marketing as a high grade product.

and the western parts of the province. In the west comparatively little rice is produced, the country being devoted mainly to wheat and pulses. Thus it is estimated that conditions in the Meerut division approximate those in the Punjab where, as already noted, the *per capita* consumption is only about 28 lb. In this part of the United Provinces the average consumption per head may on the whole be safely assumed to be a little in excess of that in the Punjab and ranges between 30 and 35 lb. In the eastern districts and in the areas bordering the Himalayas the *per capita* consumption is not less than about 200 lb. per head, rather *on a par* with conditions in the adjacent territories in Bihar.

In Mysore, the annual disappearance is 82 lb. per head, while that of Hyderabad is 56 lb.

#### (2) QUALITY REQUIREMENTS.

(a) *Paddy*.—Paddy, as such, is used for seed, for manufacturing rice products (parched rice, etc.), and for stockfeeding. As regards seed, well matured sound grains of paddy are considered most suitable for sowing and, as far as lies in their power, cultivators endeavour to retain the best of their produce for this purpose. Cases have been observed in which a premium of, say, two or three annas per maund has been paid by growers to obtain good seed, while in a few instances in areas well-known for their production of fine rices, four to eight annas per maund extra may sometimes be paid for seed of high purity. Where facilities for the distribution of pure seed by the agriculture departments exist, no difficulty is usually experienced in disposing of such seed at a premium over ordinary non-pedigreed varieties. In addition to external sound condition, the question of the type to be sown is important, as different types have different trade values. Paddy seed of a superior variety of a particular group commercially recognised always fetches a premium over ordinary varieties of the same group. It is, however, not always possible to distinguish between a pure sample and another having admixture of inferior strains, and in most cases it is the reputation of a particular source of supply that is the determining factor. The agriculture departments in the provinces and States have been making efforts to distribute pure seed of improved varieties. (See Chapter XI).

For the preparation of rice products such as parched paddy, parched rice and beaten rice the use of medium varieties is most common, although fine and bold types are also used to a considerable extent in certain tracts. For instance, in Bengal the fine varieties *Hamai* and *Patna* are made into parched rice and beaten rice respectively, while the medium variety *Kanakchur* is used for the manufacture of parched paddy. In Madras, medium *Sirumani* is the principal variety used for manufacturing all the three products. In Bihar while parched paddy is generally manufactured from the fine *Kalamdan* variety the other two products are made from medium varieties. In Orissa, all the three products are prepared from *Saruchina*, a fine variety. In the United Provinces the bulk of the products manufactured derives from bold varieties such as



*Sathi*, *Pahari*, etc., although fine types like *Raimunia* grown in the Saharanpur tract may also be used. In the Central Provinces *Gurmatia* and *Budhiabako*, bold and medium varieties respectively, constitute the raw material from which rice products are generally made. In the Bombay Presidency the fine *Kolamba* is used for manufacturing parched rice, while *Pattani*, a bold type, is converted into beaten rice. In the Punjab the bold variety *Jhona* and the medium *Begami* are the principal qualities used for the various products.

The demand for paddy for stockfeeding as already mentioned is quite negligible and only the bold or most inferior varieties are used for the purpose.

(b) *Rice*.—The primary classification of rice into three distinct groups, namely, *Fine*, *Medium* and *Bold* (or coarse) seem to fit in quite naturally with the three main grades of society, namely, the well-to-do, the middle class (which includes the great majority of professional workers) and the working classes. The tendency is for the costly fine rices to be bought by the well-to-do, while the less expensive medium and the cheap varieties are patronised by those of moderate means and by labouring classes respectively. Each of the above-mentioned three classes of rice may further be subdivided into the main types of raw and parboiled while quality is also assessed in terms of age particularly in the fine rice group. In addition, consumers, particularly in certain areas, differentiate between milled and hand-pounded rices and between artificially coloured rices and those which are marketed in their natural state.

It may be convenient, therefore, to discuss the quality of market requirements under the following main headings:—*Fine*, *Medium*, *Bold*, *Raw* and *Parboiled*, *Milled* and *Hand-pounded* and *Coloured* rices:

Broken rices have a market of their own and are referred to separately.

(i) *Fine\* rices*.—These rices are characterised by length, slenderness, translucency and a more or less marked fragrance. On cooking, the kernels, particularly of the long grained varieties, elongate appreciably retaining their individuality and fragrance. These rices are the dearest in the price range and are normally consumed by the well-to-do, although the middle class and professional community may also buy them sometimes on special ceremonial occasions. Since such consumers live mostly in towns and cities the urban demand constitutes the most important factor in the demand for fine rices.

The bulk of the fine rices are consumed in the raw form. The demand for parboiled fine rice is, however, in the large rice growing provinces of Bengal, Bihar and Orissa where roughly three-fourths of the local production of fine paddies are first parboiled before husking. Being less costly than the raw fine rices the parboiled varieties can be bought by consumers of limited means both in those areas and even in more distant tracts. The well-known parboiled

\* The concept of "fineness" varies considerably in different parts of India and has been referred to on page 35 in the previous chapter.

The chief bold variety in demand abroad is the parboiled *Kangni* of Sind, the principal destinations being the Persian Gulf, Bahrein Islands and South Africa.

### (3) SEASONAL VARIATIONS IN DEMAND.

The various religious occasions which play a not unimportant part in stimulating the demand for other agricultural produce in the form of luxuries such as sweetmeats and other confections at certain times of the year do not appear to exert any marked influence on the consumption of rice in general. In the main rice producing provinces, *e.g.*, Bengal, Bihar, Assam, Orissa (including the Orissa States), in many parts of Madras and in some of the eastern districts of the Central Provinces, where rice is the staple food, the consumption varies so little in the course of the year that for all practical purposes it may be regarded as constant.

The Hindu marriage season which falls in many parts of the country between March and May gives a temporary stimulus to the consumption of rice to some extent but the total production is so large that any increase caused by this factor makes little impression when set off against the whole crop.

In the tracts in which rice production is not large and where other food crops constitute the staple diet a certain amount of seasonality in the demand is observed. The most important of such areas are the Punjab, the western districts of the United Provinces and the Central Provinces, parts of Sind, Rajputana and Central India. The custom in these territories is for little rice to be eaten during the monsoon, rather more in the winter, while consumption is greatest when the weather turns hot and dry in the two or three months before the rains break.

The monthly movement of rice by rail and river gives some measure of the seasonal variation in the demand. Appendix XXXIX shows, for example, that over the quinquennium 1934-38 traffic is highest between January and May with the peak in March. During the five months 47·6 per cent of the total annual volume of trade is carried but there is little variation in the share of each month, the lowest proportion being 9·1 per cent in May and the highest 10 per cent in March. Over the rest of the year monthly loadings range from 8·4 per cent in July down to 6·2 per cent in September. September, October and November register less traffic than any other period and may in some degree reflect a slight reduction in the demand owing to the availability in those areas of newly harvested supplies of the *kharif* or autumn food crops such as maize.

The seasonal movement of paddy, however, shows somewhat greater contrast than that of rice for, while the consumption of rice, particularly in the very large areas in which it is the staple food goes on with no appreciable variation from month to month, the

milling of paddy does not continue with the same intensity throughout the year. The rice mills are busiest in the months of greatest supply of paddy, in other words in the period immediately following the harvest. A clear indication of this is given in the rail and riverborne traffic in paddy given in Appendix XXXIX, which shows January, February and March as the months of greatest activity with April and May in close attendance. During these five months 51.5 per cent of the average total annual loadings are recorded, the period January to March accounting for 32 per cent. During the monsoon, the rice mills turning out parboiled rice have to operate on a restricted scale owing to the necessity for the parboiled paddy to be dried before milling. No steam drying plant is employed in India, as in Burma, so that the paddy has to be exposed to the sun. Heavy and intermittent rainfall, the high humidity which prevails during the rainy season and the fitful appearances of the sun are factors which generally slow up the production of rice in those areas in which the monsoon is of some severity.

#### (4) TREND,

Owing to defective statistics it is difficult, if not impossible, to arrive at any definite conclusion in regard to the trend of *per capita* consumption in India. There are, for example, no means of ascertaining carry-overs, no records are maintained of the output of the rice mills and the estimates of production are faulty. Based, however, on such official statistics as are available, the following table gives an approximation of the annual consumption of rice over an extended period.

#### *Approximate per capita consumption.*

		(lb. per head).			(lb. per head).
1910-11/1913-14	..	..	172	1934-35	.. .. 188
1914-15/1918-19	..	..	191	1935-36	.. .. 165
1919-20/1923-24	..	..	190	1936-37	.. .. 194
1924-25/1928-29	..	..	179	1937-38	.. .. 181
1929-30/1933-34	..	..	193	..	.. ..

It will be observed that since the War of 1914-18 there appears to be no definite or consistent trend one way or the other and the consumption has varied between 165 lb. in 1935-36 and 194 lb. in 1936-37. As compared with the average *per capita* disappearance of the period

1910-11/1913-14, it can be stated that there is on the whole an apparent increase.

As regards internal tendencies statistics of rail and river-borne imports and exports for paddy and rice point to certain conclusions. In Appendix XXXVII, which shows the rail and river-borne traffic in paddy in respect of the various trade blocks of India, it will be remarked that the 438,900 tons of paddy, which were transported in the period 1911-12/1913-14, have now dwindled to something approaching half this figure. An explanation may be found in the large increase that has since taken place in the number of rice mills erected in different parts of the country. These mills are largely situated in and serve important rice growing areas thus obviating the former necessity to move quantities of paddy comparatively long distances from producing to milling centres. Bengal and Calcutta show reduced imports and exports as compared with 1911-12/1913-14 and this is also in consonance with the increased milling capacity now available in adjacent areas. Madras records bigger imports particularly in 1939-40 due mainly to the considerable volume of paddy shipped to Madras ports from Indo-China. Exports from this province, on the other hand, have diminished largely.

The volume of rail and river-borne trade in rice has, contrary to the trend shown by paddy, increased from 1,323,700 tons in 1911-12/1913-14 to an average of 1,561,000 tons in 1936-37/1938-39 as will be seen from Appendix XXXVIII. This increases a little more than counterbalances the fall in the traffic in paddy. Provinces mainly sharing in larger imports are Bengal, Bihar, the United Provinces, Bombay and Madras, but imports into Calcutta have declined by over one-fifth, from 554,900 tons in 1911-12/1913-14 to 121,900 tons in 1936-37/1938-39. For these contractions in the foreign export trade, which used formerly to pass through Calcutta, is probably mainly responsible. Exports from Bengal to internal destinations have tended to diminish in the past twenty five years whereas those of Bihar and Orissa have risen slightly. Imports from the Punjab have also improved owing mainly to the increase in the trade in fine rices for which the Punjab is well-known. Sind also sends more rice to other provinces and States, while exports from the Central Provinces have developed nearly threefold as between 1911-12/1913-14 and 1936-37/1938-39 mainly as a result of increased production in the eastern districts and the spread of rice mills in those tracts. Calcutta and Bombay exports by rail to internal destinations have also risen in the above-mentioned period, in the former case from 87,200 tons to 154,000 tons and in the latter from 54,100 tons to 144,000 tons. Large imports of rice by sea from Burma are chiefly responsible for these increased movements from the ports.

The export demand shows no tendency to expand or contract in recent years. Since 1928-29 shipments abroad have ranged from a low point of 188,000 tons in 1935-36 to as high as 281,000 tons in 1938-39. In a number of years, however, exports have remained within the comparatively narrow limits of 203,000 tons and 235,000 tons.

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## BURMA.

### A.—Utilisation.

Burma's average annual production of rice in 1934-35/1936-37 was 4.75 million tons of which about 1.67 millions or 35 per cent is estimated to have been retained for local requirements leaving a surplus of 3.08 million tons available for export.

#### (1) DISAPPEARANCE AND PER CAPITA CONSUMPTION.

The 1.67 million tons of rice which constitute internal requirements comprise some 185,000 tons (approximately 278,000 tons of paddy) used for seed—the average seed rate being 44 lb. of paddy per acre for transplanted rice and 54 lb. for broadcast—and about 1.48 million tons used for human consumption. The latter figure includes the nominal quantity of some 133 tons of rice (the equivalent of 200 tons of paddy), manufactured into the Burman counterparts of the parched products so popular in India and about 40,000 tons of rice for the manufacture of "Hmon-Hinga" and various kinds of Burmese cakes (see Chapter X).

Roughly 360,000 tons or a little more than 24 per cent of the 1.48 million tons of rice consumed locally is hand-husked by the growers themselves for domestic use. The balance of 1.12 million tons is machine-milled, mainly into the *Small Mills Specials* and *Bazár Qualities* and ultimately finds its way from the mills into consumers' hands through the numerous shops and bazár stalls.

With an estimated population of 15.6 millions in 1937 the net available supplies allow 231 lb. of rice per head per annum.

Rice is mainly consumed in the boiled form. It is first washed and then boiled in about one and a half times its volume of water, for about fifteen minutes or so, depending on the quality of the rice, until the grains become sufficiently soft. The rice is stirred with a spoon and the water completely drained off. The pan is then kept on a very slow fire for another ten minutes, so that all excess moisture may be driven off and the hard portion of the grain given time to become soft. Some persons may, however, boil the rice in a small quantity of water, so as to do away with the necessity for draining off the unabsorbed liquid. In the Shan States and in the homes of some Chinamen the rice may be steamed instead of boiled. The rice so cooked is eaten along with curries generally twice a day, once in the morning and once in the evening and forms the staple food of the people.

On special occasions rice may also be consumed in the form of coconut rice, butter rice and *pulao* rice. Coconut rice is prepared by first cooking the coconut juice (*i.e.*, juice squeezed out of the copra) in a little salt and butter or ghee and then adding the washed rice. After stirring the rice, water just sufficient to cook

the rice has to be added. This is important as there should be no surplus water to be drained off afterwards. Butter rice is cooked more or less in the manner of coconut rice, but no coconut juice is used. In its place butter or ghee is required and spices are generally added. *Pulao* is prepared in much the same way as already described in the preceding section dealing with India.

In addition to these special preparations, rice, if glutinous, may be cooked in special green bamboos, so that the inner membranous tissue of the bamboo may form the outer covering of the bamboo shaped lump of cooked rice.

## (2) EXPORTS.

The demand for rice and its derivatives such as bran, etc., for the export trade is the most important feature of the local rice industry. The extent of this trade may be briefly described as follows.

(a) *Paddy*.—India takes the greater proportion of the paddy exported from Burma and her share of the 135,000 tons average annual shipments from that country during the period 1931-32/1938-39 amounts to 86 per cent of the total. Ceylon ranks a poor second with 6 per cent and the remaining 8 per cent is distributed among other countries. The volume of paddy exports fluctuates irregularly from year to year and has ranged from 66,000 tons in 1937-38 to 237,000 tons in 1931-32.

(b) *Rice*.—India is also Burma's best customer for rice. Of the total exports of rice averaging 2.92 million tons during 1931-32/1938-39 India absorbed 49 per cent, Ceylon 12 per cent, Germany and the Straits Settlements 6 per cent each and China 5 per cent, while the Netherlands, the United Kingdom, Sumatra and the Federated Malay States took 8 per cent between them, leaving a balance of 14 per cent to be split up between various other destinations in small individual quantities.

## B.—Demand.

### (1) QUALITY REQUIREMENTS.

(a) *Internal consumption*.—The quality of the rice mainly consumed in Burma has already been referred to and consists of the trade descriptions *Small Mills Specials* and *Bazar Qualities*. These are machine-milled raw rices. Parboiled types are not in demand by Burman consumers as a whole but small quantities of the superior parboiled qualities such as *Long* or *Sugandhi* are eaten by non-Burman residents. Gujaratis, members of the Indian Hindu com-

munity in Burma, generally prefer the small grained raw types grown in Upper Burma.

(b) *Export*.—On an average during the period 1933-34/1938-39, some 51 per cent of the rice exported from Burma consisted of raw rice, 42 per cent of parboiled and 6 per cent of broken rice, the balance of 1 per cent being unclassified. Reference to the table on page 95 showing composition of the rice exports from Burma points to the growing demand for the parboiled qualities in recent years. This expansion, however, has not been maintained during the past year or two and it may be that the demand for parboiled rice is becoming more or less stabilised.

The qualitative requirements of the different countries may be summarised as follows.

*India*.—The Indian market is a combined one for paddy and rice. The qualities of paddy mostly in demand by India are as follows.

- (i) *Laroong*, deriving from Arakan and belonging to the *Ngasein* group from which *Big* and *Small Mills Specials* and *Milchar* are milled, is shipped from Akyab and goes mainly to Madras and Travancore.
- (ii) Exports to Madras, Travancore and Bombay appear to consist mainly of *Yahine* from Moulmein, belonging to the *Letywezin* group and producing *Small Mills Specials* and *Straits Quality*.
- (iii) *Ekarine* of the *Emata* group, another source of *Small Mills Specials* and *Straits Quality* is shipped principally to Bengal from Moulmein.
- (iv) *Yathalay Longthay*, included in the *Ngasein* group is shipped for milling to Bombay. It is used in Burma for making *Small Mills* and *Bazar Quality*.
- (v) *Ngasein*, consigned to mills in Madras and Travancore, is of the type used in *Big*, *Small Mills Specials* and *Milchar*.

In regard to rice, only Bombay and the Kathiawar ports take raw rice in really large quantity and do not import parboiled rice on any appreciable scale. Bengal imports both raw and parboiled qualities, while Madras is an importer mainly of parboiled rice, although raw rice, broken rice and paddy all figure in fairly large

quantities in the import trade of that province. Travancore's takings are in the main paddy and parboiled rice.

The great bulk of the raw rices exported to India consists of the *Big and Small Mills Specials* qualities. These are the lowest qualities produced in Burma and may contain up to 40 or 50 per cent of broken rice and not an inconsiderable percentage of red grains. The demand for parboiled rice is covered largely by the *Milchar* and *Full Boiled* qualities produced from the same kinds of paddy as *Big and Small Mills Specials*. Bombay is the only centre in which there is any demand for superior rice and this is met to a great extent by imports of *Sugandhi* and one or two small grained types from Upper Burma.

*Ceylon*.—The island imports very little paddy. The great bulk of the rice exported from Burma to Ceylon is comprised of parboiled qualities in which *Milchar* of the steam dried and full boiled grades predominates.

*Europe*.—Europe's takings are mainly in the form of raw or "cleaned" rice with a little broken cleaned for Belgium, the United Kingdom and Germany. For the European market, quality is of prime importance, the chief grades in demand being *Europe Super* and *Nos. 0, 1, 2 and 3* milled from selected *Ngasein* and *Medon* paddies and *Super* and *Special Sugandhis* deriving from high quality *Emata* paddy. The latter products are in some respects similar to *Patndi* rice exported from Bengal and it is reported are used to some extent to displace *Patnai* particularly by rice millers in England, who are to an increasing extent associated with Burma milling interests.

In addition to the above qualities, considerable amounts of *Loonzein* or "cargo rice" (rice from which only the shell or husk has been removed leaving the kernel still covered by the closely adhering cuticle or pericarp) deriving from the *Emata*, *Ngasein* and *Medon* types of paddy are imported from Burma by various European countries for processing into a highly finished article. Germany, the Netherlands and Belgium have hitherto been the chief markets for *Loonzein*.

*Other Western markets*.—These include South and East Africa, Mauritius (with Zanzibar and Pemba), the West Indies (including Cuba) and Aden with dependencies.

Quality is a fairly important consideration in most of these markets, although not to the same extent as in Europe.

The demand from Africa is for *Long Boiled* and *Milchar* of various grades milled from *Emata* and *Ngasein* paddies.



Mauritius takes *Long Boiled* and good quality sun-dried *Milchar*, while the demand from Zanzibar and Pemba is for the *Small Mills* quality milled from selected *Ngasein* paddy. In meeting the demand for parboiled rices in these markets, Burma and Bengal are to a large extent in competition.

The British West Indies take from Burma raw rice of the *Straits Quality* and *Long Boiled* milled from *Emata* paddy. In recent years a demand has sprung up for *Ngasein* and *Emata Loonzeins*. The Cuban demand is largely of the *Straits Quality*.

Aden and the surrounding areas require parboiled rices mainly, *Milchar* of medium grade and *Long boiled* are the qualities most in demand. The former constitutes the bulk of the trade.

*Far Eastern markets.*—This group comprises the Dutch East Indies, the Straits Settlements, the Federated Malay States, Hong Kong and China and may be regarded primarily as “price” markets.

From the point of view of quality the demand from the Dutch East Indies, particularly from Java, ranks lower than that of any other of Burma's customers. The main grades imported are *Small* and *Big Mills Specials* (from *Ngasein* paddy), *Bazár Quality* (from *Medon* paddy) and *Ngasein Loonzein*.

The Straits Settlements and the Federated Malay States also take raw rice but of rather better quality, such as for example, *Medon*, *Bazár* and *Small Mills* (from *Ngasein* paddy). Small quantities of parboiled rices of the *Sun Dried*, *Milchar* and *Long Boiled* qualities are also taken by these destinations.

Hong Kong takes qualities similar to the Straits Settlements and the Federated Malay States but the demand is less constant.

China is less particular as regards qualities and will take any grades up to *Straits Qualities* provided they are cheap. The demand here is variable.

Japan is a rather more discriminating market and formerly took *Straits Quality*, *Ngasein*, and *Mcdon*. Latterly imports have been very irregular owing to the development of rice culture in Formosa and Korea whence Japan now derives practically all the rice needed for home consumption.

*Bran.*—On an average 269,000 tons of bran are exported annually. The demand for this by-product from the United Kingdom absorbs about 88 per cent of the total exports from Burma. The

Straits Settlements consume 5 per cent, while the remaining 7 per cent is taken by various other countries including India whose share is about 1 per cent only.

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## INTER-CHAPTER TWO.

The total quantity of seed required to sow 77.43 million acres (3 years average ending 1936-37) is estimated at 2.41 million tons of paddy equivalent to 1.61 million tons of rice representing 5.7 per cent of the total production. Another 1.5 million tons of paddy equivalent to 1 million tons rice and 350,000 tons parboiled rice together representing 4.75 per cent of the productions are utilised for making the three principal products, *viz.*, *murmura* (parched rice), *kheel* (parched paddy) and *chura* (beaten rice). Out of the remaining 90 per cent or so of home production only about a quarter million tons or a little less than 1 per cent represents the export demand and the rest along with imported supplies is practically all consumed in cooking, only a few thousand tons being put to stockfeeding and industrial uses.

Rice is the most important single article of food in India and some 27.25 million tons of rice are consumed in various cooked preparations, the great bulk being in the form of plain boiled rice. The *per capita* consumption of rice for the whole of India is about 181 lb. per annum, the highest rate being in Bengal with a *per capita* consumption of 344 lb. Of the three varieties of rice, fine, medium and bold (or coarse), fine rice is the costliest and is normally consumed by the well-to-do. Raw fine rice, newly harvested or only a few months old, does not cook so well as older and more mature varieties and, therefore, fine rice which has been stored for a year or more commands a premium ranging from several annas to as much as one or two rupees per maund. Medium rice is the most important commercially as it constitutes nearly half the total market requirements in India. Bold (or coarse) rice is usually consumed by cultivators, artisans and manual workers.

The reasons why some people prefer certain varieties of rice and object to other varieties are rather complex

and may often be traced to the widely varying economic and social conditions in different parts of the country. Consumers in India seem to think that the variety of rice to which they have been accustomed agrees with them best and that any other kind of rice is unsuitable. In certain parts of the country orthodox Hindus object to eating parboiled rice, while in other areas no such objection prevails.

As a general rule, parboiled rice is cheaper than untreated rice of the same variety, because parboiling hardens the grain and enables a higher percentage extraction of what may be termed "head rice", *i.e.*, whole grains to be obtained on milling. Parboiled rice also stores better than raw rice in the uncooked state and, when cooked, it retains its freshness for a longer period.

9/ Consumption of parboiled rice has increased considerably during the past 20 years and many mills have set up special plants for parboiling. As between machine-milled and hand-pounded rice, consumption of the former variety is steadily on the increase. Even among the labouring and artisan classes there has been a rapid swing over to milled rice, a large proportion of which is parboiled. On the other hand, hand-pounded rice is beginning to find favour once again among the educated and professional classes, particularly in South India.

One of the difficult problems in the marketing of rice lies in the large number of brokens generally found mixed with whole grains. Of the 3.1 million tons of fine rice marketed every year, about 15 per cent consist of brokens; of the medium varieties of rice put on the market, about 10 per cent consist of brokens and among the bold varieties the proportion of brokens may range up to 50, 60 or even 70 per cent.

Of Burma's annual average production of 4.75 million tons (for the three years ending 1936-37) approximately some 185 thousand tons is used for seed

and 1.48 million tons for internal consumption, the remaining 3.08 million tons being available for exports. These quantities represent 4, 31 and 65 per cent of the production respectively. The exported rice is all machine-milled. The quantity consumed internally comprises 1.12 million tons of machine-milled rice and 360 thousand tons of hand-husked rice which is converted by the growers themselves for domestic use.

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## CHAPTER III.—WHOLESALE PRICES.

## INDIA.

NOTE.—A word of explanation is necessary to account for the fact that references to rice are more frequent and comprehensive than those to paddy although the former is, so to speak, a product of the latter. The reason is to be found in the unorganised and, frequently, primitive conditions in which the bulk of this crop is marketed in its primary stages. There are, for instance, no large conveniently appointed assembling markets or *mandis* comparable with those of the type associated with wheat or cotton, to which paddy may be brought by the growers and offered for sale to competing buyers. A considerable proportion of the crop is acquired directly off the field, by rice millers or their agents, by traders of various categories, and professional dehuskers. Thus large quantities of paddy never enter the markets at all. In these circumstances it will be apparent that over large areas price data in respect of paddy are comparatively scanty and, when available, biased in many instances by the conditions in which this commodity changes hands.

Madras constitutes an important exception. In this province considerable quantities of paddy are actually brought to the market by growers and are there subjected to the normal processes of competition involving bargaining by prospective buyers. The result is that detailed and fairly representative records of paddy prices are available for a number of local centres.

## A.—Introduction.

Indian rice is unique in that the spread which separates the cheapest from the dearest varieties is enormous and may amount to close on 700 per cent. In a typical current example (August 1940), selected 2/3 years' old *Dehra Dun Basmati* was found to be quoted in Delhi at Rs. 19-8-0 per maund wholesale and Rs. 20 retail at a time when low grade *Bold* hand-pounded rice could be obtained at about Rs. 3 in remote parts of Orissa and Eastern States Agency. It is very doubtful whether any commodity in any part of the world can show a price range of similar extent.

Some of the elements which seriously handicap any examination of prices are the enormous number of varieties, the complexities of consumers' preference and the localised nature of the demand. If to these be added the further disability of the non-existence of standardisation\* of qualities, the magnitude of the difficulties involved in analysing rice values will be realised. For instance, in the large consuming and distributing centres of Bombay and Calcutta, where the only varieties of rice common to both markets are the trade description *Big and Small Mills Specials* and *Sugandhi* imported from Burma, there may be found on any day as many as 150 to 200 quotations for the various grades of the 40 or 50 varieties ordinarily handled by the local trade. The case of a small up-country primary market† in which special observations were made may be cited as another example. At least 11 different commercial varieties are normally obtainable in this minor centre with about 50 different quotations on any market day. These are not isolated instances. They illustrate in a nutshell the impossibility of defining what might be termed an all-India price as the basis for discussion.

\*Almost all transactions have to be made on sample mainly for this reason.

†Balaghat in the Seoni district of the Central Provinces.

Official records (to which more detailed references are made later in this chapter) sometimes allude to "common" rice as the basis for official quotations, from which it might be inferred that a single variety exists of widespread cultivation and general consumption throughout India. The term, however, is devoid of any real meaning for the "common" rice of one area is liable to differ entirely from the "common" rice of another, while even as between centres in the same province or State the quality or qualities implied in the vague descriptions used in some official publications are more often than not totally dissimilar. Such quotations are obviously of no use from a commercial standpoint and are indeed of problematical value for any other purpose.

When comparing recorded price data reckoning must generally be made of differences in the units of weight or measure used and the basis of quotations. In Madras, for instance, wholesale rates are quoted per bag of 166 lb. gross, in the majority of the large markets, while in the southern districts, the Madras measure (3.1 lb. of rice) is the normal basis for quotation. In Bombay, rice imported from outside the province is quoted in terms of rupees per bag. The packing, however, varies according to source, bags received from Northern India containing  $2\frac{1}{2}$  maunds each of rice (approximately 205 lb.) while rice imported from Burma may sell in units of 164 lb. net. In Bombay city, local rices are quoted per *khandi* of 728 lb. in the wholesale trade. Thus it is impossible for anyone who examines the quotations appearing in the daily press, commercial bulletins or in the official publications normally accessible to the businessman, to arrive at any deduction concerning the relationship or trend of prices without in most instances having to perform a laborious series of calculations.

Apart from the large number of varieties of rice, each with its own price level and price range, certain physical characteristics determine value. These have already been discussed in detail in Chapter I and need only be summarised here. For example, prices vary according to conformation. Fine rices are dearer than medium and medium more costly than bold or coarse. The price of rice also depends on whether it is raw or parboiled, the latter usually being cheaper, while the process of dehusking or milling has a direct bearing on value. Other important quality characteristics which influence prices are kernel structure (hard or soft, as shown by translucency or chalkiness), colour, polish, fragrance, uniformity of size and shape, age, (particularly in respect of high priced fine rices) and cooking quality. Broken grains in the rice and admixture of other varieties or damaged and defective kernels are also significant factors. When studying Indian rice values, it is essential to bear in mind that there being no standard of quality for comparison, physical characteristics are assessed merely by visual examination, the accuracy of which depends solely upon the personal skill and experience of the examiner. Thus the concept of quality is capable of so wide a range of interpretation in different parts of the country that quality factors cannot be translated into precise terms of value. The almost complete absence of organised trading such as, for example, takes place at many centres in cotton, wheat, linseed, groundnuts,

etc., constitutes another handicap in the analysis of rice values and this is even more marked in the case of paddy for the reasons given early in this chapter.

For these reasons it is proposed to discuss only the values of a few of the more important commercial varieties which not only have a vogue in their own areas of production but are, in some instances, marketed in other parts of the country. The total number of such rices is relatively small.

The elimination of a large number of non-descript varieties and the reduction of the cultivated types to a selected few is one of the main directions in which improvement might be brought about. It must, however, be recognised that rice is essentially an article of domestic consumption in this country and has practically no industrial uses whatever. It reaches the consumer in the form in which it is finally prepared for the table, generally by boiling and no other kind of processing interposes as is the case with wheat which has first to be ground into *ata* or flour before it can be eaten in the form of *chapatis* or bread. The complexities and capriciousness of consumers' likes and dislikes are many and often inexplicable. Thus the buying and selling of rice has acquired a somewhat personal character and a technique which is not met with in other commodities. The standardisation of qualities would to a some extent deprive many of the pleasures of exercising that instinct of bargaining which is so ingrained in the Indian temperament. Nevertheless, it is certain that ultimately the reduction and standardisation of selected varieties would assist producers in securing better prices. Whether this object is possible of attainment within the predictable future is questionable but it is well to remember that the problem is not incapable of solution. Other countries in which rice culture is highly developed, such as Japan, Italy, the United States, etc., have demonstrated what can be done in these directions.

#### B.—Trade and official prices.

The various provincial governments and a number of State Durbars maintain records of agricultural commodity values prevailing at the district and *tahsil* or *taluk* headquarters. The duty of collecting these data is generally entrusted to a subordinate official of the Revenue Department whose actual source of information is an intermediary, usually a trader by profession and as such supposed to be well acquainted with market procedure, appointed in an honorary capacity by the head of the district administration. In Bengal, where the permanent settlement system obtains, and in Bihar, the local police inspector is generally the medium of price collection. The existing system has little to commend it particularly as in a number of instances it was observed that the petty officials responsible for the verification of the data collected often took these responsibilities somewhat lightly. It is hardly surprising, therefore, that in the great majority of instances the rates thus recorded not only lack representative character but frequently exhibit astonishing fluctuations. For example, in the case of the prices of so-called "ordinary" rice at Dehra Dun as recorded by the Statistician to the Government of the United Provinces, it was found that the



differences between the average monthly prices during January and February, 1936, are reported to have been as much as Rs. 1-13-6 per maund or 34 per cent, between March and April, 1935, Re. 0-15-0 or 27 per cent and between October and November, 1933, Rs. 1-6-0 per maund or 31 per cent.

The monthly differences between the prices of officially-termed "common" rice at Cawnpore and the trade quotations for the popular *Samhalu* variety which is generally regarded as the "common" rice of this centre have been tabulated in Appendix XL over a period of 5 years (1932-36). This shows that there was a striking disparity between these two sets of prices. On 35 occasions out of 60 the trade prices were higher than the official prices and on 24 occasions lower. The maximum difference in the former case was as much as Rs. 1-4-9 per maund or over 26 per cent (November, 1936) and in the latter Re. 0-14-5 per maund or nearly 24 per cent (June, 1932).

Variations between trade and official prices are often so diversified as to render the latter useless as an indication of general trends. The trade prices for different varieties of rice and the official prices for "common" rice at Agra from April to August, 1932, are a typical example and are tabulated below :—

*Average monthly wholesale prices of rice at Agra (United Provinces).*  
(Per maund).

—	April	May	June	July	August
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
Saharanpur Basmati Sela ..	5 7 0	5 14 0	6 0 0	5 15 6	5 13 8
Punjab Basmati .. ..	5 5 9	5 7 0	5 6 11	5 6 3	5 6 6
Raimunia (Saharanpur) ..	4 12 3	4 13 10	4 15 8	4 15 3	5 0 11
Burdwan Sela .. ..	3 13 2	3 14 3	3 15 11	4 0 7	3 15 9
Milchar (Burma) .. ..	3 7 6	3 5 10	3 7 7	3 8 7	3 7 5
Rangoon No. 1 (Small Mills Specials).	3 5 9	3 6 7	3 7 7	3 7 4	3 6 6
Rangoon No. 1½ (Small Mills Specials).	3 5 0	3 5 3	3 7 5	3 6 10	3 6 1
Average ..	4 3 6	4 5 0	4 6 5	4 6 4	4 5 10
Official price of "common" rice.	4 0 0	3 12 11	3 12 11	3 12 11	3 11 6

The average monthly trade prices shown under the different varieties quoted in the above table are based on the actual prices paid for certain qualities on the first, tenth and twentieth day of each month. It will be seen that in May, all the varieties displayed

an upward tendency, the rise varying from 3 pies per maund for *Rangoon No. 1½ (Small Mills Specials)* to 7 annas per maund for *Saharanpur Basmati Sela* (parboiled); while the official prices showed a fall of over 3 annas per maund. In June, the trade prices went up in five instances and declined in two with an average increase of Re. 0-1-5 per maund whereas the official records showed an unchanged market. In July, when the various trade prices fluctuated in all cases with a very slight average decrease, the official prices still showed no change. In August, the former registered an average net fall of 6 pies per maund as compared with Re. 0-1-5 officially recorded.

Apart from these inconsistencies it will be observed that the official prices for "common" rice bore no relation whatsoever to any of the quotations in a thoroughly representative range of qualities in spite of the fact that any one of the four cheaper grades might justifiably be regarded as a "common" rice. In April, for instance, the average price of *Burdwan Sela*, *Milchar* and two qualities of *Small Mills Specials* worked out to Rs. 3-7-9 per maund as compared with the official figure of Rs. 4-0-0. It is clear, therefore, that no reliance can be placed on official price data except possibly as a general index of long term trends or seasonal fluctuations. For these reasons the prices referred to in this chapter and elsewhere in this report have for preference been taken from trade sources wherever available.

### C.—Indian and world prices.

In theory every commodity should have what may be termed a "world price", a price to which values in each country should be related allowing for transport costs, quality variations and the time factor. In the case of rice it is practically impossible to determine what the world price should be owing to the fact that in contradistinction to the other two chief world cereals, wheat and maize, international trade in rice is widely distributed over a very large number of countries. Since the War of 1914-18, comparison between the prices ruling in different parts of the world has tended to become increasingly complex owing to the creation of artificial conditions imposed through various restrictive measures on the free movement of trade through tariffs, quotas, exchange and currency regulations, barter agreements and sometimes even by total prohibition.

The demand for Indian rice abroad largely arises from members of various Indian communities, long settled in other tropical and sub-tropical countries, who still retain a strong preference for the varieties grown in their homeland. There is a small export trade with Europe and North America but its extent is limited and concerns a variety (*Patnai*) which does not normally compete with the low and medium grade rices which form so large a proportion of world trade. In the circumstances, therefore, world prices of rice have no direct influence on the Indian price level as a whole although in common with other primary products world economic conditions ultimately dominate general price tendencies throughout the globe. This will be clear from the following table showing the trend of rice values at Calcutta, Rangoon, Saigon and London from 1929 to 1939.

## Average annual prices of rice in world markets.

Year.	No. 2 Burma in Rangoon (in rupees per 7,500 lb.).	No. 2 Burma or Bassein (Burma) in London (parcels c. i. f. in shillings per cwt.).	No. 1 Saigon (round white 25% Brokens) in Saigon (Indo- China) piastres per 100 kg. (220·463 lb.).	No. 1 Saigon in London (parcels c. i. f.) (in shillings per cwt.).		Ballam in Calcutta* (in rupees per maund.).
				s.	d.	
1929.. ..	465	13 2	..	..	..	..
1930.. ..	395	11 0	..	..	..	5 2 9
1931.. ..	249	7 10	6·72	8 1	..	4 0 10
1932.. ..	269	8 4	5·47	8 5	..	3 7 8
1933.. ..	194	6 7	4·06	6 10	..	3 3 11
1934.. ..	203	6 8	3·25	6 2	..	3 11 3
1935.. ..	254	7 8	4·18	7 5	..	3 9 0
1936.. ..	243	7 9	5·04	8 0	..	4 1 4
1937.. ..	263	9 2½	7·90	9 2½	..	3 15 6
1938.. ..	255	8 2½	10·65	8 5	..	4 0 0
1939† ..	255	7 8½	9·26	7 2½	..	4 10 4

It will be observed that on the whole values move fairly sympathetically with the exception of Calcutta where the price of *Ballam*, a representative local variety of medium class, shows opposite tendencies in a number of years. For instance, while Rangoon, Saigon and London quotations tend to fall, Calcutta rises and vice versa. The range of fluctuations at Calcutta will also be noticed as being narrower than those in the other markets implying a greater degree of stability. From the high levels attained in 1929 prior to the world economic depression which had set in with 1930, prices fell precipitously reaching their lowest levels in 1933 and 1934. Values at Rangoon and Calcutta were the first to touch bottom in 1933 followed in 1934 by London and Saigon. The extent of the decline may be gauged from the fact that prices of *No. 2 Burma* rice at Rangoon and Ballam at Calcutta were 58 and 37 per cent respectively lower than their respective levels in 1929 and 1930 respectively. As regards Siam rice, Saigon had fallen by 52 per cent in 1934 as compared with 1931, while London had lost 24 per cent. The remarkable upswing of prices at Saigon in 1936-38 was primarily due to

\*International Year Book of Agriculture. Calcutta prices are based on data maintained by the Bengal Chamber of Commerce.

†International Review of Agriculture (Monthly).

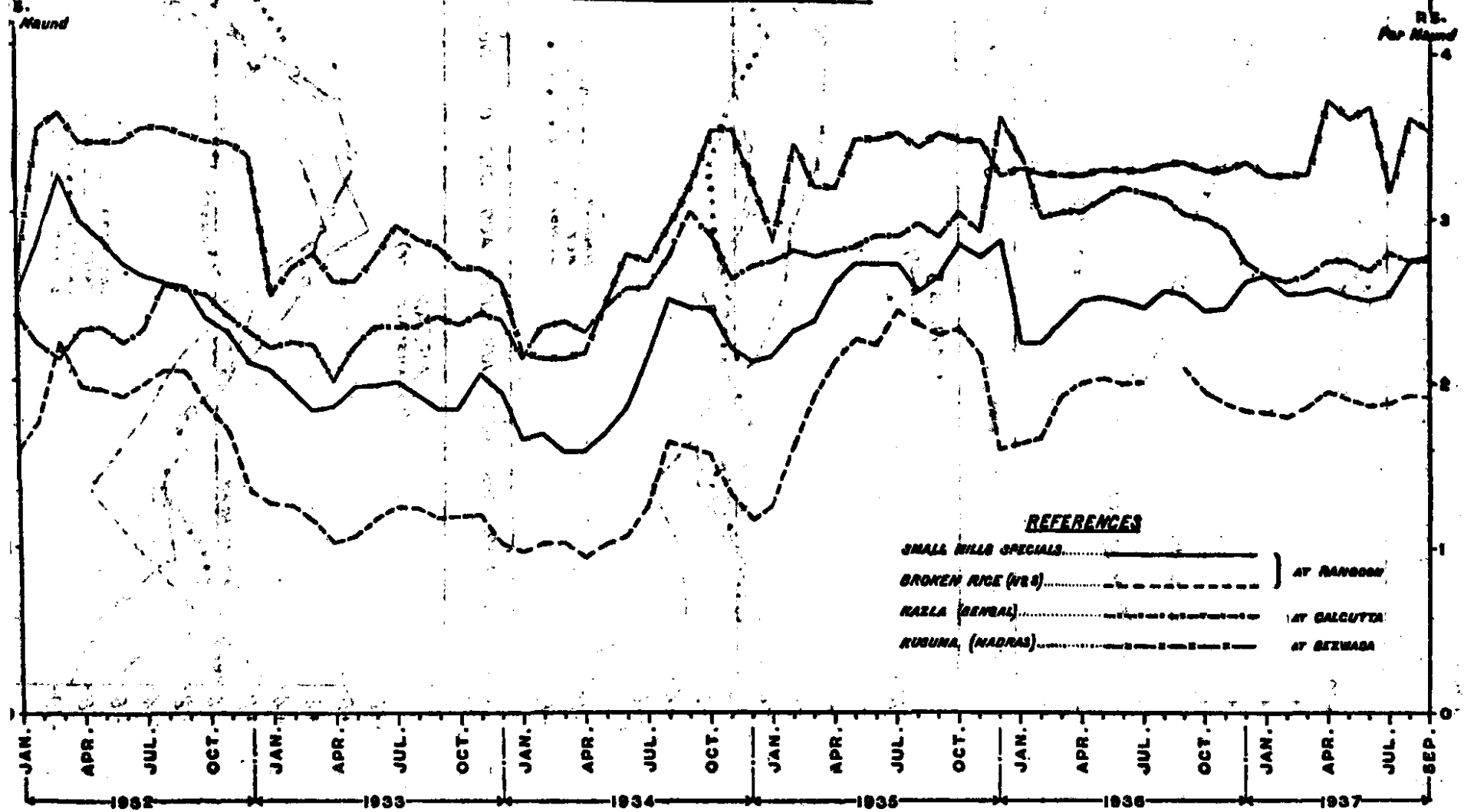
the depreciation of French currency and partly to the good demand from China in 1937. The low point which occurred in 1934 was 40 per cent below the average annual price three years previously.

The degree of relationship existing between the month to month prices in India of four commercially important indigenous rices and those of Siam and Burma rices in the London market will be gauged from the diagrams facing page 95. It will be seen that during 1936-39 Burma and Siam rice values in London moved in fairly close sympathy owing to the fact that the rices of both these countries share similar physical characteristics in some respects and compete in much the same overseas markets. If the curves representing the prices in India of four important trade descriptions are examined and compared not only with each other but with London, conspicuously divergent tendencies will be apparent. *Sirumani*, for example, follows a course largely independent from the other local rices and from the London market. This variety has a special outlet in Ceylon and on that account its price is governed mainly by conditions in that Island. The price of *Seeta* in Calcutta shows a general relationship only with London but has little in common with month to month fluctuations. It will be recalled that *Seeta* is the well-known hand-pounded semi-finished variety shipped to the United Kingdom and, before the present War, to Continental Europe. The price in Madras of the popular *Molagolukulu* variety grown in the Nellore area will also be observed to follow its own course on most occasions.

On the other hand, the prices of certain cheap domestic rices, chiefly in the maritime provinces of Bengal and Madras, do show a considerable degree of concordance with the fluctuations in the values of those qualities of Burma rice which are ordinarily imported into India in very large quantities such as, for example, *Small Mills Specials* or *Brokens No. 3*, the latter being of special importance in Madras. The diagram facing this page illustrates the course of monthly quotations over a number of years in respect of *Kazla* (Bengal), *Kusuma* (Madras) and the two Burma qualities previously referred to. The various curves will be observed to follow fairly closely related trends.

Although the relationship between prices in producing and consuming countries may be only general if examined on a long term basis, there are occasions from time to time when parties approach a level at which it is possible to buy and sell simultaneously covering all the incidental charges. This does not necessarily overrule the possibility that business may be done when simultaneous parities are unfavourable but such a procedure would involve taking a view of the market. A number of factors have to be taken into consideration in calculating this parity. These may conveniently be illustrated by converting the Indian price of *Seeta* rice at Calcutta on any given day to its c.i.f. London equivalent and comparing it with the actual price ruling in London on the same day. For instance, the price of *Seeta* for March shipment from India was 10s. 7½d. per cwt. c.i.f. London on 3rd March, 1939. In Calcutta the price of *Seeta* on the same day was Rs. 4 per maund. The following

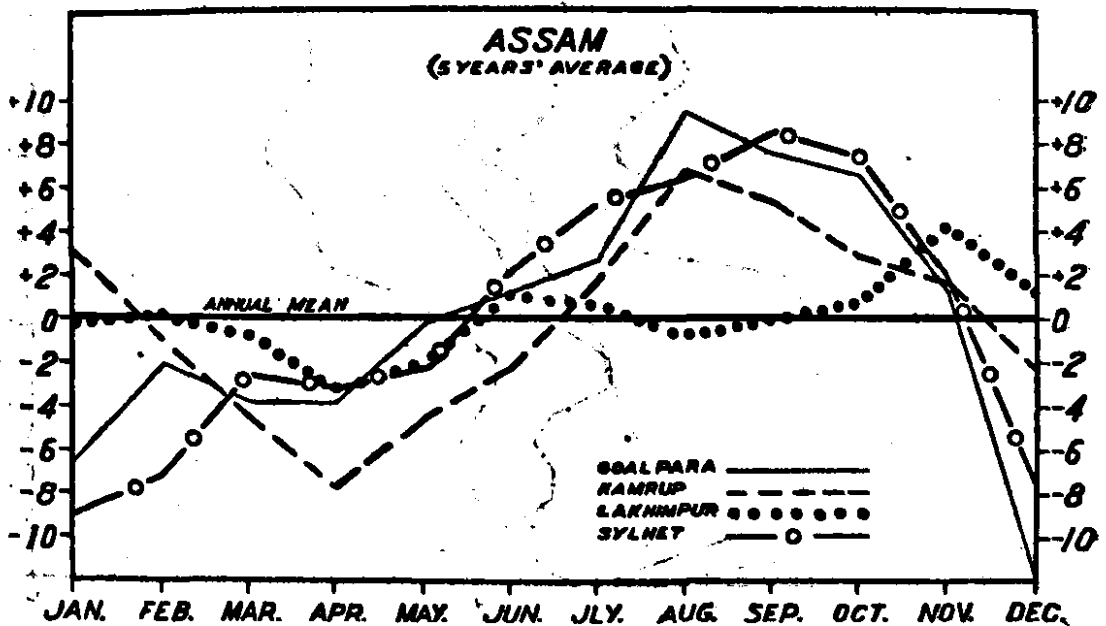
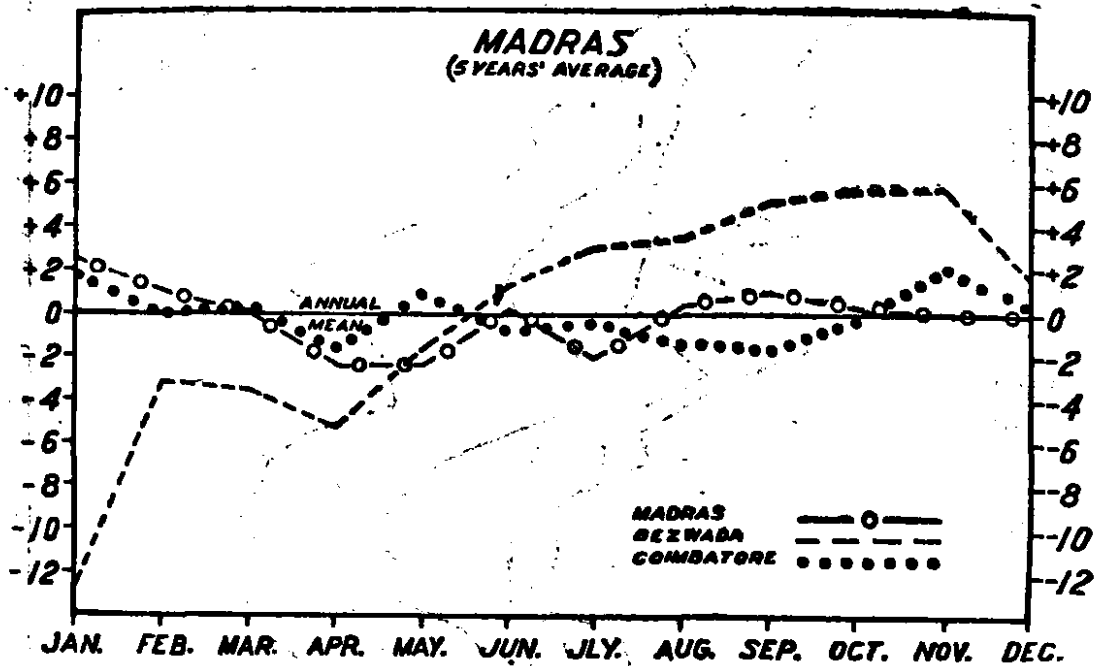
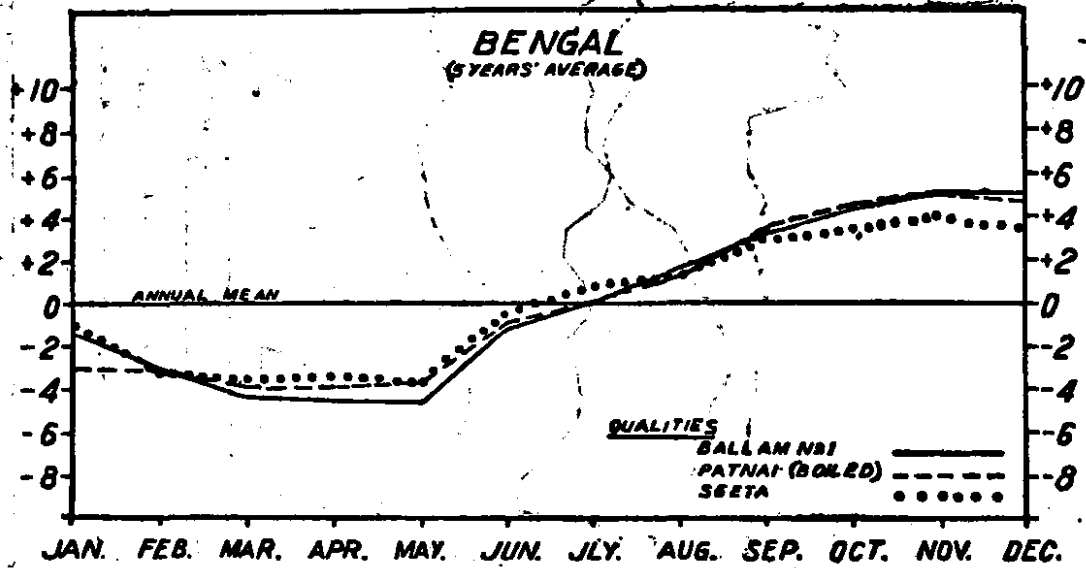
**COMPARISON BETWEEN THE PRICES OF BURMA RICES & TWO OF THEIR CHEAP  
INDIAN COUNTERPARTS**



**REFERENCES**

SMALL MILLS SPECIALS..... ) AT RANDOR  
 BROKEN RICE (RS.)..... )  
 HAZLA (BENGAL)..... ) AT CALCUTTA  
 RUGUNA (MADRAS)..... ) AT BIRMAHA

PERCENTAGE DEVIATIONS OF THE AVERAGE MONTHLY WHOLESALE PRICES FROM THEIR ANNUAL MEAN.



calculation will show that on the occasion in question the two markets were in fairly close parity the Calcutta price working out to about 10-11 per cwt. c.i.f. London.

	Rs.	A.	P.
Wholesale price of <i>Seeta</i> rice at Calcutta in March, 1939, per bag of 2 maunds @ Rs. 4 per maund .. .. .	8	0	0
<i>Add—</i>			
Price of gunny bag .. .. .	0	4	0
Marking, filling, sewing and weighing .. .. .	0	0	9
Cartage from shippers' godown to railway station .. .. .	0	0	6
Loading at railway station .. .. .	0	0	5
Railway freight to Kidderpore docks @ 0-1-0 per maund .. .. .	0	2	0
Customs duty .. .. .	0	4	6
Port Commissioners dues including river dues and shipping charge @ Rs. 2-9-0 per ton .. .. .	0	3	0 0 15 2
<hr/>			
Cost f. o. b. Calcutta .. .. .	8	15	2
Equivalent price in shillings per cwt. (Exchange ratio Rs. 1=1/6) s. 9-13			
<i>Add—</i>			
Insurance @ 5/16 per cent .. .. .	0	03	
Freight @ s. 33-75 per ton .. .. .	1	68	
United Kingdom charges including selling brokerage, say	0	15	1-86
<hr/>			
			s. 10-99
United Kingdom price per cwt. c. i. f. London, say .. .. .			s. 11*

It will be recalled that when *Seeta* is exported abroad it is never sold in the form in which it is actually shipped but is re-milled and given a high finish before being finally marketed. The difference between the price of the product as shipped (*Seeta*) and that of the finished article (*Cleaned Patna*) may be seen in the following table giving the average monthly prices at which sales of *Seeta* have been made in London in recent years. The data cover the period January to April as purchases for the United Kingdom are made almost exclusively for shipment during January—April owing to the deterioration which sets in after April, the rice developing yellowish tinge and, as such, being unacceptable to the trade in Britain, save in exceptional circumstances. In these conditions price data covering other months of the year would be of doubtful value.

\* The important item of interest has not been taken into account in the above calculation. A considerable lapse of time may occur between payment for goods in India and reimbursement at destination especially when the shipments to be made are offered 2, 3 or 4 months ahead. In normal times shippers obtain funds in India by selling sterling to the exchange banks. Such sales may be telegraphic transfer of bills of exchange drawn at 3 or 6 months sight on London. When money is plentiful exporters borrow from the banks "on call" for short term periods. The rate of interest, therefore, depends entirely on the system of finance adopted and the conditions prevailing in the money market.

*Average monthly prices of sales of Seeta rice in the United Kingdom.*  
(Per cwt. ex-ship).

—	January.	February.	March.	April.	Average price of Cleaned Patna.
	s. d.	s. d.	s. d.	s. d.	s. d.
1928-29 ..	18 4½	18 1	17 2	..	..
1929-30 ..	17 0	15 7½	15 5½	15 0	..
1930-31 ..	11 10½	12 0	11 10	12 6½	..
1931-32 ..	13 3	12 5½	12 1½	11 9	..
1932-33 ..	10 10½	9 8½	9 5½	9 8	17 9
1933-34 ..	10 10½	9 10½	9 8	9 9	17 6
1934-35 ..	10 1	9 11	10 9	11 9	17 6
1935-36 ..	12 9	14 1½	13 8½	..	20 0
1936-37 ..	12 1	12 0	11 10½	..	22 0
1937-38 ..	10 6	10 6	9 10½	11 6	20 0

It will be remarked that a very wide difference exists between the price of the hand-pounded product as received from India and the re-milled article derived from it. In some instances, the latter is practically double the price of the former. To what extent this is justified by high processing costs or losses in re-milling cannot be gauged. In reply to personal enquiries made from millers in London it was merely stated that the rice was liable to break up so badly in re-milling that the large proportion of broken grains resulting necessitated severe screening and could only be disposed of at low rates thus increasing the cost of the final product. In view of the marked reluctance shown by the members of the London milling industry to provide concrete data, further investigations could not be made at the time. It is significant to remark that an important section of the United Kingdom rice milling industry has very close associations with the trade in Burma which country exports to the United Kingdom a quality of rice\* closely approximately the *Patnai* (*Seeta*) variety and competing with it. It might be argued, therefore, that undue bias is shown to the Burma product but the fact remains that the inordinately high prices asked for *Cleaned Patna* militate against any expansion in the demand for this variety of rice and place it at a serious disadvantage when competing with other Empire and non-Empire goods in the United Kingdom market.

\*Shipments of this variety (*Long*) may sometimes be designated *Patna Type* or *Patna Quality*.



Since India's export trade is mainly directed to Ceylon and the East African coast, including Mauritius, it may be of interest to reproduce the calculations which in normal times determine the parities between values in this country and those at which the goods can be placed abroad. In the case of Mauritius, the sea freight is based on the rate prevailing early in 1939, before the War raised all ocean shipping costs. As regards Ceylon most of the rice consigned to that destination from the Tanjore area moves by rail via Dhanushkodi where it is transhipped across the narrow stretch of water separating Ceylon from India. An all-in rate of freight is available between certain stations in the Tanjore area and points in Ceylon such as Colombo.

*Details of an actual transaction in White Sirumani rice sold at Colombo and originating from Kotallam. (Tanjore).*

(Per maund).

	Rs. A. P.
Wholesale price per maund of <i>White Sirumani</i> rice at Kotallam, ex-godown .. .. .	3 13 9
 <i>Add—</i>	
	Rs. A. P.
Charges incurred in removing goods from godown to railway station including cartage and other incidental expenses.	0 1 0
Railway freight from Kotallam to Colombo via Dhanushkodi .. .. .	0 8 6
Return freight on the empty gunny bags .. .. .	0 0 6
Export duty .. .. .	0 2 3
Import duty payable at Colombo .. .. .	0 12 0
Selling agent's commission .. .. .	0 1 3
Cartage from railway station to godown at Colombo .. .. .	0 1 0
Godown rent at Colombo .. .. .	0 0 4
Shippers' margin .. .. .	0 1 5
	1 12 3
Wholesale price at Colombo .. .. .	5 10 0

In this case the wholesale price at Kotallam represented 68 per cent of the price eventually realised at Colombo the equivalent difference being Rs. 1-12-3 per maund including the shippers' margin, or Rs. 1-10-10, the bare cost of delivering the produce in Ceylon.

The following shows the calculations to be taken into account in shipping rice from Calcutta to Mauritius.

*Patnai rice, Calcutta to Port Louis, Mauritius.*

(Per bag of 2 maunds net).

Wholesale price at Tollygunge (Calcutta) per bag of 2 maunds net @ Rs. 3-10-0 per maund .. .. .	Rs. A. P. 7 4 0
<i>Add—</i>	<i>Rs. A. P.</i>
Cost of new B. Twill bag (March, 1939) .. .. .	0 4 0
Marking, filling, sewing and weighing @ Rs. 4-8-0 per 100 bags .. .. .	0 0 9
Boat hire alongside steamer .. .. .	0 2 0
Marine insurance .. .. .	0 0
Net freight @ Rs. 15 per ton .. .. .	1 1 7
Port Commissioner's fees including shipping charges and river dues @ Rs. 2-8-0 per ton .. .. .	0 3 0
Labour charges at docks .. .. .	0 2 0
Export duty @ Re. 0-2-3 per maund .. .. .	0 4 6
Shippers' commission .. .. .	0 2 0
	2 4 4
Total cost per bag c.i.f. Mauritius .. .. .	9 8 4

This would be equal to Rs. 4-12-2 per maund or Rs. 1-2-2 more than the Calcutta price, the latter representing 24 per cent of the c.i.f. equivalent.

**D.—Seasonal variations.**

(1) RICE.

In common with other agricultural products, the prices of rice and paddy are subject to well defined seasonal changes, the latter more so than the former. These are discussed in the present section in terms of percentage deviations of the average monthly prices from their annual mean, and the varieties referred to are for the most part popular trade descriptions falling within the cheap to medium price categories. The seasonal variations are for additional clarity illustrated in a large number of diagrams.

**Bengal.**—The diagram on page 143 indicates the monthly percentage deviations in respect of *Ballam*, *Patnai* and *Seeta* rices in the Calcutta market based on a five-year period. Broadly, the range of deviations is very similar for the different varieties which on the whole do not show conflicting tendencies of a marked character. The extreme range of variation occurs between November and May

and covers 9·8 per cent in the case of *Ballam*, 7·7 per cent for *Seeta* and 9 per cent for *Patnai*. All the three varieties show a high point in November but *Ballam* and *Seeta* have their lows in May and *Patnai* in April. The equivalent of the percentage variations are Re. 0·6-3, Re. 0·5-8 and Re. 0·5-7 per maund respectively. The gradual declining tendency shown from November onwards may be accounted for by the seasonal pressure of arrivals of the winter crop, the harvesting of which usually begins from November. Values which are lowest in April and May synchronise at a time when stocks of rice are usually large. The average of the price deviations in respect of the three varieties of rice in Calcutta shows that the extreme range of variation which occurs from November to May amounts to 8·8 per cent or Re. 0·5-9 per maund as shown in the diagram facing page 151. After May, the price level improves and is 0·4 per cent or 3 pies per maund higher than the annual mean in July. During the subsequent months the upward trend continues until the peak is reached in November by which month the rise above the annual average has attained 4·7 per cent or Re. 0·3-1 per maund.

**Madras.**—Since rice cultivation in Madras is distributed over a large part of the year owing to the wide range of seasonal conditions in this province, the seasonal variations in different markets show conflicting tendencies in certain months (see diagram facing page 143). In January, for instance, while the prices of *Basangi* rice in Madras and *Gorikasanna* in Coimbatore are seen to be about 2 per cent higher than the annual mean, the prices of *Kusuma* at Bezwada are lower by more than 12 per cent. In November, Coimbatore and Bezwada rices are more than 2 and 5 per cent respectively above the annual mean while at Madras there is no change. Taking the province as a whole, however, it may be said that there is a general seasonality in rice values but this is not very pronounced. The extreme range variation takes place between November and January and amounts to 5·7 per cent; the high occurring in October and November and the low in January. The next low point occurs in April and is probably influenced by the appearance of the second crop, the pressure of arrivals tending to depress values. From June onwards prices maintain a level higher than the annual mean and reach their peak in October and November. (See diagram facing page 151).

**Assam.**—The average monthly prices of "common" rice in the four most important markets of the province display only a limited degree of concordance in their trend and seasonal variations are not always closely related. For instance, while the tendency is for the price level at Sylhet and Goalpara to rise between January and February, the reverse occurs at Kamrup, while Lakhimpur shows little change. Again, values at Sylhet, Goalpara and Kamrup commence to fall after September whereas at Lakhimpur prices tend to rise from August until November. The extreme range of variations occurs at Goalpara, between August and December and amounts to as much as about 21 per cent or Re. 0·8-6 per maund, the high being in August and the low in December. The steep decline is apparently due to the heavy rush of post-harvest arrivals, Goalpara being an important local point of assembling and distribution. The average

of prices as shown in the diagram facing page 143 indicates a definite seasonality. The year's peak is reached in August just prior to the maturing of the main winter crop, the average rise over the annual mean being over 5 per cent or Re. 0-2-5 per maund. After August the price level declines to its lowest point in December when the supplies of recently harvested rice are large. The extreme range of variation occurs, therefore, between August and December and amounts to nearly 9·7 per cent which is the equivalent of Re. 0-4-6 per maund. From January to May the level of prices remains below the annual mean, varying between 4·5 per cent in April to 2·3 per cent in May. After May, the price level tends to rise.

**Bihar.**—From the seasonal price variations at Muzaffarpur, Jayanagar and Darbhanga which are illustrated on the diagram facing this page, December and January are seen to be the months in which prices are generally lowest, while the annual high point occurs in August, although at Jayanagar the peak is apparently reached as early as June. For the province as a whole the extreme range of variation is comparatively small and amounts to 8·7 per cent.

**Central Provinces.**—The diagram facing this page refers to two important markets in the main producing areas (Raipur and Drug) and one consuming market (Yeotmal). While the general trend is common to all three centres, prices at Raipur and Drug are sometimes at complete variance, as for example, between August and September, November and December and January and February. It will also be noticed that prices in the consuming market are more stable than those in the producing areas. At Yeotmal, for instance, the maximum monthly variation during the average year amounts to just over 3 per cent or Re. 0-1-9 per maund ; while at Raipur and Drug the equivalent extremes are 7·7 and 7·4 per cent respectively or Re. 0-2-10 and Re. 0-3-0 per maund. Prices start declining with the advent of the harvest and are generally lowest in March. The highest level is touched in August, the extreme range of variation amounting to 8·7 per cent or Re. 0-3-10 per maund only. The prospects of the *kharif* or autumn food crops, *e.g.*, maize and millets to a certain extent influence prices of rice during August and September. Poor *kharif* crops tend to raise or at least maintain the price of rice while the contrary is the tendency if the monsoon is satisfactory and the outlook good.

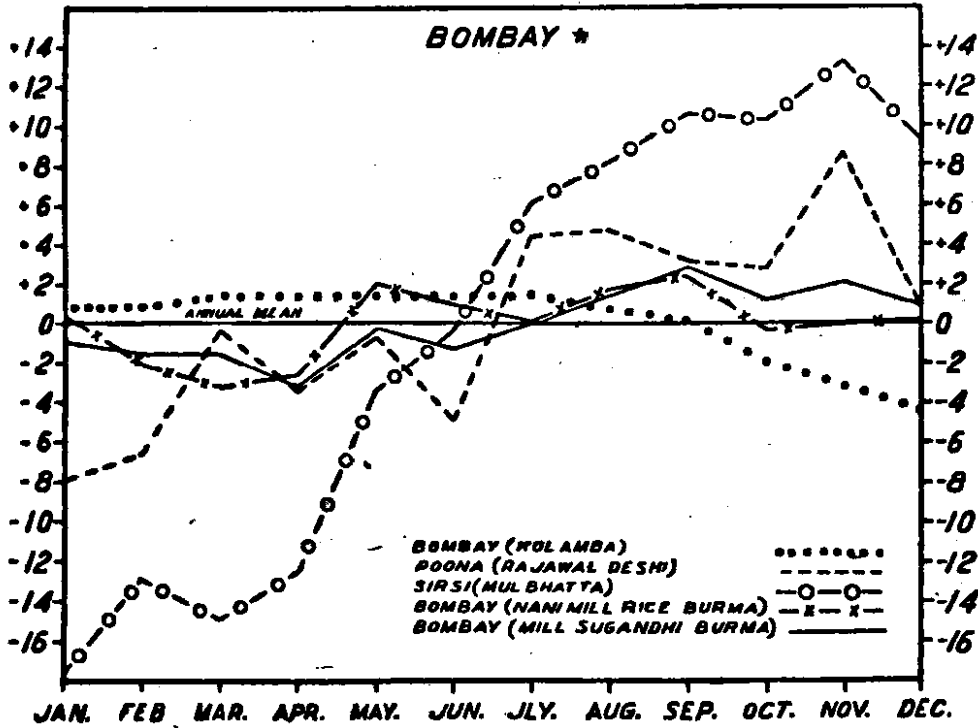
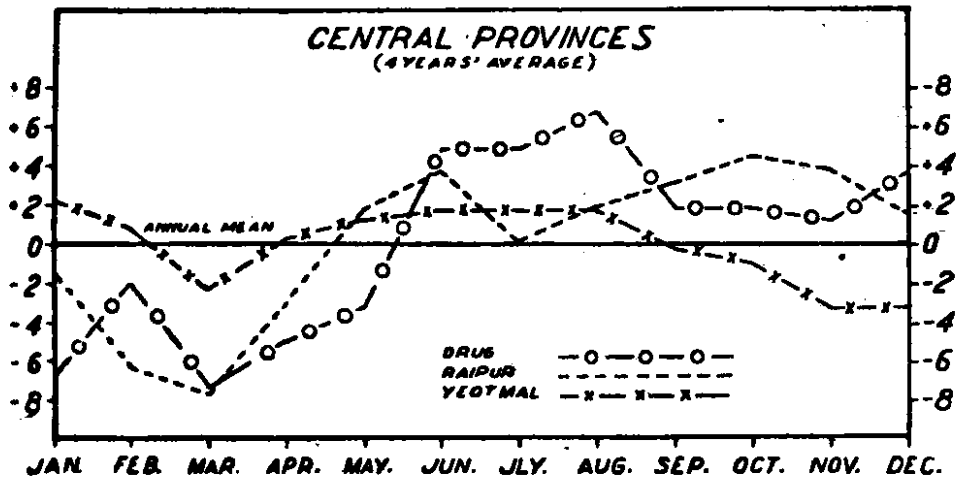
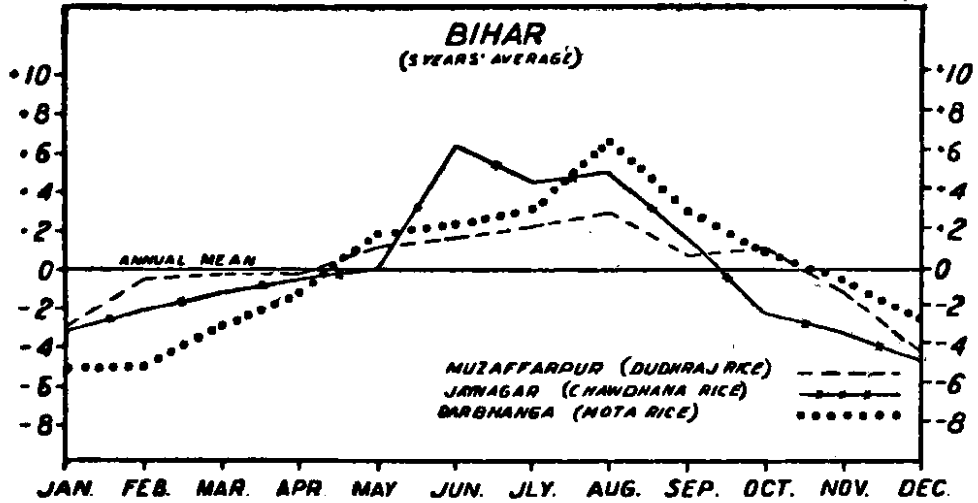
**Bombay.**—The seasonal variations in this province as will be apparent from the diagram facing this page are violent in respect of local rices and much less accentuated in the case of imported Burma rice. It will also be noticed that the prices at the consuming centres where the demand is fairly constant are less subject to wide variations than those in the producing areas. Bombay, for example, shows comparatively narrow variations the maximum being 4·4 per cent, whereas Poona and in particular Sirsi are conspicuous on account of wide fluctuations averaging 8·6 per cent and 17·8 per cent respectively.

The extreme range of variation in the prices of *Kolamba*\* at Bombay occurs between July when prices are normally high and

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\* Not to be confused with the fine small variety of the same name mentioned elsewhere in the report.

**PERCENTAGE DEVIATIONS OF THE AVERAGE MONTHLY WHOLESALE PRICES FROM THEIR ANNUAL MEAN.**



	3 YEARS' AVERAGE	4	5
* MOLAMBA	.....	.....	.....
RAJAWAL DESH	.....	.....	.....
MULBHATTA	.....	.....	.....
NANI MILL (SMALL MILLS QUALITY)	.....	.....	.....
SUGANDHI	.....	.....	.....



December when they are low. The average range covers 5.9 per cent or Re. 0.5-5 per maund, the decline being accelerated between October and December. This period corresponds with the time of harvesting when the impending supplies are large. The deviation curves for *Nani Mill* (*Small Mills Specials* from Bassein) and *Sugandhi* rices imported into Bombay from Burma will be seen to move in fairly close sympathy with each other. The extreme range of fluctuations occurs between September and April, the lowest point for *Small Mills Specials* occurring in March and that of *Sugandhi* in April. The variation amounts to 5.5 per cent or Re. 0.2-6 per maund in the case of the former and 6.2 per cent or Re. 0.3-5 per maund in the case of the latter. Between April and September when the highest point of the year is normally attained values rise and fall without pronounced tendencies. The peak reached in September amounts to 2.4 and 2.9 per cent higher than the annual mean for *Small Mills Specials* and *Sugandhi* respectively.

In regard to the local rices at Poona and Sirsi, November shows the highest level of prices, namely, 8.6 and 13.3 per cent respectively above the annual mean. In both markets prices are normally lowered in January, Poona showing 8 per cent and Sirsi 18 per cent below the annual average. The total range of variation amounts to 16.52 per cent at Poona and 31.06 per cent at Sirsi. The equivalents of these deviation are Re. 0.11-1 and Rs. 1.0-9 per maund respectively. The heavy slump, which occurs between December and January, synchronises with the post-harvest period when the arrivals in the market are pressing.

**Sind.**—The average monthly variations in the prices of *Kangni* rice at Larkana and Karachi are illustrated in the diagram facing this page. Larkana is situated in the chief producing tract while Karachi is a consuming and distributing market. The graph shows that the range of monthly variations is less at Karachi than at Larkana, the range of variations being 8 and 10.2 per cent respectively. Taking the province as a whole prices are seen to vary within a fairly limited range between July's high and January's low, a range of 8.7 per cent or Re. 0.4-6 per maund. The main decline sets in after October with the post-harvest pressure of the new crops. From January onward prices tend to improve and rise steadily until July, as illustrated in the diagram facing page 151.

**United Provinces.**—The seasonal variations in this province as revealed by the prices of rice in the Bareilly, Benares and Cawnpore markets are marked. Bareilly shows the widest range of variations from a low of 5.9 per cent in January to a high of 7.9 per cent in August. At Cawnpore prices are highest and lowest in June and November respectively when they are 3.4 and 5.4 per cent above and below the annual mean. Benares exhibits less stability than Cawnpore, the net price range being 11.1 and 8.8 per cent respectively. The average monthly deviations are shown in diagram facing page 150.

The average for the province shows an extreme range of variation of 8.2 per cent or Re. 0.5-5 per maund, the high point occurring in August and the low in February. From August values de-

cline steadily and with accelerated speed from October to November. (See diagram facing page 151).

**Punjab.**—Monthly variations in the prices of *Jhona* rice in the three important markets, Gujranwala, Akalgarh and Hafizabad shown in the diagram facing page 149 indicate small seasonal fluctuations and a marked degree of stability. The maximum deviation from the annual mean does not exceed 2·85 per cent. The average of the three markets shows the high point to be in July and the low in December as illustrated in the diagram facing page 151. At its highest the average is only 1·6 per cent or 11 pies per maund above the annual mean and the lowest less than 1·2 per cent below.

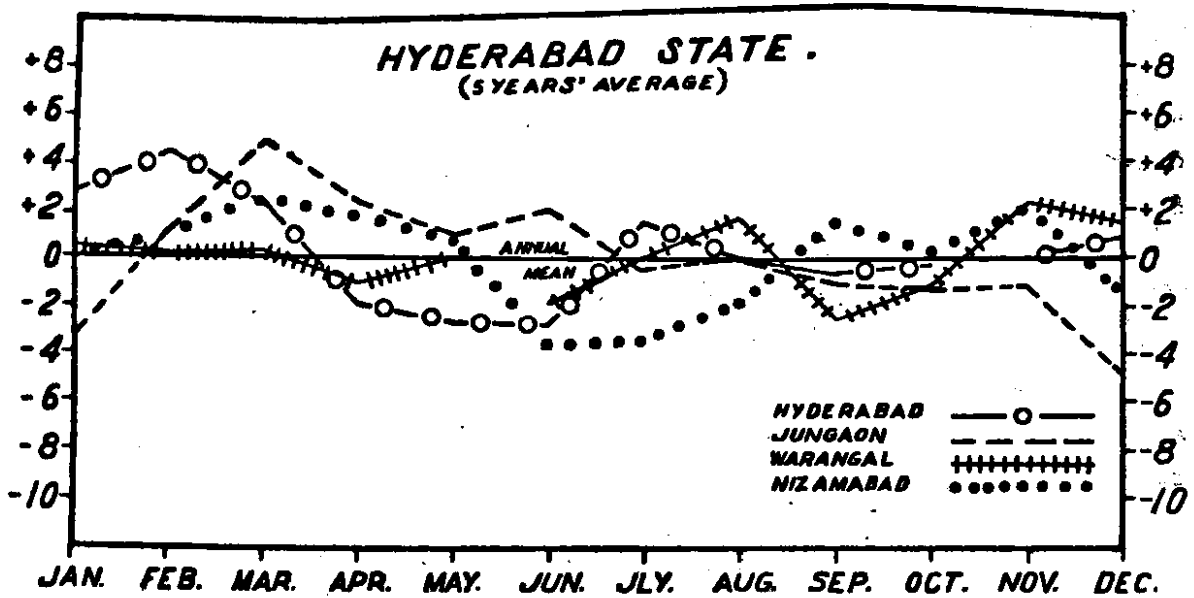
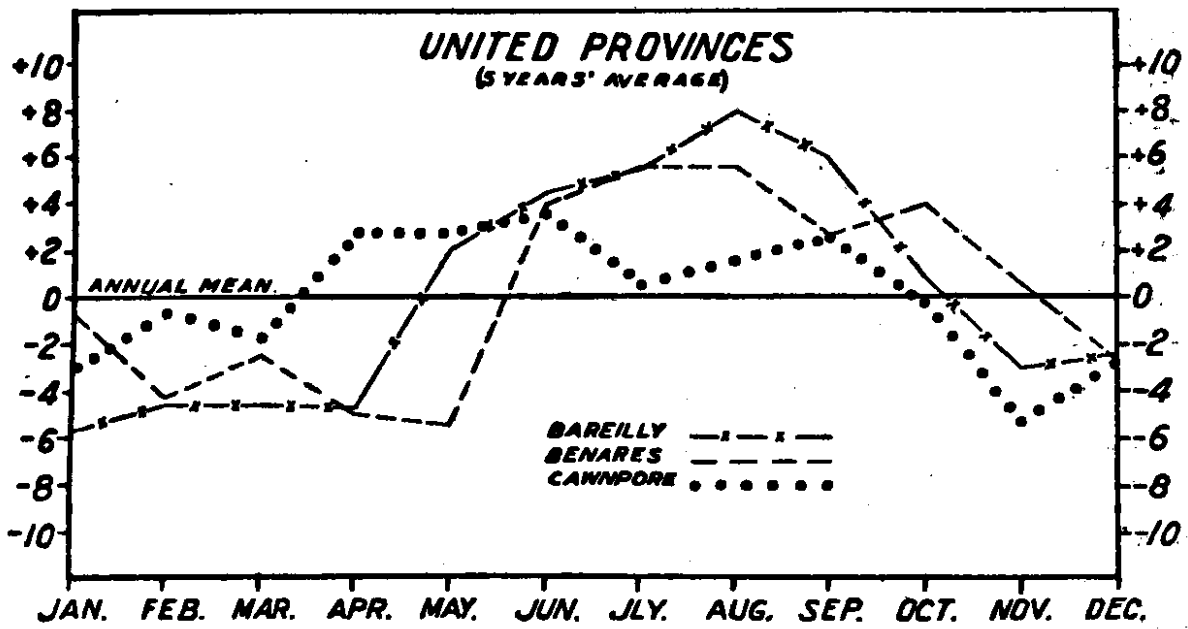
**Delhi.**—The production of rice in this small area is insignificant but as a centre of consumption and distribution it is important, supplies being mainly derived from the adjacent provinces. *Basmati* rice is generally imported from the United Provinces and the Punjab, *Begami* from the Punjab and *Small Mills Specials* from Burma via Calcutta. The percentage deviations from the annual mean of the average monthly prices of these qualities are represented on the diagram facing page 149. Their individual movements vary from month to month so that the price levels for *Small Mills Specials*, *Basmati* and *Begami* are at their lowest in March, April and May respectively. There is, however, a common general seasonal trend. Between January and June prices are relatively low. After June the trend is higher and with one exception (*Basmati*) the level remains well above the annual mean, the respective peaks occurring in August for *Basmati* and September for *Begami* and *Small Mills Specials*. The tendency thereafter is for prices to decline as the new crop approaches maturity. It is significant that the high priced fine quality *Basmati* shows rather less variation than the cheaper varieties. For example, the net deviations between the lows and highs of *Basmati*, *Begami* and *Small Mills Specials* during the year are seen to be 4·8, 6·3 and 6·5 per cent respectively. It is also interesting to observe that the low point in the case of *Basmati* was only 2 per cent below the mean as compared with 3·9 per cent for the *Begami* and *Small Mills Special* qualities, while the high point in the first named rice rose to 2·8 per cent above the annual average, the other varieties improving to a relatively smaller degree, namely, 2·4 and 2·6 per cent respectively.

It would appear from this that the prices of cheap rices vary to a greater extent than those of the costly varieties but this is not conclusive as the diagram facing page 160 shows the fine *Basmati* to be subject to much greater seasonal variation than the coarse *Jhona*.

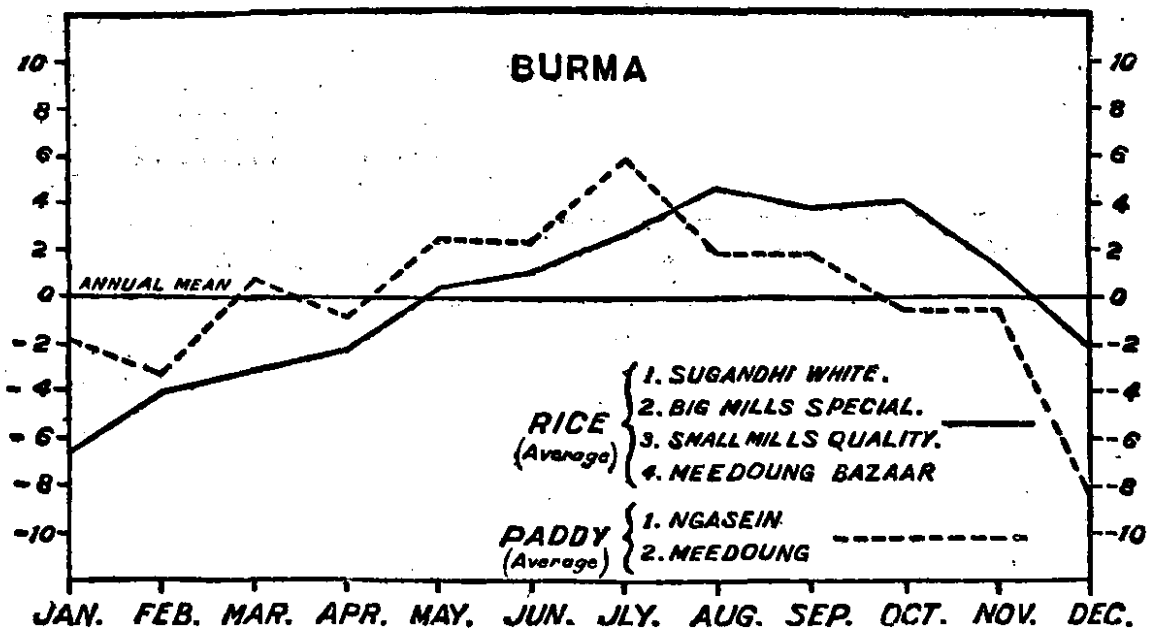
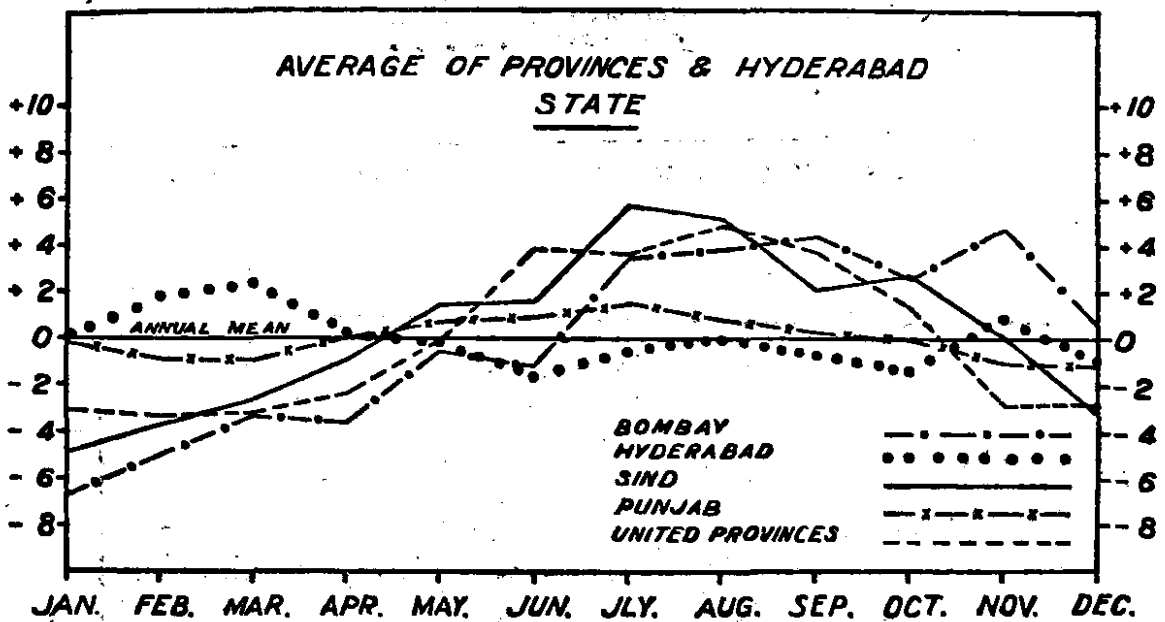
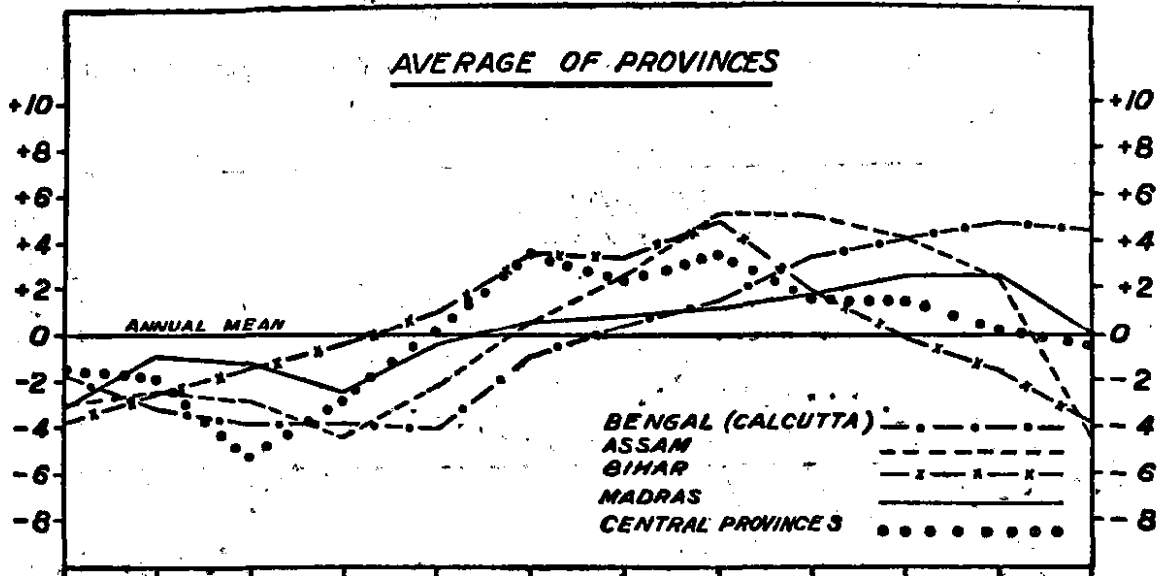
**Hyderabad.**—The diagram facing page 150 represents the average monthly price variations in respect of *Mota* (coarse) rice in the Hyderabad, Warangal and Nizamabad markets. The monthly fluctuations show little sympathy of movement and move up and down in an independent manner for which it is difficult to find a satisfactory explanation. It will be observed that in contrast to most of the provinces, values are above the annual mean from January to April, the high for the year occurring in March at a time when



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rices elsewhere are mostly on the down grade, while the low synchronises with June. Between these two months the range of variations is only about 4 per cent which is hardly indicative of the many small intermediate fluctuations which apparently take place in the year.

**Summary.**—The averages of provinces and Hyderabad State are set out in the diagram facing this page and clearly reveal the following broad tendencies. (a) Prices are depressed between December and May and lowest generally in January. Noteworthy exceptions are the Central Provinces and Assam where prices are lowest in March and April respectively. On the whole this period synchronises with large arrivals. The harvest having been completed in December and January the pressure of the new season's supplies tends to depress values. (b) As the season advances and weight of supplies moves into consumption, stocks are lightened bringing about a rise in the price level which reaches its peak in individual areas at different months in the second half of the year. As the diagram opposite this page shows, in five instances out of ten July and August are the months of highest prices. In one, both June and August share this distinction while in another the March level is highest. The remaining three show prices to be dearest in November. (c) Soon after the highest levels of the year have been reached in the late summer and autumn, values begin to recede and with small subsidiary ups and downs the immediate pre-harvest and harvest months reach bottom either in January or in one of the four succeeding months.

Taking India as a whole the extreme range of seasonal variations in the price of rice averages 7.5 per cent, the provinces with the highest and lowest fluctuations being Assam with 9.64 per cent and the Punjab with 2.75 per cent. It is interesting to compare these proportions with wheat in which the average widest seasonal movements covered 13.25 and 5.5 per cent respectively.

## (2) PADDY.

Seasonal variations in the wholesale prices of paddy in the four main rice producing areas of Bengal, Madras, Bihar and Assam, which jointly account for about seven-tenths of the total rice acreage in British India, show a comparatively wider range of highs and lows than is the case with rice. This may be simply explained by the fact that the primary seller of paddy is invariably the cultivator, while the primary seller of rice is the merchant, the miller or the professional dehusker. The average producer has no means of regulating his supplies to the demand and a number of circumstances to which references have already been made compel him to dispose of his paddy in the months immediately following the harvest. On the other hand, the production of rice, or more properly, the conversion of paddy into rice continues over a very large part of the year. Moreover, the processing of paddy into rice and the ultimate disposal of the various products are functions performed by members of the merchant community who possess finance, storage facilities and other aids to balance distribution. The rate of disappearance

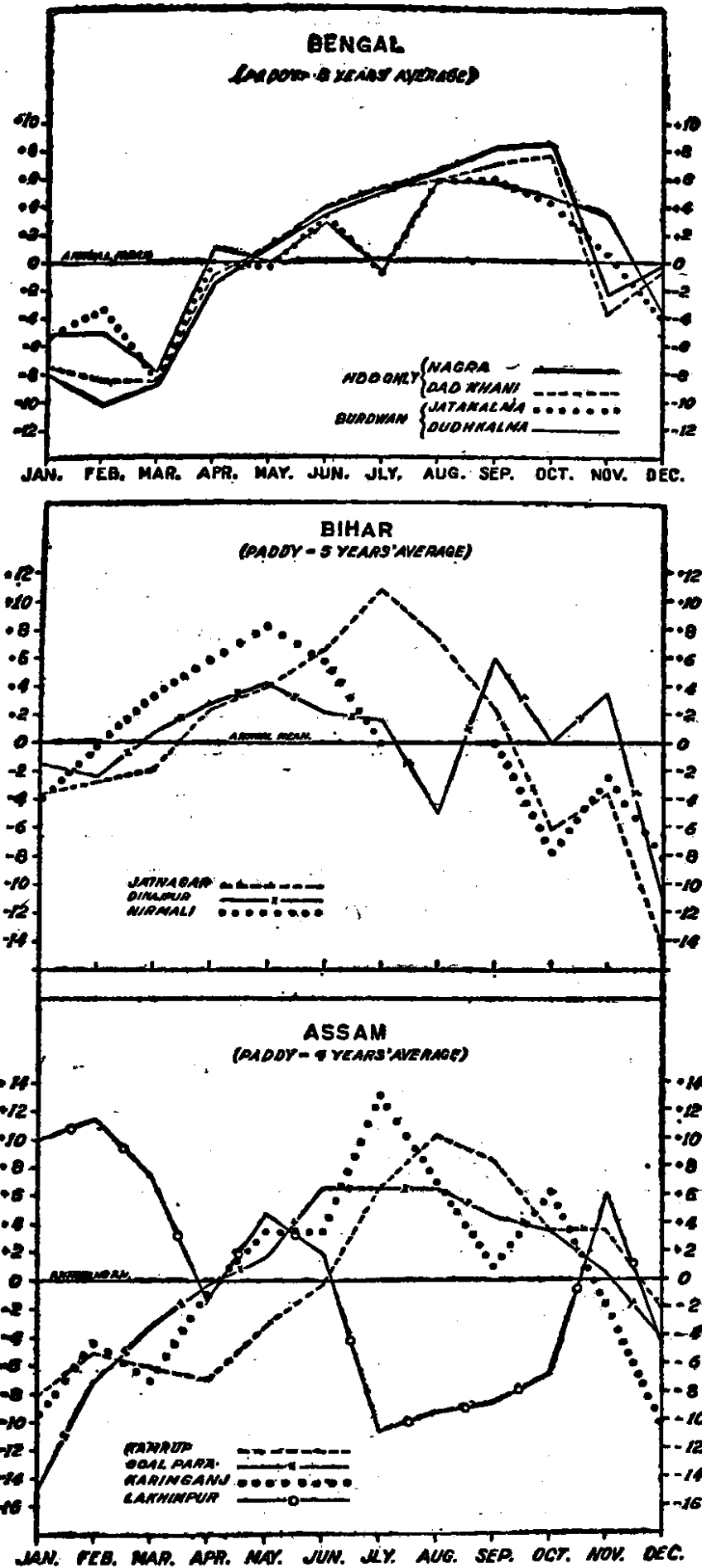
of rice is also on the whole fairly constant throughout the year particularly in the large thickly populated rice growing tracts in which this cereal is the staple food. These factors to a large extent account for the relatively greater stability of rice prices which will at once be apparent from the diagram facing page 151.

**Bengal.**—The four varieties of paddy at two important milling centres which form the basis of the diagram facing this page show the same general seasonality but their fluctuations are quite distinct and separate. The well-known commercial varieties of *Jatakalma* and *Dudhkalma* are seen to be closely associated in their movements but at the same time subject to a good deal of variation. *Nagra* and *Dadkhami*, on the other hand, exhibit fewer month to month variations and are much more stable relatively. The normal seasonal trends as reflected in the harvest and post-harvest fall in prices and the upswing which begins as soon as the pressure of new crop arrivals has spent itself are all in evidence at the two markets taken as representative of Bengal. The year's lows occur in February in the case of *Nagra* and March in the case of *Dadkhami*, *Jatakalma* and *Dudhkalma*. After March the price level rises crossing the annual mean in April and May and remaining well above it, with only one short-term exception, until November. In the average year the peak is reached in September and October. The extreme range of variation amounts to over 18·5 per cent in the *Nagra* variety at Hooghly, while the average works out to 13·5 per cent. The corresponding figure for rice for Calcutta is 8·8 per cent.

**Bihar.**—The diagram facing this page represents the monthly variations in paddy values at the important centres of Dinapur, Jayanagar and Nirmali. It will be observed that on the whole prices move in sympathy with the exception of Dinapur where a sharp rise occurs between August and September, a trend distinctly contrary to the movements of the other two markets. The steep decline which occurs between November and December will be particularly noticed. These are the months in which the bulk of the crop is usually harvested. From January onwards values tend to rise reaching peak level in May at Nirmali and July in Jaynagar, Dinapur attains a subsidiary peak in May but a decline sets in thereafter until August when as already mentioned there is a sharp upswing to an all-season peak in September. The average of these three markets shows the highest price to be attained in July and the lowest in December, representing an extreme range of variation of 17·9 per cent or the equivalent of Re. 0·5·2 per maund as illustrated in the diagram facing this page. This compares with 8·7 per cent or Re. 0·4·6 per maund in the case of rice.

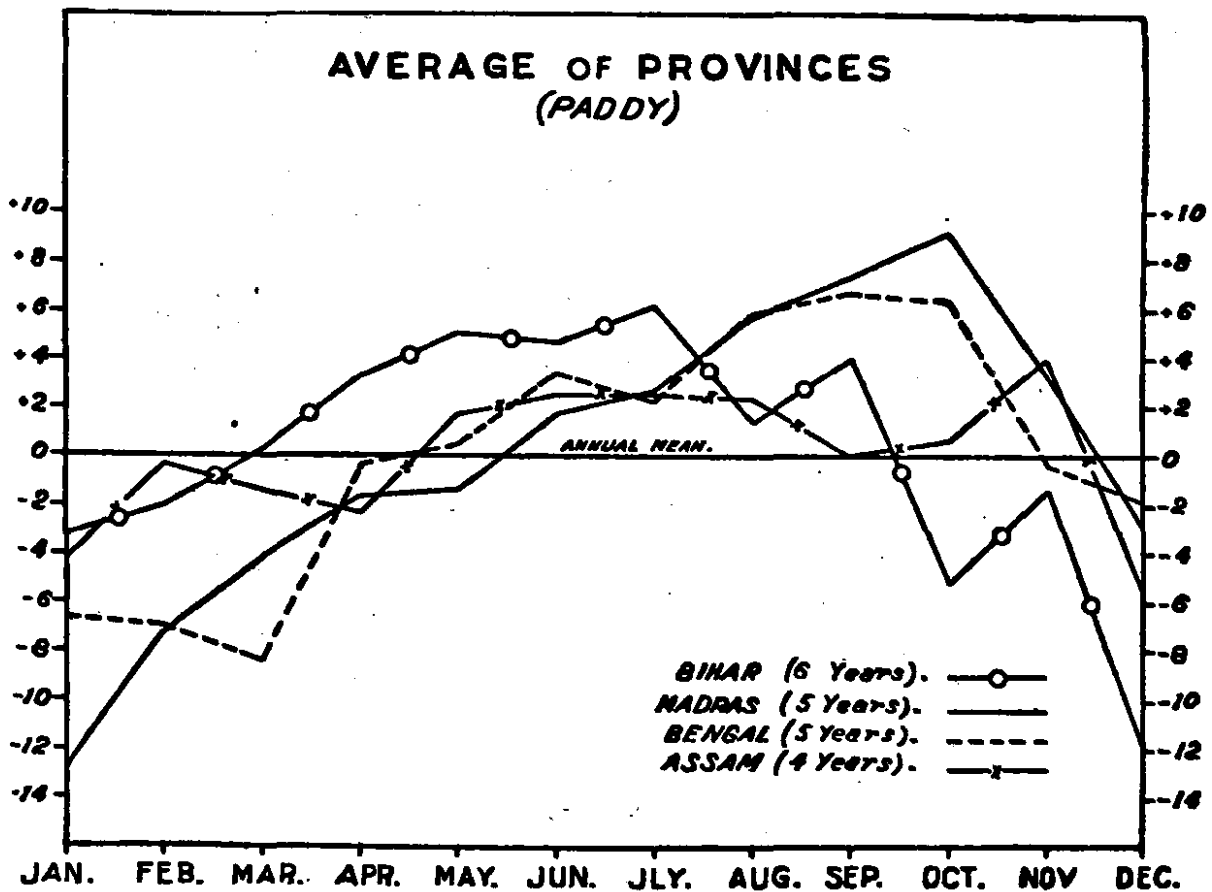
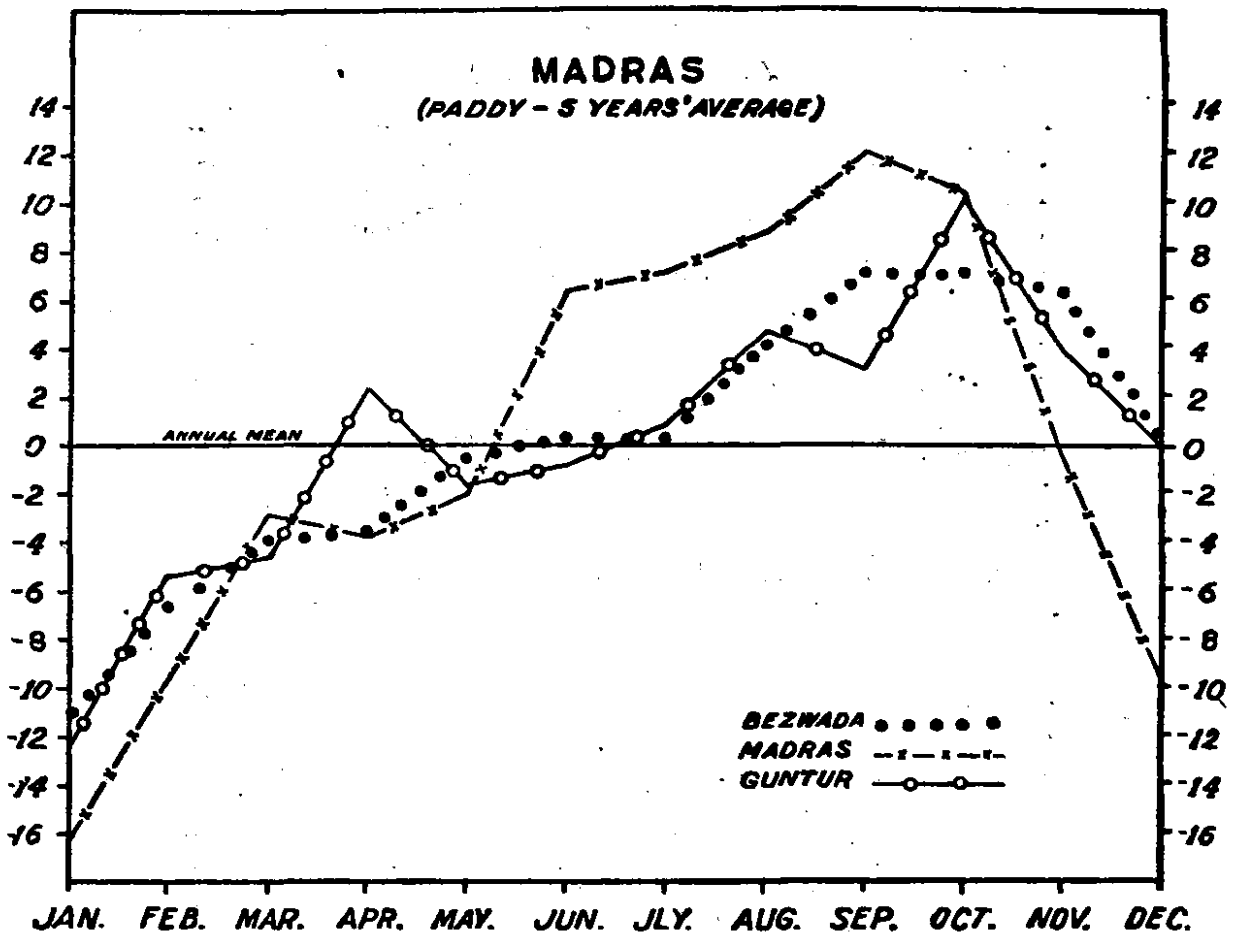
It is interesting to observe that the marked seasonality in arrivals of paddy are reflected in the quotations. An absence of quotations at certain times of the year are due to the fact that paddy marketings are often completely finished by May or June. At Jaynagar, for instance, there were no quotations from July to November in 1934 and 1935, from July to October in 1936 and from July to September in 1933. At Nirmali, another market in the producing area, there were no quotations for paddy from July to September during 1933 to 1938.

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Facing page 153.]

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**Assam.**—The monthly variations in the prices of paddy in four different markets of this province illustrated in the diagram facing page 152 show considerable fluctuations and somewhat conflicting tendencies. To what extent the unreliability of the price data available is responsible must remain a matter of conjecture but part at any rate of the diversity in local price movements is probably due to geographical reasons and the fact that almost the entire production of Assam is consumed within the province. Assam is divided into two great valleys, the larger being Assam valley up which runs the Brahmaputra river and the smaller the Surma valley in Sylhet. Both valleys grow much rice but lie separated by the Garo and Khasi Hills and are to a considerable degree isolated from each other. Consequently values in different markets tend to follow independent courses. At Lakhimpur, for example, over the greater part of the year, the trend differs altogether from those at Kamrup, Goalpara and Karim Ganj; the former falling steeply from February to April and again from May to July at a time when the tendency in the other markets is to rise. After July and August, when the price levels at Kamrup, Goalpara and Karim Ganj fall generally, Lakhimpur rises reaching a subsidiary peak in November.

The average seasonal variations in the price of paddy in the four markets resemble those of rice. From January to April the price level is lower than the annual mean, by 4·2 per cent in January, 0·3 per cent in February, 1·4 per cent in March and 2·3 per cent in April. After April the level rises above the mean excepting for a slight dip in September, probably due to the arrival of the autumn crop and reaches its highest point for the year in November after which it falls sharply. The extreme range of variation occurs between November and December and amounts to 9·4 per cent or Re. 0·2·9 per maund as illustrated in the diagram facing this page. This compares with 9·7 per cent or Re. 0·4·6 per maund in the case of rice.

**Madras.**—The diagram facing this page relates to the prices of coarse paddy at the important centres of Madras, Bezwada and Guntur. On the whole the concordance of movement is fairly marked. It is noteworthy that prices at Madras show an extreme range of variation greater than those of the other two markets—the spread occurring between the high of September and the low of January and amounting to as much as 28·4 per cent or Re. 0·8·6 per maund. On an average, prices touch bottom in January when the level is 12·7 per cent or Re. 0·4·0 per maund below the annual mean. Thereafter a steady rising tendency is in evidence, the annual mean being overpassed between May and June. The upward movement continues reaching its peak in October after which a steep decline occurs, synchronising with the arrivals of the first or winter crop. The extreme range of variation, therefore, takes place between October and January and amounts to 21·8 per cent or about 7 annas per maund as shown in the diagram opposite this page. It is significant that the corresponding figure for rice is only 5·7 per cent or 3 annas per maund.

**Summary.**—The general trend of seasonal movements in the price of paddy in the four principal rice growing provinces is much the same as that of rice with the exception that paddy values show a considerably greater range of variation, as will at once be apparent from the diagram facing this page. While the extreme seasonal fluctuation in respect of rice falls within the limits of 2·7 per cent in the Punjab and 9·6 per cent in Assam with an average of 7·5 per cent that of paddy ranges from 9·4 per cent in Assam to 21·8 per cent in Madras averaging 11·6 per cent. The harvest depression is particularly marked in the case of paddy.

The marked seasonal variations which occur in respect of paddy might, it is suggested, be greatly reduced if it were possible to adjust supplies to demand. A practical solution to the problem would seem to lie in the development of co-operative sales organisations among the actual growers of paddy\*. Complementary to this it would be desirable for such societies to maintain and operate their own milling plant. This would tend to short-circuit the present channels of distribution and given competent organisation would put more money into the pockets of the rice growers themselves. It is fortunate that paddy is subject to little or no deterioration even if stored over long periods. This immunity is due to the protective covering of hard husk which surrounds the rice kernel. Assuming that the paddy has been sufficiently dried for storage, experience has shown that the produce can safely be kept without harm for many months even in very humid conditions.

#### **E.—Prices in different markets.**

Since rice is primarily a local crop in the sense that the greater portion of the produce grown in most tracts is consumed locally or within a comparatively circumscribed area, it might be expected that in the main, prices in different markets show a little or no tendency to move in close sympathy. That this is a fact will be clear from the diagram based on Appendix XLII facing page 155 and from what

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\* It may be of interest to quote some of the observations on this question made in the Report of the Bengal Paddy and Rice Enquiry Committee (1939).

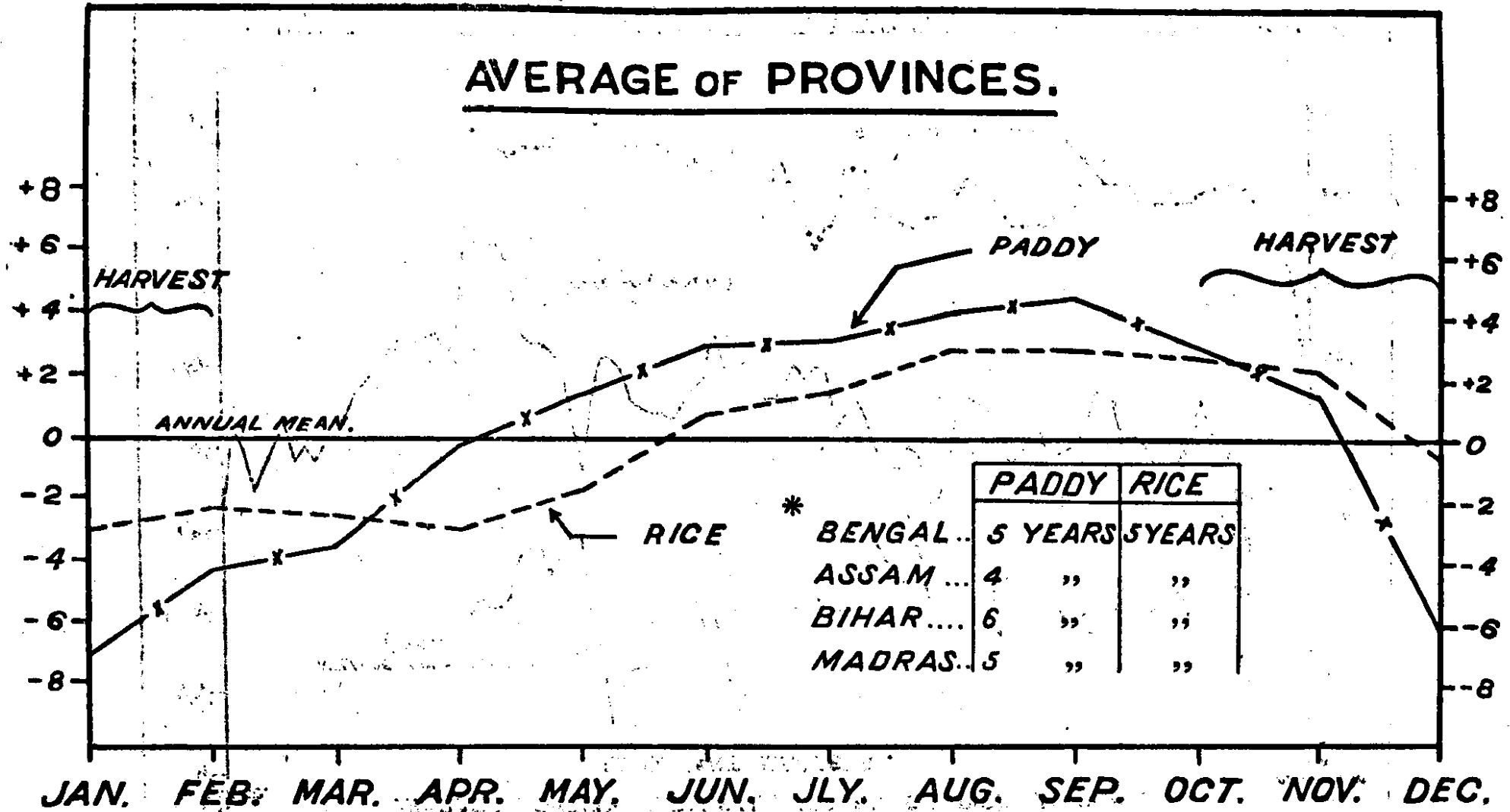
“ The cultivator is obliged to sell his produce immediately after harvest, because he wants cash and cannot hold-up the crop. He has no reserve of financial strength and, therefore, he cannot wait for prices to improve. Any attempt at joint action for the marketing of the growers' produce must take due note of this fundamental weakness in their economic position.

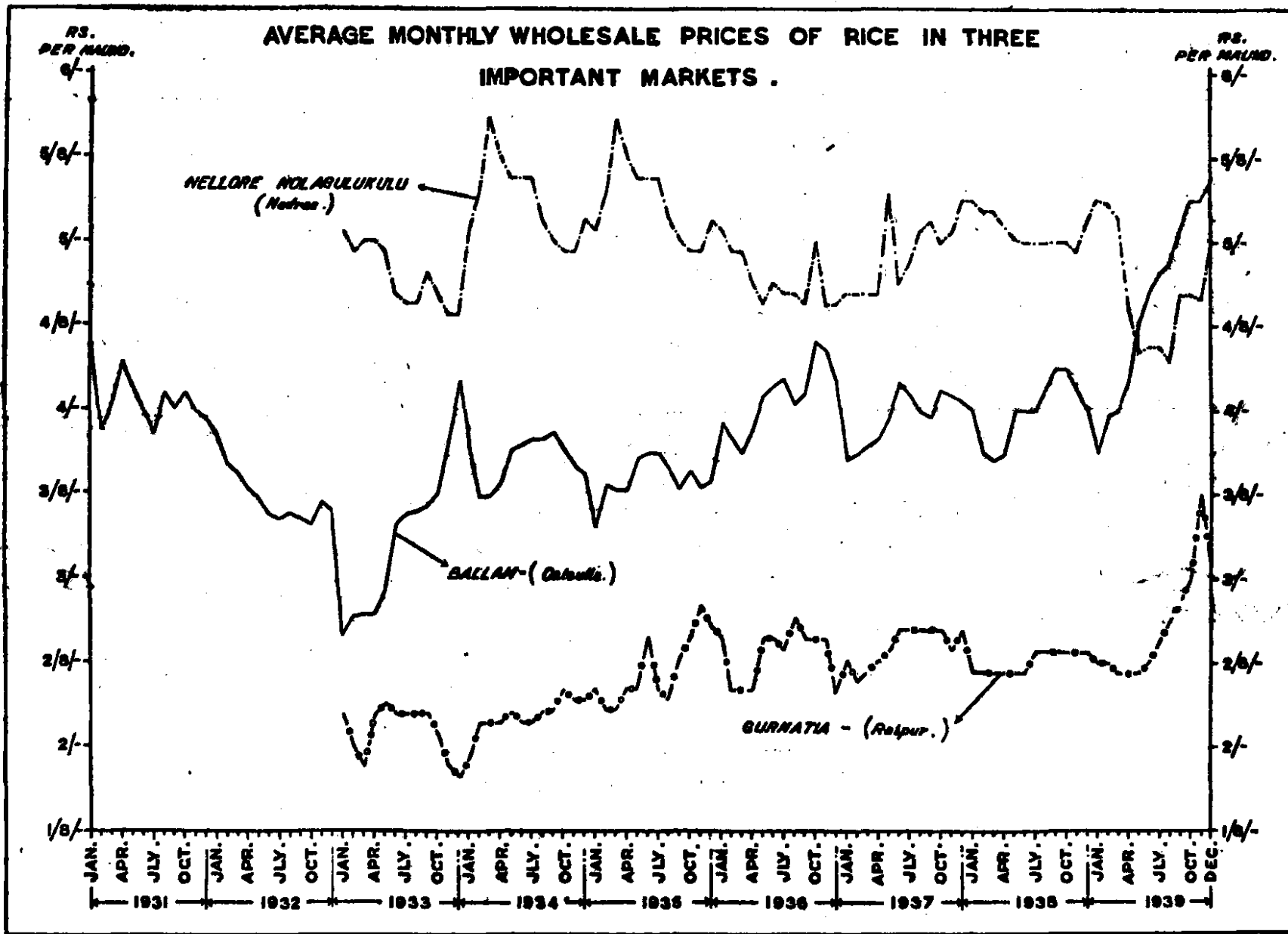
“ Some of the witnesses we examined—generally of the official and the non-official professional classes—suggested the establishment of co-operative purchase and sale societies. It was argued that the only way to increase the competitive strength of the growers was to pool their resources and to market their produce through a co-operative society. On the other hand, the proposal met with very little enthusiasm from the great majority of the growers' representatives and, surprisingly enough, also from the departmental officers. The growers' representatives insisted that, short of almost full payment for their produce, it would not be worth the cultivators' while to market their produce through co-operative societies, whereas the departmental officers complained of the lack of honest and competent co-operative workers and the disloyalty of members.

“ We have carefully considered this question in all its bearings and are inclined to think that the establishment of properly organised co-operative purchase and sale societies at selected centres, for a crop like paddy, offer possibilities which should not be altogether ignored.....”



## AVERAGE OF PROVINCES.





has already been said earlier in this chapter. A comparatively limited number only of the innumerable commercial varieties actually enter the channels of inter-provincial trade and a few examples of the better known of these may be quoted in illustration of the relationship which exists between values in producing and consuming centres.

Normally the price of an article at source or origin should be very closely related to the price at destination allowing for the costs of transportation and other charges incidental to placing the commodity on the market including the merchants' margin of profit. In practice, however, this ideal is seldom attained, the price spreads between any two given points tending to change constantly and sometimes, depend upon market conditions. For instance, the normal or *pro forma* difference between the price of *Basmati* rice at Gujranwala, a well-known milling and distributing centre in the Punjab, and Bombay should be about Rs. 1-12-0 per maund, but this margin is generally greatly exceeded as the following table shows.

*Average annual prices of Basmati rice of Gujranwala and Bombay.*

(Per maund of 82 2/7 lb.)

—		Gujranwala.	Bombay.	Actual difference.	Normal difference.
		Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
1933	.. ..	5 14 2	9 9 0	3 11 8	} 1 12 0
1934	.. ..	5 10 3	9 8 10	3 14 7	
1935	.. ..	6 8 6	9 7 6	2 15 0	

The above statement also reveals that prices at a consuming centre do not necessarily follow closely the market whence supplies are drawn and may in fact show diametrically opposite tendencies as in 1935 when the average price of *Basmati* fell slightly in Bombay but rose by Re. 0-14-3 per maund at Gujranwala.

A point of some significance is borne out by these quotations. The trade in *Basmati* rice is a speciality and owing to the high cost of the product the demand for it is confined to the discriminating and comparatively well-off. In consequence turnover tends to be relatively slow and limited implying the locking up of capital, sometimes for a considerable period. Market risks are also comparatively greater than when handling a commodity with a quick turnover. Thus it is axiomatic that the distributors' margin of profit in such cases must be in proportion to the hazards of the enterprise. The data quoted amply shows that so far as Bombay is concerned the margins earned in the distribution of *Basmati* rice are quite considerable. At Delhi, on the other hand, comparatively larger quantities of this variety are imported and consumed and it might be expected that the price spread would be less when allowance is made for the lower transportation charges from Gujranwala. This is actually the case as shown

by the average annual prices at Gujranwala and Delhi in 1938-39 which were Rs. 5-6-3 and Rs. 6-1-0 per maund respectively. The normal importing charge is about Re. 0-8-6 per maund as compared with an actual spread of Re. 0-10-9.

In contrast to the foregoing the case of an ordinary popular cheap variety such as *Kangni* produced in the neighbourhood of Larkana in Sind may be taken. It will be observed from the following table that the average price spread between source and destination, in this instance Delhi, is very finely cut to the normal difference and in some months even below the cost of transportation alone.

*Average monthly prices of Kangni rice at Larkana and Delhi in 1937.*  
(Per maund of 82 2/7 lb.)

	Larkana.	Delhi.	Actual difference.	Cost of transportation only. (Railway freight).
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
April .. ..	2 14 0	3 10 6	0 12 6	} 0 11 7
May .. ..	2 14 0	3 10 9	0 12 9	
June .. ..	2 13 0	3 10 0	0 13 0	
July .. ..	2 13 0	3 10 0	0 13 0	
August .. ..	3 0 0	3 11 6	0 11 6	
September .. ..	3 0 0	3 10 0	0 10 0	
October .. ..	3 2 0	3 8 7	0 6 7	

The extreme variability in the relationship of prices between markets which are normally in day to day contact is shown in the following example illustrating the values of *Basmati Sela* at Saharanpur and Agra in the United Provinces. The former being a centre of production and the latter of consumption.

*Average monthly prices of Basmati Sela at Saharanpur and Agra in 1934-35.*

	Saharanpur.	Agra.	Actual difference.	Normal difference.
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
April .. ..	4 15 10	6 0 9	1 0 11	} 0 11 0
May .. ..	5 6 6	5 15 9	0 9 3	
June .. ..	5 12 11	5 14 10	0 1 11	
July .. ..	5 8 10	5 14 4	0 5 6	
August .. ..	5 11 0	5 15 3	0 4 3	
September .. ..	5 7 4	5 12 10	0 5 6	
October .. ..	5 5 4	5 13 10	0 8 6	
November .. ..	5 2 7	5 15 9	0 13 2	
December .. ..	5 3 11	6 7 0	1 3 1	
January .. ..	5 5 4	6 9 8	1 4 4	
February .. ..	5 13 8	6 0 9	0 3 1	
March .. ..	5 10 4	5 15 6	0 5 2	

During the twelve months period recorded above, it will be observed that the difference in price varied between the remarkably wide limits of Re. 0-1-11 per maund in June to Rs. 1-4-4 in the following January, the average working out at Re. 0-9-5 or some Re. 0-1-7 below the normal cost of delivering rice from Saharanpur to Agra.

An interesting contrast in some respects is furnished by an example in the Madras Presidency, the rice in question being the popular medium priced *Molagolukulu* of Nellore and the markets, Nellore, Madras and Coimbatore. The following table shows the average monthly prices at these three centres in 1934.

*Average monthly prices of Molagolukulu rice at Nellore, Madras and Coimbatore in 1934.*

	Nellore.	Madras.	Coimbatore.	Difference between	
				Nellore and Madras.	Nellore and Coimbatore.
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
January .. ..	3 5 0	4 8 0	5 3 0	1 3 0	1 14 0
February .. ..	3 5 0	4 7 6	5 1 0	1 2 6	1 12 0
March .. ..	3 5 0	4 5 7	5 0 0	1 0 7	1 11 0
April .. ..	3 5 0	4 4 9	5 2 0	0 15 9	1 13 0
May .. ..	3 5 0	4 4 9	5 1 0	0 15 9	1 12 0
June .. ..	3 4 0	4 4 9	5 1 0	1 0 9	1 13 0
July .. ..	3 4 0	4 8 0	4 15 0	1 4 0	1 11 0
August .. ..	3 4 0	4 8 0	5 1 0	1 4 0	1 13 0
September .. ..	3 10 0	4 12 9	5 3 0	1 2 9	1 9 0
October .. ..	3 5 0	5 9 6	5 6 0	1 4 6	1 1 0
November .. ..	4 0 0	5 4 9	5 5 0	1 4 9	1 5 0
December .. ..	4 5 0	5 9 6	5 6 0	1 4 6	1 1 0
Average .. ..	3 8 9	4 11 4	5 2 4	1 2 7	1 9 7
		Normal difference		1 1 0	1 9 0

In both instances the normal cost of placing rice in Madras and Coimbatore at the time, which was Rs. 1-1-0 and Rs. 1-9-0 respectively, closely approximated the average difference between the quotations prevailing at Nellore and the two consuming centres; monthly variations were more pronounced at Coimbatore than at Madras and on three occasions were much below parity at the former market. The actual range of monthly price differences between Nellore and Madras was within the limits of Re. 0-15-9 and Rs. 1-4-9 per maund at the

former centre as compared with Rs. 1-1-0 and Rs. 1-14-0 in Coimbatore.

The widely differing conditions of which a few instances have been quoted are apart from market influences due primarily to lack of co-ordination between markets arising from the absence of recognised standard of quality and the complexities of consumer preference as reflected in the varying degrees of importance attached to quality factors in different parts of the country.

#### F.—Price differences in respect of quality.

##### (1) RICE.

The price of rice does not depend only on market conditions. Differences in type or variety and grade or quality are also important factors. Any consideration of price differences arising from quality must, therefore, take account of several elements such as the existence of a very large number of varieties, each having its own distinctive physical feature and the absence of any form of standardised practice in regard to parboiling, hulling and grading. For example, each of the three main categories into which Indian rices have been classified on the basis of conformation or grain size (fine, medium and bold or coarse) contain not one but many types possessing dissimilar characteristics and different price ranges. A particular type may be put on the market either as hand-pounded or machine-milled product and each in turn may be raw or parboiled. In certain markets price differences are associated with colour artificially applied, or as in Bengal and parts of Orissa, induced in the parboiling process by lengthening the time of steaming. Age or maturity in fine and medium rices, mainly of the raw category, is another important criterion of value. Finally, the price of any variety of rice is assessed in accordance with the estimated content of broken and damaged grains, red grains, chalky and weevilled grains, admixture of other varieties, all of which are liable to vary within the widest limits. So numerous are these factors that it will be recalled anything up to 200 different quotations are generally available in a single large consuming and distributing centre, such as Calcutta or Bombay for the 40 to 50 distinctly separate varieties of rice normally handled in each of those markets. Defective price records are also responsible for inaccuracies and inconsistencies in the relationships between various types and qualities of rice. In the circumstances it would be futile to essay a detailed and comprehensive price analysis of a large number of varieties and the best that can be done is to select some of the better known trade descriptions and generalise on the basis of the data obtained in connection therewith. It will be appreciated that the discussion which follows does not and cannot cover every extreme case. For example, the maximum difference between raw and parboiled rices deriving from the same variety of fine paddy was found to be usually in the neighbourhood of 8 to 10 annas per maund and occurred in the Central Provinces, Bombay, Hyderabad and Mysore but this by no means precludes the possibility of even wider differences in one or two instances in the same or other areas. Certain broad conclusions, however, clearly emerge from the data gathered

during the course of this survey and these for convenience are discussed under the following main quality factors.

- (a) Price differences between fine, medium and bold rices.
- (b) Price differences between raw and parboiled rices.
- (c) Price differences between machine-milled and hand-pounded rices.
- (d) Price differences arising from variations in grade or quality.
- (e) Price differences arising from age or maturity.
- (f) Price differences between natural tinted and coloured rices.

(a) *Fine, medium and bold (or coarse) rices.*—It will have been obvious from the previous chapters that speaking generally fine rices are relatively costly, the bold or coarse varieties cheap and the medium ones of intermediate value. Some idea of the relationship existing between typical rices of each major group at various important centres will be obtained from Appendix XLI. It will, for example, be seen that while the general principle holds good at every centre, there are wide divergencies between the relative values of rices in the three main categories in different areas. The most striking of these occur in Northern India, in the United Provinces and the Punjab and in Bombay where the examples cited in Appendix XLI show fine rice to be on an average about double the price of bold. In the Central Provinces and Sind the price differences between fine and bold rices are also considerable, the former ranging from 55 to 71 per cent dearer than the latter. The reason for this lies in the fact that the fine rices forming the basis of comparison consist in the main of the highly priced scented varieties practically all of which are marketed after careful sifting and dressing so as to contain as low a proportion of broken grains as possible. This last factor greatly adds to the cost and the rice has to be sold at a sufficiently high rate to compensate for the relatively lower prices realised from the sale of broken grains extracted from it.

On the other hand, the differences in price between fine and bold rices in Madras are remarkably small as compared with other provinces. This is difficult to explain but is probably due to the fact that none of the fine rices of this province appear to possess the characteristic of fragrance which is so highly esteemed throughout Northern India and in many of the central and western parts of the country. At Bezwada in Guntur the price of a typical local fine variety (*Venkasanali*) was found on an average to be only 11 per cent higher than that of an equally representative bold variety (*Kusuma*), while at Ellore in West Godavari the average premium for the fine *Khichili Samba* over the bold *Konamani* was about 16 per cent.

The price relationship existing between medium rices and those of the fine and bold categories is also highly variable and in the examples quoted in Appendix XLI ranges from 9 per cent above the latter at Cuttack in Orissa to 33 per cent at Etawah in the United Provinces and from 12 per cent below the former at Muzaffarpur and Dinapur in Bihar to as much as 77 per cent in Bombay.

Another factor which is constantly altering the relationship between fine, medium and bold varieties is that the trade descriptions included in the three categories are liable to fluctuate independently of each other in accordance with the dictates of local supply and demand. One example may suffice as an illustration. The diagram facing this page, in which the percentage deviations of average monthly prices of *Basmati* (fine) and *Jhona* (bold) from their annual mean at Gujranwala (Punjab) are shown, reveals some significant divergencies between the relative price levels of these two popular varieties in the same market. Apart from the fact that *Basmati* has an extreme range of variation of some 10·7 per cent between the highs and lows of the year against *Jhona's* 4·5 per cent, opposite tendencies occur in a number of months as, for example, between February and March, March and April, and October to December.

Another example showing the variability of the price relationship between different rices is given in the following table from which it will be observed that over a term of years the price of fine rice as represented by the *Basmati* variety has ranged from 160 per cent to 182 per cent of the price of the medium *Sone*.

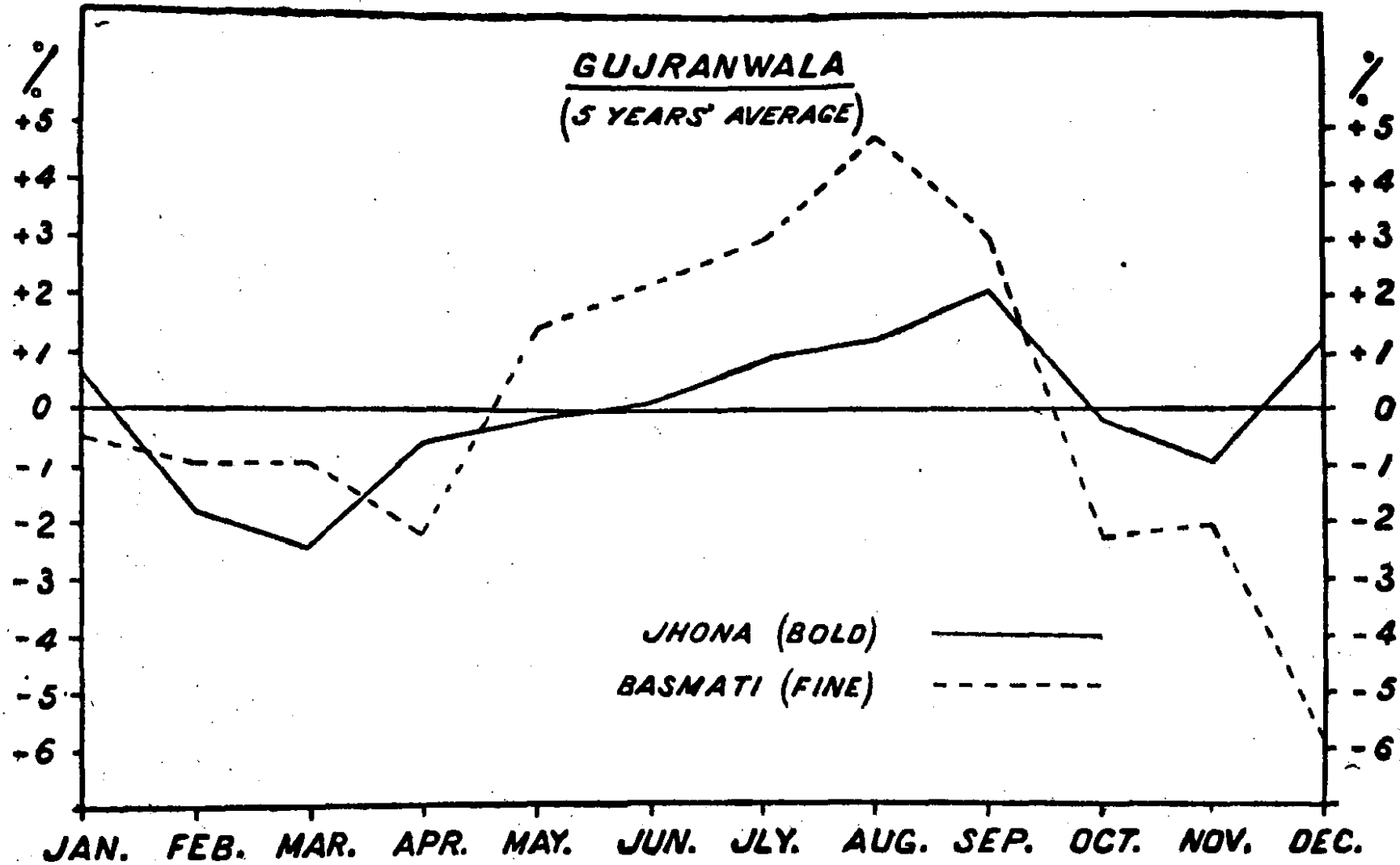
*Average annual prices of Basmati (fine) and Sone (medium) rices at Gujranwala.*

	Actual prices.		Percentage relationship. (Sone=100).
	Basmati.	Sone.	Basmati.
	Rs. A. P.	Rs. A. P.	
1931 .. ..	7 7 3	4 4 7	174
1932 .. ..	7 6 1	4 1 0	182
1933 .. ..	5 14 2	3 11 8	158
1934 .. ..	5 10 3	3 8 4	160
1935 .. ..	6 8 3	4 0 11	160

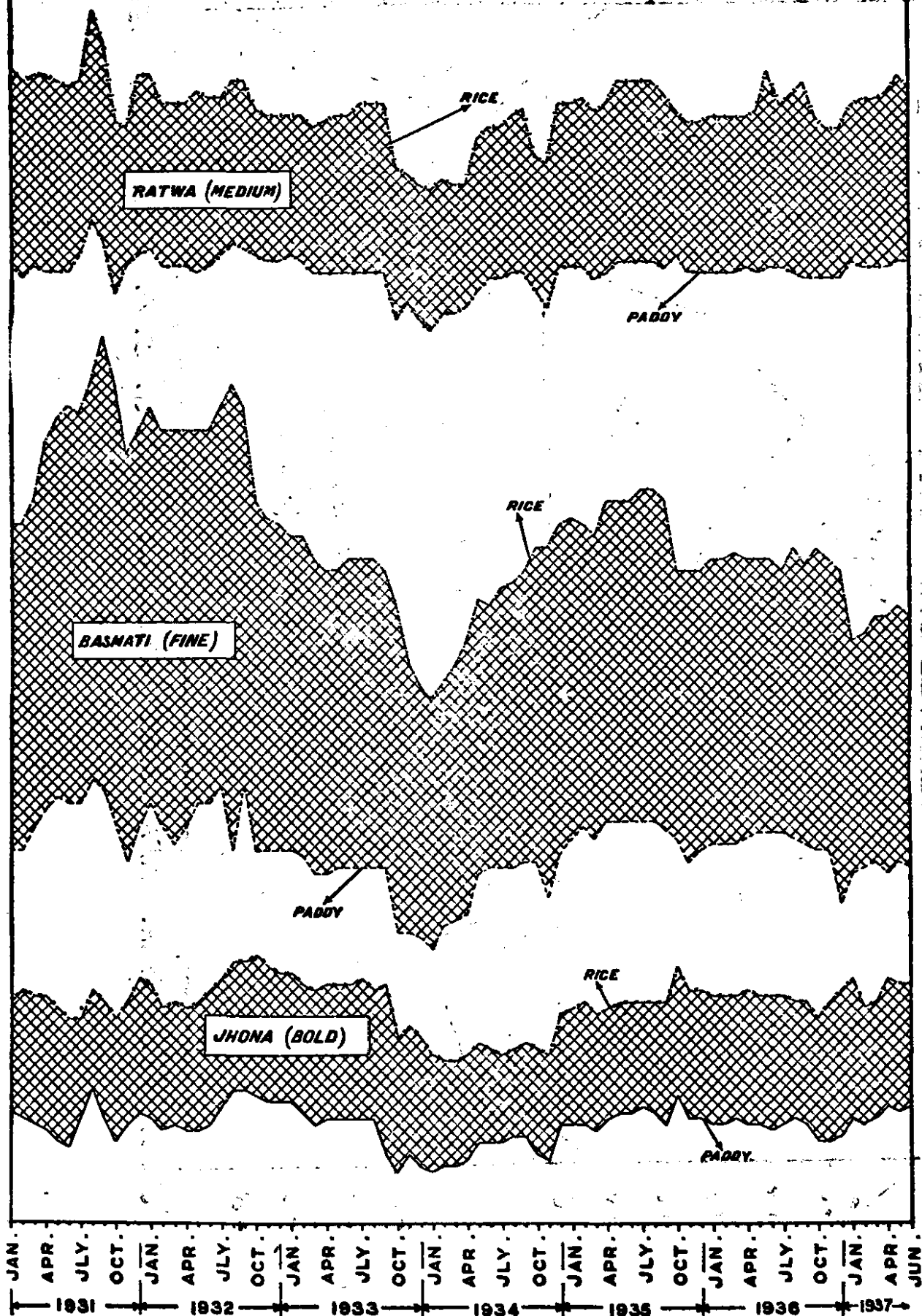
For these reasons the data given in Appendix XLI must on no account be regarded as fixed or absolute measures of the inter-relationship existing between the three main classes of rice in different areas but as an approximate indication only subject to wide variation. The trade descriptions quoted amount to an insignificant proportion of the many hundreds of such varieties, each having its own price level and, in addition, an intermediate range of values reflecting variations in grade or quality caused by physical factors such as broken grains, colour, polish, etc.

(b) *Raw and parboiled rices.*—In considering the relative values of these two types it is important to compare only those qualities which are produced from the same variety of paddy. If this is done it will be found that parboiled rices are generally cheaper than their raw prototypes. This is primarily due to the fact that the parboiling





### VARIATIONS IN THE PRICE RELATIONSHIP BETWEEN PADDY & RICE IN THE PUNJAB



treatment by toughening the kernel reduces breakage in hulling and gives a higher outturn of whole rice. The better cash returns thus obtained more than offset the additional cost of parboiling.

The comparative cheapness of the great bulk of parboiled rices is also due to the fact that they consist largely of the low-priced bold varieties. A very rough estimate, for example, would place the constitution of the 15.3 million tons of parboiled rice annually produced in India as approximately 9.2 million tons comprising bold variety, 4.8 millions medium and only 1.3 million tons fine.

Paddy which is not properly dried after harvesting and is, therefore, likely to contain a large proportion of kernels liable to fracture on hulling also sells cheaper, sometimes by as much as 5 annas per maund than produce which has received careful post-harvest treatment. Such paddy is often parboiled to minimise breakage and the low price at which it originally changes hands is reflected in the eventual value of the rice manufactured from it.

The price differences between raw and parboiled rices are also subject to constant variation and the only conclusion which an examination of the available data supports is that the differences are greatest in the more costly rices and least in the cheaper varieties. For example, in the Punjab parboiled rices of the fine and medium categories are found normally to vary between 6 and 8 annas per maund below their raw counterparts, while in the case of bold rices the differences range from 2 to 4 annas.

Similar conditions prevail in the United Provinces where parboiled fine rices generally sell at some Re. 0-8-0 per maund cheaper than their corresponding raw qualities and medium and bold varieties about 2 annas. The following quotations prevailing in January 1939 may be regarded as representative.

Market.	Trade description.	Price per maund of raw rice.	Price per maund of parboiled rice.	Difference per maund.
		Rs. A. P.	Rs. A. P.	Rs. A. P.
Saharanpur ..	Basmati (fine)	6 0 0	5 8 0	0 8 0
Balrampur ..	Didai (medium).	3 2 0	3 0 0	0 2 0

In the Madras Presidency, where the price distinctions between the fine and bold varieties are not so marked as in many other rice growing tracts, parboiled rices ordinarily sell about 4 annas per maund cheaper than the raw counterparts, although in the case of the cheapest bold varieties the difference may be as low as one anna.

In Sind the only variety of paddy converted into both raw and parboiled rice is the well-known *Kangni*. The minimum and maximum price differences between the two qualities of rice are known to have ranged from two annas and to as much as nine annas per maund

respectively during the three years ending 1936-37, the most frequently recurring spread being 5 and 6 annas. Having regard to the class of paddy this difference is unusually high and may be due to the relatively poor recovery of whole kernels from untreated paddy as compared with the parboiled article.

In Bengal only a few varieties of paddy are converted into both raw and parboiled rices. A good example is that of *Patnai* paddy which is converted into the *Seeta* (raw, hand-pounded) and boiled *Patnai* qualities. The following table shows the monthly average prices, the average price difference and the maximum and minimum differences during each month in 1939 based on weekly quotations.

	Seeta.	Patna (boiled).	Average price difference.	Maximum price difference.	Minimum price difference.
January .. ..	3 15 9	3 12 0	0 3 9	0 4 0 (5.7%)	0 3 0 (4.9%)
February .. ..	3 15 6	3 10 4	0 5 2	0 5 6 (8.6,,)	0 4 0 (6.5,,)
March .. ..	3 14 2	3 10 6	0 3 8	0 5 6 (8.5,,)	0 3 6 (5.7,,)
April .. ..	4 3 0	3 15 8	0 3 4	0 5 0 (7.1,,)	0 2 6 (3.8,,)
May .. ..	4 10 0	4 1 0	0 9 0	0 11 0 (14.5,,)	0 5 0 (7.1,,)
June .. ..	4 12 9	3 15 3	0 13 6	0 14 0 (18.2,,)	0 11 0 (14.5,,)
July .. ..	4 11 6	3 13 9	0 13 9	0 14 0 (18.2,,)	0 12 6 (16.9,,)
August .. ..	4 11 6	3 15 3	0 12 3	0 12 6 (16.9,,)	0 12 0 (15.8,,)
September ..	5 3 7	4 9 0	0 10 7	0 12 0 (15.4,,)	0 10 0 (11.9,,)
October .. ..	5 8 0	4 13 0	0 11 0	0 11 0 (12.5,,)	0 11 0 (12.5,,)
November.. ..	5 4 0	4 8 0	0 12 0	0 12 0 (14.3,,)	0 12 0 (14.3,,)
December .. ..	5 4 0	4 9 0	0 11 0	0 11 0 (13.1,,)	0 11 0 (13.1,,)

It will be observed that the average monthly differences have ranged from Re. 0-3-4 to Re. 0-13-9 per maund with a minimum of Re. 0-2-6 in April and a maximum of 14 annas in June and July.

In other areas instances of comparable qualities of raw and parboiled rices are rare owing to the fact in some tracts such as Bihar, Orissa, etc., the great bulk of the local production is marketed in parboiled form and there is comparatively little trade in raw rices. Other regions, such as the Bombay Presidency, the Central Provinces and the States of Hyderabad and Mysore are notable mainly for raw rices. Whatever evidence was available from these tracts also confirmed that parboiled rices are cheaper than raw rices, by an average of from 8 to 10 annas in respect of fine and medium rices and anything from 1 to 6 annas for the bold category.

(c) *Hand-pounded and machine-milled rices.*—Hand-husked and machine-milled qualities deriving from the same variety of paddy are not available everywhere. For example, no hand-pounded rice whatever appears to be put on the market in the Punjab, Sind and the North-West Frontier Province. Consequently price comparisons

between these two qualities cannot be made in respect of this large area. There is a considerable trade in hand-pounded rices in Bengal, Bihar, Orissa, the United Provinces and Madras, while relatively small quantities are marketed in the Central Provinces and Bombay.

Observations made during this survey confirm that while hand-pounded rices are generally dearer than machine-milled in the fine and medium categories, with the possible exception of some of the medium varieties marketed in Bengal, this does not always apply to the bold rices. It was found for example that small premiums were quoted in favour of the hand-pounded types of bold rices in some markets whereas in others there was either no material disparity between the values of the two qualities or the difference favoured the machine-milled product.

Where hand-pounded rices are rated higher than their machine-milled counterparts the difference is partly accountable for by the extra cost of manual labour involved. The fine rices in particular are carefully sifted, frequently by the slow and tedious winnowing tray method which adds to the cost of production. There are, however, other important factors which in large measure account for the relatively high premiums obtained for fine and medium hand-pounded rices and for the discounts at which bold hand-husked descriptions are often sold. Many of the finer varieties possess certain physical characteristics such as translucency and hard kernel structure which stands up well to manual treatment and compare very favourably with the machine-milled product. In contrast, the grains of many of the bold varieties are, it will be recalled, soft and unattractive in appearance, often containing a fair admixture of kernels covered with red cuticle which is generally regarded as objectionable. Rices of this type tend to break up more in hand-pounding and since a much whiter and better looking article can be produced by machine-milling the hand-husked bold rices are at a disadvantage and generally sell at cheaper rates.

At Saharanpur, in the United Provinces, one of the best known markets for high grade produce, hand-pounded versions of fine types such as *Basmati* usually carry a premium of about 12 annas per maund over their machine-milled counterparts. In most of the other important rice centres in this province, the medium varieties and a few of the bold showed differences in favour of the hand-husked product ranging from about 2 annas to 4 annas per maund, the bolder varieties having the lower premiums. Very coarse chalky types like *Sathi* are priced identically both for the hand-pounded and machine-milled qualities.

In Bihar and Orissa, where quotations are only available in respect of parboiled types of both hand-pounded and machine-milled qualities belonging to the fine, medium and bold categories, it was found that the price of the former exceeded that of the latter generally by Re. 0-1-6 to 2 annas per maund and occasionally by 3 to 4 annas per maund in the case of fine and medium descriptions. The relationship is, however, reversed in the rices of the bold group, the differences being always in favour of the machine-milled product, usually varying between 2 annas and Re. 0-2-6 per maund but sometimes even as high as 7 or 8 annas.

In Bengal, hand-husked fine rices generally sell at a premium of two to four annas per maund over their machine-milled prototypes. Hand-pounded medium and bold varieties on the other hand show a discount of 4 to 8 annas per maund as compared with the machine-milled. The premiums obtainable in respect of fine hand-husked rices are usually somewhat higher during the monsoon owing to the contraction of supplies of milled rice due to the difficulty of drying large quantities of paddy before hulling.

In the Madras Presidency, the difference normally favouring hand-pounded rice lies between 8 annas and 10 annas per maund, while in Bombay the popular *Ambemohar*, a fine rice, produced both in the hand-husked and machine-milled forms, is generally sold at a premium of 12 annas per maund, if marketed in the former state. In the Central Provinces, hand-pounded bold rices are about 1 anna per maund dearer than their machine-milled counterparts, while the difference may be as much as 6 to 8 annas per maund in the fine and medium varieties.

(d) *Variations in grade or quality arising from impurity content, presence of broken grains, etc.*—With the exception of a number of grade specifications laid down comparatively recently under the provisions of the Agricultural Produce (Grading and Marking) Act, 1937, in respect of certain specified varieties of rice (see chapter VI), no generally accepted standards of quality are recognised in respect of Indian rices. A comparatively small number of establishments, mills and traders have their own private trade marks or brands which may be distinguished by fanciful names or series of numbers such as 1, 1½, 1¼, etc., but the qualities represented by these symbols are nowhere related and may in fact change from season to season according to the selling policy of the firms concerned. It is also not the custom in India actually to analyse samples of rice (or paddy) by separating out and determining the various component parts such as broken grains, fragments, damaged grains, etc., in the same way as is done for wheat and other food grains as well as oilseeds. Standard contracts such as exist for most of these commodities in important markets, and notably at the terminals of Bombay, Calcutta and Karachi, are conspicuous by their absence in the rice trade. The basis for judging quality differs according to trade usage and the variety of rice. For instance, broken grains and fragments are generally regarded as of the first importance in assessing the value of raw rices, while the proportion of red grains present is often the chief criterion for an evaluation of parboiled types. Colour and polish may be stressed in one area and regarded as of only secondary importance in another, while fragrance or aroma are not everywhere appreciated. The presence of weevilled grains lowers the value of rice in some tracts but in others, provided the number of weevilled kernels is not unduly large, it enhances the price on account of its being an indication of age or maturity, a most desirable characteristic in fine rices.

The following quotations at three important markets in the United Provinces relating to the year 1934-35 and based on the average annual prices of that period indicate that the difference between the highest and the lowest grades of fine rices normally varies from Re. 0-11-6 to Rs. 1-4-6 per maund, the corresponding

spreads in respect of medium and bold qualities being Re. 0-6-6 and Re. 0-1-9 to Re. 0-3-3 per maund respectively.

*Price differences between different qualities of rice in the United Provinces.*

(Per maund).

Market.	Trade description.	Highest quality.	Lowest quality.	Difference.	Proportion to value of the highest quality.
		Rs. A. P.	Rs. A. P.	Rs. A. P.	Per cent.
Saharanpur ..	Basmati (fine) ..	5 8 3	4 12 9	0 11 6	13·0
Do. ..	Ramajwain (medium)	4 4 0	3 11 6	0 8 6	12·5
Etawah ..	Hansraj (fine) ..	5 11 6	4 7 0	1 4 6	22·4
Do. ..	Pahari (bold) ..	3 1 3	2 15 0	0 2 3	4·6
Naugarh ..	Anji (medium) ..	4 6 6	4 3 3	0 3 3	4·6
Do. ..	Rambhog (medium)	3 5 0	3 3 3	0 1 9	3·3

The costliest fine scented rices such as *Basmati* may in large consuming centres be rated at more than double the price of the lowest grade of the same variety. For example, in Delhi at the end of August 1940, the best available *Dehra Dun Basmati* was quoted at Rs. 19-8-0 per maund wholesale (Rs. 20-0-0 retail) whereas the cheapest grade of this variety was offered at Rs. 7-12-0 per maund wholesale (Rs. 8-0-0 retail). What proportion of this difference may be attributed to age or maturity cannot be stated as it is not possible to isolate the effect on prices of each quality factor. From a casual examination of the samples, however, the dearest quality appeared to consist of even running uniform slender grains and had the characteristic fragrance of *Basmati* in a marked degree. It had also that dark pearly translucence indicative of age. The cheapest was of lighter colour and contained a certain proportion of broken grains and a few grains of other varieties (mostly *Ramajwain*).

In the same period at Delhi the medium variety *Begami* was priced Rs. 5-8-0 per maund wholesale for its best quality (Rs. 5-11-6 retail) and Rs. 4-12-0 for the lowest grade (Rs. 5-0-0 retail), the differences here appeared mainly to be due to broken grains.

In the Punjab markets the difference between the dearest and the cheapest *Basmati* rices seems to range between 12 annas and Re. 1-0-0 per maund. At Lahore, for example, the price of first and second grade *Basmaties* during 1935 averaged Rs. 6-8-0 and Rs. 5-12-0 per maund respectively. At other centres such as Gujranwala and Amritsar, the difference varied from 12 annas to 14 annas and in a few cases was found to be Rs. 1-2-0 per maund.

In Sind, the highest and lowest grades of the fine *Sugdasi* rice usually show a difference of about Re. 1-0-0 per maund while the corresponding difference in the case of the bold *Kangni* varies from roughly 8 to about 12 annas.

In the Bombay Presidency, price differences caused by variations in quality were found to exist mainly in respect of the superior varieties. An examination was made in March, 1939, of the values of *Kolamba* (fine) rice at Kalyan as part of a special enquiry. It was ascertained that on the day the investigation was made the highest grade was quoted *ex-mill* at Rs. 5-10-0 and the lowest at Rs. 4-6-0 a difference of Rs. 1-4-0 per maund. On other occasions, it was observed that when the best grade of *Kolamba* was offered at Rs. 5-0-0 per maund, the inferior grades were selling at Rs. 4-2-0 to Rs. 4-4-0 per maund, an average difference of 13 annas or 16 per cent. Similarly at Poona, if the highest grade of *Rajawal* (fine) be quoted at Rs. 5-0-0 per maund, the lowest will ordinarily fetch Rs. 4-0-0 or 20 per cent less.

The differences between the prices of high and low grade qualities of the same variety in the Central Provinces may be gauged from the following typical quotations taken at the important market of Raipur in September 1935.

Variety.	Highest quality.	Lowest quality.	Difference.	Percentage of value of the highest grade.
	Rs. A. P.	Rs. A. P.	Rs. A. P.	
Baspatri (fine) ..	4 8 0	3 12 0	0 12 0	16.7
Hansa (medium) ..	2 14 0	2 10 0	0 4 0	8.7
Gurmatia (bold) ..	2 10 0	2 7 0	0 3 0	7.1

In Bengal markets, the range of price differences in three typical centres was found to vary from 10 annas to Re. 1 per maund in the case of fine rices and somewhat less in respect of the ordinary varieties as will be seen from the following table.

Name of market.	Variety.	Average price per maund*.		Difference.	Percentage of value of the highest grade.
		Highest quality.	Lowest quality.		
		Rs. A. P.	Rs. A. P.	Rs. A. P.	
Nadia (Krishnagar)	Kataribhog (fine)	7 0 0	6 0 0	1 0 0	14.3
Do.	Banktulasi (medium-fine)	5 4 0	4 10 0	0 10 0	11.9
Do.	Ballam (medium)	4 12 0	4 4 0	0 8 0	10.5
Do.	Kalma (medium)	4 8 0	4 2 0	0 6 0	8.3
Do.	Nagra (medium)	3 12 0	3 4 0	0 8 0	13.3
Jessore ..	Ballam (medium)	3 12 0	3 2 0	0 10 0	16.7
Dacca ..	Do.	3 12 0	3 4 0	0 8 0	13.3

\*Values at Nadia and Dacca are based on data covering the calendar year 1934 and those at Jessore for the fiscal year 1934-35.



To summarise, therefore, it would appear that price differences arising from variations in grade or quality generally range between roughly 10 annas and Rs. 1-4-0 per maund or 12 and 22 per cent as regards rices in the fine category and from about 2 to approximately 8 annas per maund in respect of the medium and bold descriptions.

It may, however, be observed that while there must in theory exist some kind of association, however loosely defined and variable between grade or quality and price, it was found in a number of instances during this survey that a close degree of relationship could not be established between the quoted price and quality as reflected by the actual physical analysis of the produce. This will be readily apparent from the table below giving the results of analysis of four samples of two different lots of the same variety ; one lot being quoted at Rs. 6 per maund and the other at Rs. 6-6-0.

	Broken grains.	Frag-ments.	Other varieties including red grains.	Under-milled grain.	Total.	Price per maund.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Rs. A. P.
<i>Hansraj.</i>						
Lot (1) .. {						6 0 0.
(a) 6.0	3.2	3.2	2.0	14.4		
(b) 11.5	10.6	1.5	..	23.6		
<i>Hansraj.</i>						
Lot (2) .. {						6 6 0
(a) 3.2	0.55	3.0	0.70	7.45		
(b) 7.45	1.8	4.7	0.55	14.5		

*Note.*—The above proportions are based on the total weight of the sample.

One of the Rs. 6 per maund samples [1 (b)] obviously justifies its relatively lower price as it contains a fair amount of broken grains in addition to a high proportion of fragments. The other, however, [1 (a)], although comparing favourably on the whole with Lot 2 (b) is nevertheless 6 annas per maund or some 6 per cent cheaper. The explanation may lie in the fact that the somewhat higher content of fragments and under-milled grains detracted from the general appearance of the former and thus reduced its value. Another actual instance relating to the *Patnai* variety showed that a sample containing an admixture of 21.7 per cent of other varieties and 4.05 per cent broken grains was valued at Rs. 4-9-0 per maund or only 1 anna per maund below another lot of the same variety containing 5.2 per cent of other rices and 3.02 per cent broken. In theory the disparity in quality should have resulted in a much greater difference in price than merely 1 anna. Many such instances occur and seem to indicate that the present system of assessing quality merely by visual examination is not altogether accurate and in the absence of physical standards

for reference depends wholly on the eye alone. This is liable to place sellers at a disadvantage as there is evidence to show that bargaining power rests more often than not in the buyer's favour.

In contrast to above, it may be of interest to compare the price differences based on clearly defined grades drawn up by the Agricultural Marketing Adviser in consultation with the trade, and operated by parties duly authorised to grade and pack certain specified varieties of rice under the provisions of the Agricultural Produce (Grading and Marking) Act, 1937. A few quotations from the Basmati Rice Producers' Co-operative Marketing Society, Ltd., Dehra Dun, United Provinces, are given below for illustration. The prices relate to graded *Basmati* (raw, milled) rice grown in the Dehra Dun tahsil and the specifications on which the three under-mentioned grades are based will be found in Appendix XLIII. It will suffice only to mention here that the Special Grade permits a maximum total tolerance of 4.5 per cent impurities including broken grains, fragments, etc., Grade A 10 per cent, and Grade B 18 per cent.

Date.	Crop year.	Wholesale prices per maund at sellers' go-down.								
		Special Grade.			Grade A.			Grade B.		
		Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.
2nd March 1939 ..	1936-37 ..	..	..	..	8	0	0	7	8	0
9th March 1939 ..	Do. ..	8	0	0	7	8	0	..	..	..
22nd March 1939 ..	1937-38 ..	7	8	0	7	0	0	..	..	..
17th April 1939 ..	1936-37 ..	..	..	..	9	0	0	8	4	0
10th May 1939 ..	1938-39 ..	7	8	0	7	0	0	..	..	..
25th May 1939 ..	1938-39 ..	7	8	0	7	0	0	6	12	0
Do. ..	1937-38 ..	8	8	0	8	0	0	7	8	0
9th Sept. 1939 ..	1936-37 ..	10	8	0	10	0	0	9	8	0
Do. ..	1937-38 ..	9	8	0	9	0	0	8	8	0
Do. ..	1938-39 ..	8	8	0	8	0	0	7	8	0
11th Sept. 1940 ..	1938-39 ..	12	8	0	..	..	..	..	..	..
Do. ..	1939-40 ..	9	8	0	9	0	0	8	8	0

(e) *Age or maturity.*—Qualitative differences between old and new rice have already been referred to in Chapter II and it will be recalled that such differences are of special significance only as regards raw rices and not the parboiled types, which with a few exceptions in Bengal, are not stored in the normal course of trade with the object of attaining maturity. It is, however, important to recognise two distinctions when considering this particular price determining factor. In one, price differences occur early in the season at a time when new crop arrivals are freshly on the market. During this period, which may last up to about three months, newly harvested rices are not regarded as really fit for immediate consumption (unless they have been parboiled—see Chapter II) and in consequence quotations for such produce are normally at a discount as compared with the previous season's crop. These differences vary with the season being more pronounced during the immediate post-harvest months, narrowing down as the season advances until all distinctions between old and new rices disappear and values reach parity two,

three or four months after arrivals have made their first appearance. All types of varieties of rice, including those in the bold category, are generally affected in this manner for shorter or longer periods depending upon the local supply position.

In contrast to the price differences between new and old rices brought about by natural conditions and lasting perhaps for a matter of weeks pending an adjustment of the supply position, paddy and rice, usually of the finer varieties, may be held in store, often for long periods, with the express object of taking advantage of the premiums which discriminating consumers are willing to pay for well matured produce. Price differences having their origins in the second set of circumstances are of special importance from the marketing view point as they are directly related to the costs of storage (see Chapter VII).

Before referring to the extent of price differences having their origin in these conditions it is necessary to state that rice may be stored either in the form of paddy or the husked product (rice). The former procedure is common in Southern India including Bombay and Madras, the States of Hyderabad, Mysore and Travancore and also in a relatively few parts of North and North-East India such as Kashmir and Assam. In these tracts local experience has shown that rice does not keep well for long periods and it is, therefore, stored in the form of paddy, premiums for age being paid for old paddy as well as for rice produced from such paddy. In all other areas the general usage is to store hulled rice and not paddy and premiums are, therefore, paid usually on the former only.

Short term price differences between newly harvested rice and old crop in the early part of the season may be illustrated by a few typical examples taken from Madras and presented in tabular form in Appendix XLIV. The crop cycle normally begins in January, the month in which new crop supplies of rice begin to appear on the market. In January, it will be seen that new and old crop quotations appear together for the first time and show a fairly considerable disparity in favour of the latter. In the case of *Atragada* rice at Bezwada, old crop is seen to be 25·7 per cent dearer than new in January, but as the season advances and the newly harvested produce begins to mature and improve in cooking quality the premium drops to 16·6 per cent in February and March, 8·6 per cent in April, 7·3 per cent in May and June and 4·4 per cent in July after which it may be presumed from the fact that quotations are not recorded, that the previous season's supplies have become exhausted and the current season's produce has fully developed the characteristics of maturity. Similar tendencies are shown by the fine *Khichili Samba* at Coconada. In January, when fresh supplies of rice begin to come in, new crop stands at a discount of 14·3 per cent as compared with old. This difference contracts to 12·1 per cent in February, 11·7 per cent in March, 10·1 per cent in April and May, 5·1 per cent in June and 3·1 per cent in July, thereafter vanishing altogether. Apart from the general relationship common to the two varieties of rice the actual price differences are totally dissimilar.

and it is interesting to note that contrary to expectations old crop *Khichili Samba* shows on the whole a comparatively lower premium over new crop than *Atragada* although it is the superior rice. If, therefore, well-known trade descriptions of rice grown on a large scale in the same or contiguous areas noted for their surplus production vary as to price differences even greater divergencies are to be expected as between other tracts. One further set of examples may suffice to illustrate this. At Waraseoni in the Central Provinces, the average price of the fine scented *Chinoor* in February, 1939, was Rs. 4-6-0 per maund for new crop and Rs. 4-12-0 for the previous season's quality. The difference of 6 annas in favour of old crop is equal to 8·6 per cent. *Luchai*, a good class medium type, was simultaneously quoted at Rs. 2-14-0 per maund for new crop and Rs. 3-2-0 for old ; the latter being 4 annas per maund or 8·7 per cent dearer. In the same market and period a third variety, the bold *Dhor*, was priced Rs. 2-8-0 and Rs. 2-10-0 for new and old crop, the premium of 2 annas favouring old crop representing 5 per cent.

Drug, Raipur and Dhamtari are other important markets in the Central Provinces for bold and medium rices. The commercial variety *Hansa*, comprising a number of botanical varieties, is marketed in each of these centres in considerable quantities. In April, 1939, at Raipur, new crop was quoted at Rs. 2-12-0 per maund and old crop Rs. 2-14-0, difference of 2 annas or 4·5 per cent. In the following month at Drug new crop *Hansa* fetched Rs. 2-10-0 and old crop 2 annas or 4·8 per cent more. At Dhamtari, in June, 1939, new crop *Hansa* was available at Rs. 2-7-0 while goods of the previous season were quoted at Rs. 2-9-0 or 5·1 per cent dearer. The futility of attempting to relate these data with the examples previously discussed will be evident from the following table. In each case the price levels and the differences vary not only absolutely but relatively. The costliest rice (*Chinoor*) shows a difference of 6 annas per maund based on Rs. 4-6-0 and Rs. 4-12-0 per maund old and new crops respectively whereas a much cheaper type (*Attragada*) has a greater difference of Re. 0-8-8 per maund.

*Comparative values of old and new crop rices in different markets.*

—	Old crop	New crop	Difference	Premium for
	(per maund).	(per maund).	(per maund).	old crop.
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Per cent.
<i>Madras—</i>				
Bezwada <i>Attragada</i>	3 12 0	3 4 2	0 8 8	16·6
(bold).				
Coconada <i>Khichili</i>	4 1 4	3 10 3	0 7 1	12·1
<i>Samba</i> (fine).				
<i>Central Provinces—</i>				
Waraseoni ( <i>Chinoor</i>	4 12 0	4 6 0	0 6 0	8·6
fine).				
<i>Dhor</i> (bold) ..	2 10 0	2 8 0	0 2 0	5·6

Where rice is expressly stored for eventual sale, enquiries have shown that in the majority of instances the maximum premium is normally obtained on rice which has been harvested about twelve months previously. The only exceptions are the fine long slender scented rices of the United Provinces and the Punjab, the premium for which increases with each year of storage up to a limit of about three years when such rices are judged to have reached their optimum cooking quality. Owing to the wide variations to which premiums for age or maturity are liable, no practical object would be served by particularising in reference to this price-determining factor. The instances given in the following paragraphs are based on the results of observations made during the survey and may be regarded as representing normal or average conditions.

In Madras, the premium for one year old rice (rice hulled from paddy harvested about twelve months previously) is usually in the neighbourhood of 8 annas per maund which works out very roughly to 16 per cent of the price of the new crop product on an average. In Bombay, the price of rice deriving from one year old paddy is higher than that of newly harvested rice by about 8 annas per maund in the case of most of the medium and bold descriptions and 12 annas to Re. 1 in the case of the more costly fine types. Expressed in terms of percentages the former is approximately equal to 10 and the latter to 15 per cent. In the United Provinces, the price differences in favour of medium varieties of rice stored for about ten to twelve months normally range from 4 to 8 annas per maund while as regards fine rices, premiums for well matured lots may range from 12 annas to Rs. 3 or even more per maund depending on the period of storage. A few representative quotations prevailing at important producing and distributing centres in this province during August and September, 1939, are given below and show that premiums for age vary from 4.7 to 20 per cent depending on quality and market.

*Premiums for age in certain markets in the United Provinces.*

Market and date.	Trade description.	Price per maund of new crop. (1938-39).	Price per maund of old crop. (1937-38).	Premium for old crop.	
		Rs. A. P.	Rs. A. P.	Rs. A. P.	Per cent.
Dehra Dun (August 1939). (Sept. 1939) ..	Basmati (fine) ..	7 0 0	8 0 0	1 0 0	14.3
	Ramajwain (medium).	4 0 0	4 8 0	0 8 0	12.5
Etawah (Sept. 1939).	Hansraj (fine) ..	5 5 0	6 6 0	1 1 0	20.0
Do.	Sondhi (medium)	3 4 0	3 7 0	0 4 0	7.7
Nowgarh (Sept. 1939).	Anji (medium) ..	5 0 0	5 6 0	0 6 0	7.5
Do.	Didai (medium)	4 0 0	4 3 0	0 3 0	4.7
Haldwani (Sept. 1939).	Hansraj (fine) ..	6 6 0	7 3 0	0 13 0	12.7
Bareilly (Sept. 1939).	Do.	5 9 0	6 4 0	0 11 0	12.4

It may be pointed out that *Basmati* reported to belong to the 1936-37 and 1935-36 crops was quoted at Rs. 9 and Rs. 10 respectively at Dehra Dun during the same period. In the first instance, the Rs. 2 premium over 1938-39 crop would be equivalent to 28.6 per cent and the Rs. 3 premium for 1935-36 goods 42.9 per cent. At Haldwani, 1936-37 crop *Hansraj* was marked at Rs. 8 or Rs. 1-10-0 per maund or more than 25 per cent dearer than 1938-39 produce. At Bareilly, on the other hand, the premium for rice of the same age was only 13 annas per maund over the current season's goods or about 15 per cent. It will be observed, however, that Bareilly's *Hansraj* and the quality of Haldwani show totally different price levels and provide a further illustration of the difficulties of comparing prices where no standards of quality exist.

The position in Sind is illustrated in the following table and shows a premium range from 7.1 to 18.2 per cent.

*Premium for the age at Larkana and Karachi in Sind.*

Market and date.	Trade description.	Price per maund of new crop. (1938-39).	Price per maund of old crop. (1937-38).	Premium for old crop.	
		Rs. A. P.	Rs. A. P.	Rs. A. P.	Per cent.
Larkana (June 1939).	Sugdasi (fine) ..	4 8 0	5 0 0	0 8 0	11.1
	Kangni (bold) ..	2 13 0	3 0 0	0 3 0	8.1
Karachi (June 1939).	Sugdasi ..	5 8 0	6 8 0	1 0 0	18.2
	Kangni ..	3 8 0	3 12 0	0 4 0	7.1

The above data point to increased premiums for high grade rices in large consuming centres. This is also supported by conditions in Delhi where *Basmati* matured for three years may be quoted at anything from Rs. 15 to Rs. 20 per maund wholesale as compared with quotations of Rs. 10 to Rs. 12 for similar rice at the centres of production.

In Bengal, *Seeta*, a well-known hand-pounded raw fine rice produced from *Patnai* paddy, sells usually at a premium of Re. 1 per maund after one year's storage but is not kept beyond this period. This works out to about 20 per cent of the price of the new crop. In other varieties the premium may vary from 4 annas to 8 annas at different places according to demand.

In Assam, the usual difference in favour of one year old medium and fine types is reported to be 3 to 4 annas which is roughly 6 to 8 per cent of the new crop values.

For India, as a whole, it may be stated as a point of considerable marketing significance that for one year's storage 12 to 20 per cent is

the premium in the case of high quality fine rices and 5 to 10 per cent in others in different tracts, as compared with the price of the new crop.

(f) *Natural and artificially coloured rices.*—The relatively small quantities of coloured rices which are marketed in India are found mainly in Madras, Hyderabad, Mysore and to a small extent in Bombay and the Punjab. In Bengal, Bihar and Orissa a yellowish colour may be induced in the parboiling process in certain varieties, e.g., *Patnai* and *Sitasal*, but these qualities of rice are seldom if ever found outside the three provinces referred to.

In most instances rices tinted by the external application of colouring agents are sold at a small premium over their untreated counterparts deriving from the same variety of paddy. Bombay, however, constitutes a notable exception.

In Madras, the Circars and Kistna districts are the chief centres of production of yellow and red ochre-coloured rices. The premiums normally obtained by such qualities over their uncoloured or natural tinted prototypes of the same variety are small and average about 6 pies per maund in the producing centres. The following table relates to four popular trade descriptions priced during March 1940, at Gudivada.

—	Artificially coloured. (Per maund).	Natural. (Per maund).	Premium for the coloured quality.	Equivalent percentage.
	Rs. A. P.	Rs. A. P.	Rs. A. P.	
Konamani ..	2 10 6	2 10 0	0 0 6	1.2
Akkulu ..	2 10 6	2 10 0	0 0 6	1.2
Delhibhogam ..	2 14 6	2 14 0	0 0 6	1.1

The coloured qualities are largely exported to the Ceded districts in Madras and to the neighbouring State of Hyderabad where they are sold at a relatively higher premium, varying between 1 anna and Re. 0-1-6 per maund. In regard to Hyderabad, it is noteworthy that while the imported coloured *Konamani*, which may perhaps be regarded as typical of Madras coloured rices, is sold in the State markets at approximately the above-mentioned premiums the locally produced *Khichidi* variety sells at identically the same price both in the coloured and uncoloured forms. In Mysore, red ochre-coloured rice known commercially as *Kempasanna* is prepared from the two locally cultivated medium varieties, *Akkulu* and *Alublu*, and sells at two annas to three annas per maund dearer than the untreated product. In the Punjab, the small quantities of fine *Basmati* and *Hansraj* rices which are coloured yellow (with powdered turmeric) to cater for the demand from Amritsar and Hyderabad (Deccan)

are normally able to obtain premiums varying from 2 to 4 annas per maund.

Contrary to the general tendency for coloured rices to sell at somewhat higher rates than their untreated counterparts it was observed in Bombay that the latter often fetched better prices. In other instances both the coloured and uncoloured products were found to be identically quoted. For example, in April, 1940, uncoloured *Kolamba* was rated at Rs. 6-12-6 per maund in the Bombay market while the coloured quality registered Rs. 6-11-6 or 1 anna per maund cheaper. During the same period another well-known description, *Kamod*, showed no difference in value as between the coloured and uncoloured qualities. The situation in Bombay seems to be due to the fact that rice intended for colouring is generally milled to a much lower degree than is customary with goods destined for sale in the natural state. The rice milling industry in this province is important and the products of the mills are usually put on the market in a comparatively well finished and attractive condition. Thus the savings resulting from reduced milling enable coloured rices to be sold at competitive rates even after allowing for the extra costs incurred in the colouring process. It is interesting to note that the same coloured rices sell at a premium of about 2 annas per maund when shipped to Travancore.

As regards parboiled rices in which a yellowish tinge of varying degrees of intensity is induced by a prolongation of the steaming period, these types, it will be recalled, are mainly found in Bengal, Bihar and Orissa. Conditions in Bengal, which may be taken as representative of the adjacent tracts in which coloured parboiled rices are produced, indicate that the premiums for such qualities normally range from about 1 anna to 2 annas per maund.

To sum up, therefore, colour is a quality factor mainly local in character and of minor importance only and is responsible for differences in price varying up to a normal maximum of 2 annas per maund.

## (2) PADDY.

The prices of paddy are determined by a combination of a number of factors in which the most important are (a) conformation or grain size, (b) milling quality, (c) age (in certain areas only) and (d) physical characteristics such as impurity content, proportion of damaged or defective, immature or undeveloped grains, red grains, admixture of other varieties and moisture content. It is impossible to isolate the effect of each of these individual elements but it is probable that conformation plays a larger part than any other factor in determining the price level.

(a) *Conformation or grain size.*—For convenience, paddy may also be classified into three main categories of fine, medium and bold according to the type of rice derived from it. As with rice, fine paddies are normally dearest and bold the cheapest with the medium varieties falling within the two extremes. Some idea will be obtained



of the remarkable price range existing between a typical cheap bold variety and the highest priced one normally met with in commerce when it is stated that at a time when the former can be obtained in the neighbourhood of Rs. 1-6-0 per maund, the latter as typified by old crop *Basmati*, would cost something like Rs. 3-5-0.

The relationship between a number of representative trade descriptions of paddy belonging to the 3 categories of fine, medium and bold in important rice producing areas is clearly brought out in Appendix XLI. It will be observed that while the same general relationship exists both in respect of paddy and rice, the differences between fine or medium and bold paddies are somewhat smaller than those of rice. For example, while the price of fine rice was 91 per cent higher than that of bold in the Punjab and the United Provinces the premiums for the same varieties of paddy in the same markets was 52 per cent in the case of the Punjab and only 33 per cent in the United Provinces. A less extreme instance is that of Madras in which the price of fine paddy is seen to be 7 per cent above bold whereas corresponding qualities of rice showed a premium of 11 per cent in favour of fine. At Jessore in Bengal, *Kalamkatti* paddy was 36 per cent dearer than *Kazla*, while the rice derived from the former was 35 per cent dearer than *Kazla* rice. In Orissa *Saruchina* paddy was 39 per cent dearer than *Lali* but the rice produced from *Saruchina* paddy was only 22 per cent dearer than *Lali* rice.

A notable exception to the general rule is worth mentioning. In Bengal, a well-known medium type of paddy named *Kanakchur* has a special reputation for the manufacture of parched paddy and on that account commands a premium which frequently carries its price level above a number of fine varieties. In May 1936, for instance, *Kanakchur* paddy was selling at Rs. 4-6-0 per maund at Calcutta at a time when the price of fine paddies in the same market ranged between Rs. 3 and Rs. 3-4-0 per maund.

(b) *Milling quality*.—In practice milling quality implies the ability of the grain to stand up to hulling and polishing without serious breakage. The factors affecting this important characteristic are discussed in Chapter IV. It will suffice to notice here that in India milling quality is usually judged either by the rough and ready test of rubbing a few grains of paddy between the palms of the hands in order to remove the husk and disclose the rice kernel or by achieving the same result by means of two small wooden boards, as is customary in Bombay. If the sample husks readily and the kernels are found not to break up unduly and to show few sun-cracks a higher price is paid than if the husk is thick or hard to remove and the grain tends to disintegrate into fragments. There are, however, no standards by which values can be related to milling quality, the price offered being based entirely on the buyers' sensory reactions to the behaviour of the paddy by sight and "feel". As far as could be ascertained by enquiries in different markets paddy regarded as being of poor milling quality would, other things being equal, sell at a discount of roughly 4 to 5 annas per maund in the case of fine varieties and 2 to 3 annas in the case of medium and bold types as

compared with a good sample. Since milling quality is of particular importance in the production of raw rices price differences arising from this factor are more pronounced in tracts notable for raw rice production than in those areas in which parboiling is predominant. The latter process toughens the rice kernel resulting in a lower percentage of brokens so that the rates paid for different lots of the same paddy destined to be parboiled are relatively little affected by considerations of milling quality.

(c) *Age or maturity.*—In certain regions, as for example in the provinces of Madras and Bombay, the States of Hyderabad, Mysore and Travancore, and at Haldwani in the United Provinces, premiums for paddy harvested some twelve to fifteen months previously are paid in respect of a number of fine and medium varieties. The conditions governing age-premiums for rice referred to earlier in this section apply with equal force to paddy. There is, for example, a wide difference between old and new crops when the latter first appears on the market but as the season advances the difference narrows until old crop ceases to be quoted. A typical instance will be found in Appendix XLIV from which it will be seen that old crop *Attragada* paddy at Bezwada was 13·1 per cent dearer than new crop in January 1939, 14·7 per cent in February, 11·5 per cent in March, 6·8 per cent in April and May, 5·4 per cent in June and 5·7 per cent in July after which month old crop quotations disappear. In other Madras markets the difference in favour of old paddy in different markets during January and February was found to vary appreciably. For instance, at Masulipatam, where the locally marketed produce consists of the finer varieties, the premium on account of age was found to average about 8 annas per maund which is in the neighbourhood of 20 per cent over new crop. In most Bombay markets the premium for old crop paddy in the first few weeks after the harvest is usually from about 6 to approximately 10 annas per maund which is the equivalent of roughly 15 to 20 per cent of the price of new crop produce belonging to the same variety. In Hyderabad, the premiums are found to vary from 2 to 3 annas per maund or about 10 to 15 per cent. At Haldwani in the United Provinces, the difference between one year old *Hansraj* paddy and new crop of the same description averages about 4 annas or 10 per cent in favour of the former.

(d) *Impurity content and other physical characteristics.*—Factors such as the presence of foreign matter, damaged or undeveloped grains, admixture of other varieties, etc., and moisture content all help to determine the value of paddy. It is unfortunate that in the rice trade no fixed basis of price differentiation is known to exist respecting these, as well as other quality factors. As with rice, paddy values are assessed entirely by visual examination so that it is not possible to relate any of these factors to price differences. It may, however, be pointed out that it is customary in most areas for allowances to be conceded by the seller to the buyer in the shape of extra weight at the time of delivery to compensate the latter for the presence of foreign matter and other impurities as well as for excess

moisture in the grain. The extra weight thus allowed to the buyer is tantamount to a reduction in the price and has been found to vary from 1.25 to 2.5 per cent in different markets. In the Punjab a cash deduction is made from the sum due to the seller at a flat rate of 10 annas per cent to allow for impurities. Wherever the system of taking extra weight or a cash allowance prevails the imposition is always observed irrespective of the actual quality of the produce which may, in some cases, be of a much higher standard than the average run of quality in that market.

#### G.—Relation between the price of paddy, rice and other derivatives.

##### (1) PADDY AND RICE.

For all practical purposes the normal ratio of rice to paddy is generally taken by the trade to be in the neighbourhood of two to three. That is to say, three units of paddy are reckoned to yield on an average two units of rice ignoring a small proportion of fragments or particles of rice. Actually, however, the outturn of rice from a given quantity of paddy will vary according to variety, the method of processing adopted and the degree of milling given, factors which having already been discussed in Chapter I need not be repeated here.

Since the rice kernel forms only a part of the paddy grain and is directly derived from it, the price of paddy must obviously normally constitute the major portion of the cost of production of rice and there should in theory exist a degree of relationship in the price of the two products very closely approximating the physical ratio above-mentioned, due allowance being made for hulling costs. In other words, the price of paddy expressed as a proportion of the price of rice should normally be in the neighbourhood of 66 or 67 per cent. Actually this is often far from being the case for a number of reasons. In the first place, the values of both paddy and rice are liable to fluctuate independently on account of the many quality factors referred to earlier in this chapter. Secondly, market conditions may be responsible for an increase in the price of paddy and a simultaneous decline in that of rice or vice versa. Whenever this happens the theoretical parity between paddy and rice values may be disturbed in one direction or the other. Thirdly, the precise relationship between the unhusked and husked grain will depend on the methods adopted to convert the paddy into its edible counterpart, rice. The cost of hand-pounding, for example, is different from that of machine-milling while parboiling also adds to processing overheads (see Chapter IV). Fourthly, it takes more power and, therefore, costs more money to turn out a highly milled rice than to produce an article which is lightly milled and finally, the proportions of broken grains and fragments of rice allowed to remain in the rice determine the price at which the finished article can be sold. It will be obvious, therefore, that the relationship between paddy and rice values in different parts of the country is susceptible of

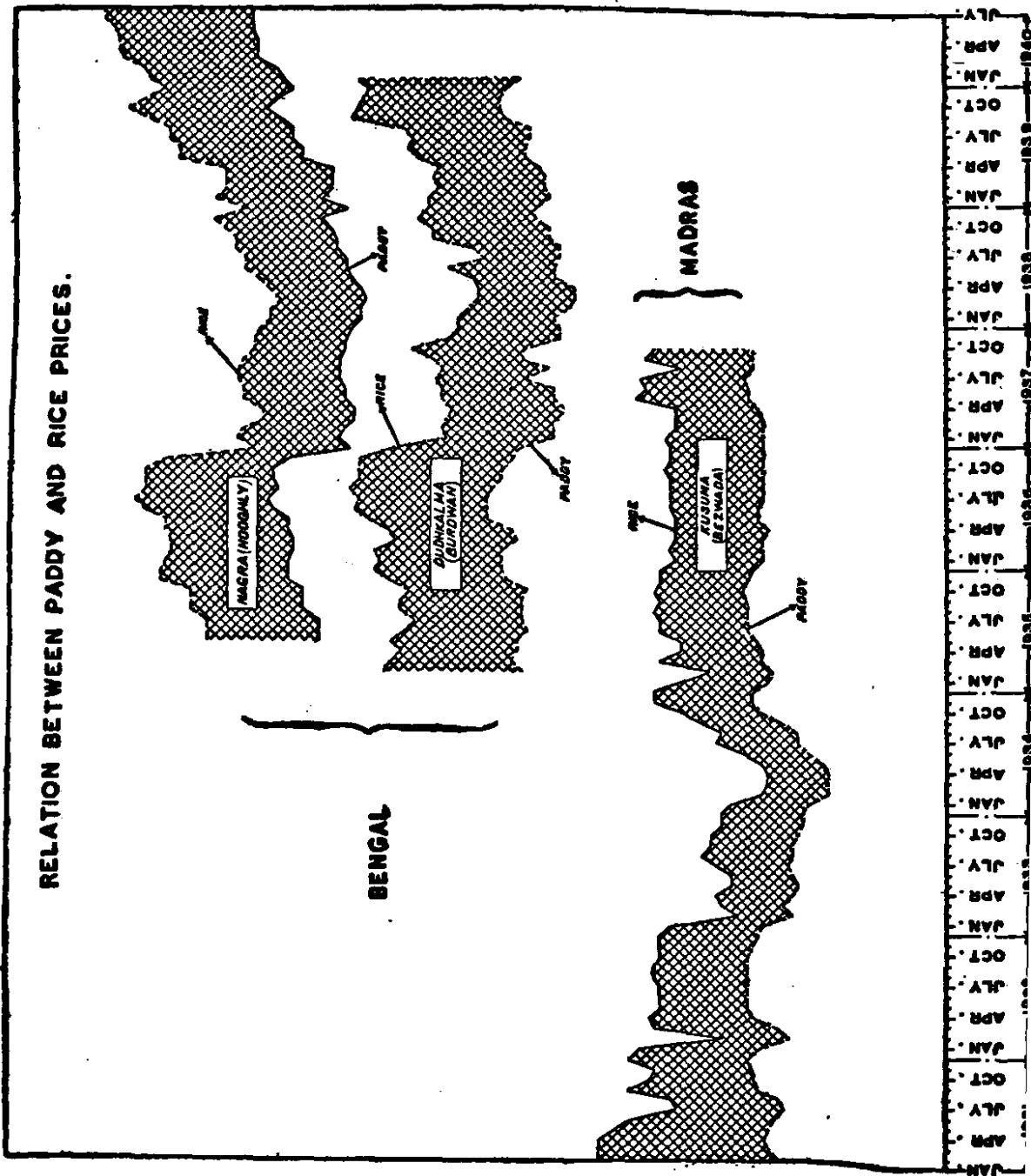
very wide divergencies brought about by the operation of one or other or a combination of several of the factors just mentioned. The following examples typical of conditions in different parts of India will reveal the extent of the diversity of relationship existing between the two products.

In Bengal and Madras, where the spread between bold and fine varieties is comparatively small, the relationship which normally prevails—between the paddy and rice of the different varieties included in these two main categories does not differ very greatly and has no parallel, for example, with their fine and bold prototypes of the United Provinces and the Punjab. This is shown very clearly in the following table based on long term data.

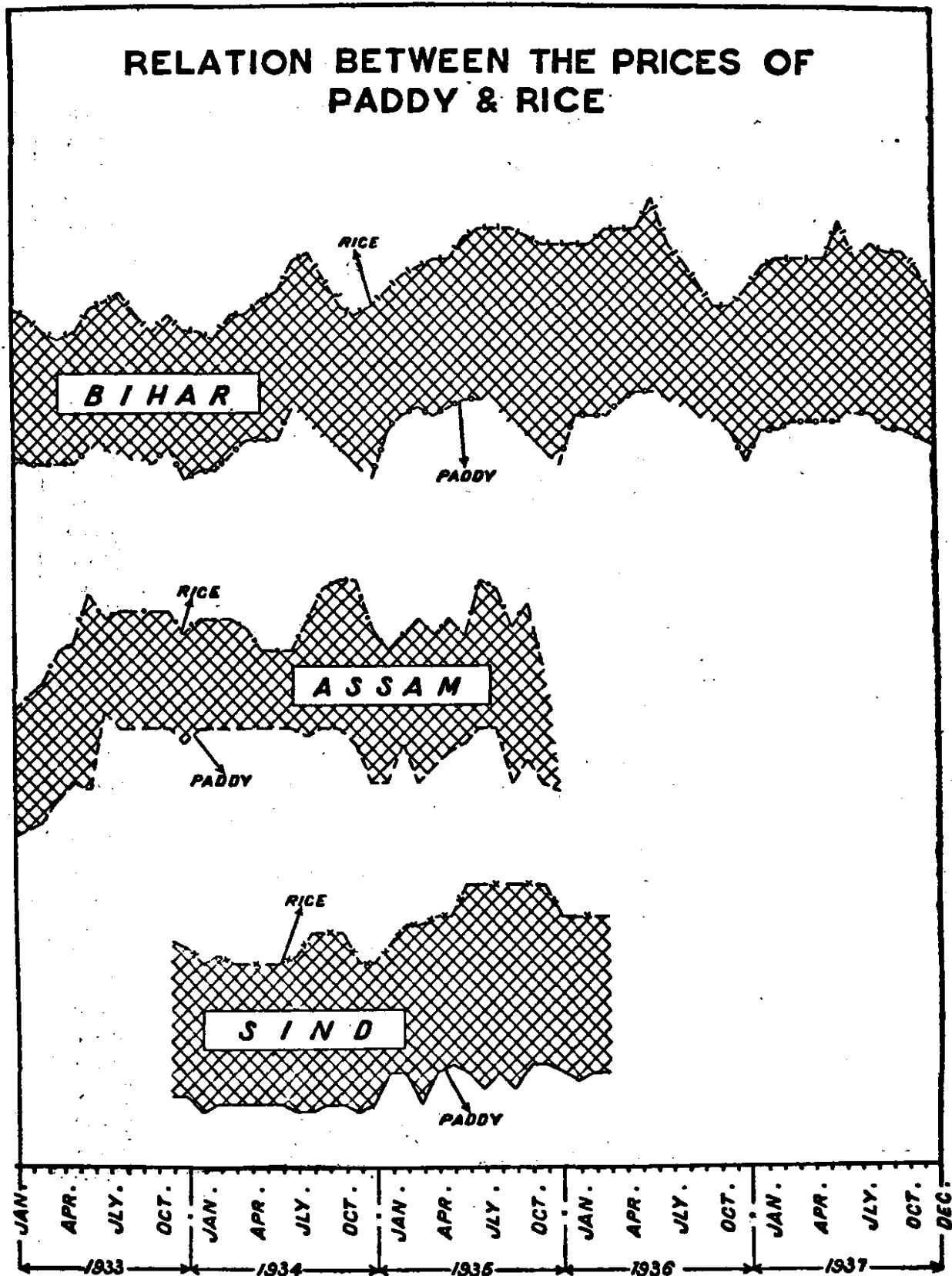
*Price of paddy expressed as a percentage of the price of rice in the same market.*

	Fine.	Medium.	Bold.
<i>Punjab—</i>			
Gujranwala .. .. .	47.4	56	62
<i>United Provinces—</i>			
Etawah .. .. .	35.0	47.7	50
Dehra Dun .. .. .	52.7	..	..
<i>Madras—</i>			
Ellore .. .. .	67.4	..	66.6
Bezwada .. .. .	65.3	64.2	..
<i>Bengal—</i>			
Garbetta .. .. .	61.3	59.3	58.3

The reason for the wider disparity between paddy and rice values seen to exist in respect of the fine rices of Northern India as compared with their counterparts in South India and Bengal lies in the fact that the fine rices of the former areas being for the most part long and slender are much more susceptible to breakage in hulling than the shorter and relatively less slender types which largely make up the fine category in the latter. This tendency is fairly marked in the fine rices of Northern India as the bulk of these varieties is not parboiled before conversion into rice. Thus a good deal of dressing and sifting is necessary to remove broken grains and frag-



● Facing page 179.]



ments and as the varieties to which the above table refers\* are generally put on the market with only a very small percentage of broken grains a proportionately higher price must be charged for the finished product. The paddy-rice price relationship in respect of fine, medium and bold rices in the Punjab is also illustrated in the diagram facing page 161 based on the average monthly quotations for the *Basmati*, *Ratwa* or *Sone* and *Jhona* trade descriptions from 1931 to 1937 contained in Appendix XLV from which the following table is condensed.

*Relationship between fine, medium and bold rices at Gujranwala (Punjab). (1931-37).*

	Average price of rice per maund.			Average price of paddy per maund.			Price of paddy expressed as a proportion of the price of rice.
	Rs.	A.	P.	Rs.	A.	P.	Per cent.
<i>Basmati</i> (fine) .. .. .	6	7	0	3	0	0	47.4
<i>Ratwa</i> or <i>Sone</i> (medium) ..	3	15	0	2	3	0	56.0
<i>Jhona</i> (bold) .. .. .	3	5	0	2	1	0	62.0

As far as could be ascertained Sind is the only other area in which the nature of relationship between the values of paddy and rice resembles conditions in the Punjab and the United Provinces. The average price of fine *Sugdasi* paddy, for example, was found to be 47.8 per cent of the quotations for its rice, while the corresponding proportions in the case of bold *Kangni* paddy was 57.3 per cent.

Apart from these somewhat notable exceptions there does not appear to exist any pronounced or consistent tendency for the costlier finer rices to be relatively dearer in relation to the paddies from which they derive than is the case with the cheaper bold or coarse variety. In a number of instances the reverse seems to hold good as the Madras and Bengal examples quoted in the above table show. The relation which the price of paddy bears to that of the finished product not only varies considerably in different areas but is also subject to constant changes. Average monthly prices of paddy and rice in a number of centres in Bengal, Madras, Bihar, Assam and Sind given in Appendix XLVI of which the following table is an abstract are illustrated in the diagrams facing page 178 and this page.

\*The commercial varieties selected at Gujranwala (Punjab) are *Basmati* (fine), *Ratwa* (medium) and *Jhona* (bold), those at Etawah *Hansraj* (fine), *Dhania* (medium) and *Pahari* (bold) and the quality at Dehra Dun, *Basmati* (fine).

*Relation between the price of rice and paddy in certain areas.*

—	Variety and category.	Average price of rice per maund.		Average price of paddy per maund.		Price of paddy expressed as a proportion of the price of rice.
		Rs.	A. P.	Rs.	A. P.	Per cent.
<i>Bengal—</i>						
Burdwan ..	Dudhkalma (medium) 1935-39	3	8 0	2	1 0	59
Hooghly ..	Nagra (bold) 1935-40	3	10 0	2	4 0	62
<i>Madras—</i>						
Bezwada ..	Kusuma (bold) 1931-37	3	4 0	2	2 0	65
<i>Bihar—</i>						
Jamnagar	„ (bold) 1933-37	3	2 0	1	14 0	60
<i>Assam—</i>						
Karimganj	„ (bold) 1933-35	2	13 0	1	13 0	64
<i>Sind—</i>						
Larkana ..	Kangni (bold) 1933-36	2	14 0	1	10 0	57

It will be observed that paddy ranges on an average from 57 per cent of the price of the rice yielded by it as in Sind to 64 per cent in Assam. The relationship, however, is continuously variable as will be seen from the various appendices referred to. At Burdwan (Bengal), for example, the annual average price of paddy between 1935 and 1939 ranged from 58.3 per cent of the price of rice in 1938 to 61.7 per cent in 1936. During the entire period, however, the extremes of variation moved from a low of 52 per cent to a high of 64 per cent, the former occurring in December 1939 and the latter in June 1938. At Bezwada (Madras) *Kusuma* paddy averaged 58.3 per cent of the price of the rice in 1931 and as much as 69.8 per cent in 1935 falling as low as 47 in January 1931. Similarly at Jaynagar (Bihar) the average value of paddy was 55.3 per cent of the price of the corresponding rice in 1934 and 60.4 per cent in 1935 and 1936. In June 1937, however, paddy represented only 54 per cent of the average price of rice in that month and in April 1933, 62 per cent. At Karimganj in Assam, the data available show the price of paddy to have ranged from 62.2 per cent of the price of rice in 1935 to 67.4 per cent. in the previous year. In June 1933, paddy was only 49 per cent of the current average quotations for rice and in June 1934, as much as 76 per cent. At Larkana, in Sind, the average annual rates of paddy and rice values moved between the lower and upper limits of 55.6 and 58.3 per cent respectively, the extreme variations in any month occurring in July 1935, when paddy was only 50 per cent of the then prevailing price of rice and in January 1935, when the proportion was 64 per cent.

It will also be apparent from the data quoted above that there is no definite seasonality in the varying price relationships between paddy and rice. This is further borne out by the data quoted in Appendix XLVII showing the comparative value of paddy at five important markets in Madras.

It will also be observed that the relationship between the same variety of paddy and rice at the two nearby centres of Guntur and Bezwada gives no indication of close sympathy.



To sum up, therefore, it may be stated from the evidence obtained during the course of this survey that the proportion which the price of paddy bears to that of rice may be anywhere between the extreme limits of 35 and 75 per cent depending upon variety, locality and market conditions. This relationship is more widely variable in Northern India where the price differences between high grade fine rices and the bold varieties are very marked. On the other hand, in the South and in the major rice growing province of Bengal, Bihar and Orissa and Assam paddy-rice ratios in respect of all categories, do not differ appreciably or have any particular bias in favour of the fine varieties.

(2) RICE, BROKEN RICE AND FRAGMENTS.

The fact that there are no published quotations for broken rices or fragments produced in India although a very full range of rates is available for Burma brokens of various types is a striking commentary on the organisation of the indigenous rice trade of the country. The term "broken rice" is generally interpreted in India as referring to pieces of kernel which are less than three-fourths of a whole kernel, while fragments (*Kani*) are usually regarded as consisting of pieces smaller than one-fourth of a whole kernel. The constitution of broken rice ordinarily found in the market varies enormously as to the size of the broken kernels and the proportion of fragments present. It is quite impossible, therefore, to relate prices to quality. All that can be said with certainty is that the larger the brokens the higher the price and vice versa. Broken grains sifted from high grade fine rices may fetch higher prices than cheap inferior bold varieties. For example, the values of brokens separated from the fine scented *Basmati* rice are normally higher than those of ordinary low rated varieties of the bold category. The former may sell at source anything from Rs. 3 to Rs. 4-8-0 or even Rs. 5 per maund at a time when bold rice has been obtainable for less than Rs. 3 in the centres of production. A few actual quotations will illustrate the variability of the relationship existing between the derivatives, brokens and fragments and the rice from which they are separated.

	Variety.	Average price per maund and percentage relationship.					
		Rice.		Brokens.		Fragments.	
		Rs.	A. P.	Rs.	A. P.	Rs.	A. P.
<i>United Provinces—</i>							
Etawah ..	Hansraj .. ..	5	11 0	2	8 0	1	4 0
			(100)		(43·7)		(21·9)
Dehra Dun ..	Basmati .. ..	6	11 0	3	10 0	2	11 0
			(100)		(54·2)		(40·2)
<i>Punjab—</i>							
Labore ..	Basmati .. ..	6	8 0	4	4 0	2	6 0
			(100)		(65·4)		(36·5)
<i>Bengal—</i>							
Calcutta ..	Patnai .. ..	4	8 0	3	8 0	2	10 0
			(100)		(77·8)		(58·3)

The above table shows that the price of brokens may vary from 43·7 to 77·8 per cent of the price of the whole rice, while that of fragments has an even wider spread of from 21·9 to 58·3 per cent.

These are only a few examples and do not necessarily indicate that the upper and lower limits of variation stop at the proportions quoted.

In view of these very considerable diversities it is not feasible to define an average difference with any degree of accuracy. For all practical purposes, however, it may be stated that from a large number of observations made during the course of this survey broken rice deriving from the ordinary cheap to medium rated varieties averaged from about 50 per cent of the value of whole rice as in Bombay and the Central Provinces and about 65 per cent in Madras. In Assam the price of brokens normally ranges between 60 and 64 per cent of the price of ordinary commercial rices. In the case of the more highly priced trade descriptions, brokens deriving therefrom are relatively more expensive and appear to range from about 60 to more than 75 per cent of the value of the rice.

In some markets brokens derived from different varieties are mixed together and sold as such. This takes place to a large extent in Bihar where the mixtures are termed *Khudi* and sell at 40 to 45 per cent of the average price of rice.

As regards fragments, these appear to be valued very roughly at one-third of the price of the rice from which they are separated.

#### H.—Market intelligence.

Three elements are probably accountable more than anything else for the somewhat unique conditions of market intelligence concerning rice\* as compared with other important cereals and oilseeds of commerce such as wheat, linseed, groundnuts, etc. These are the lack of any recognised standards of quality, the localised character of the demand and the absence of trading in "futures". Another factor which contributes to the confusion in price quotations is that a large proportion of the rice crop is produced in areas such as Bengal, Bihar, Assam and Orissa, notable for their defective communications and marketing facilities.

The absence of uniform quality standards prevent strict comparison of values, while the localised character of the demand tends to minimise the inter-dependence of markets. Although the establishment of "futures" markets for rice is not necessarily to be recommended the absence of "futures" trading constitutes one link the less in the possible chain of price co-ordinating factors†.

\* The term rice is here used in its widest sense and includes paddy, etc.

† "Futures" trading not only implies the existence of standard contracts governing quality, terms of delivery, payment, etc., but indicates a fluid market in which large quantities of goods may be bought or sold with rapidity at any time during the working hours of the day. Fluctuations in value are frequent and necessitate the exercise of the closest attention by market operators. The use of the telephone and telegraph to convey buying and selling orders and to apprise clients of the state of the market is widely resorted to as time is the all-important factor in these transactions. "Futures" trading is, however, only a part of the general merchandising of a commodity and the same urgency of action is indicated when handling "actuals" or "spot" goods as "futures" and "spot" prices are in direct and usually close relationship. In the case of rice, a more leisurely atmosphere pervades the various processes of trading and it is probably correct to say that the telephone and telegraph are less used in the conduct of business in this commodity than in most of the other important agricultural products which enter commerce.

While the trade is sufficiently well organised to keep itself in close touch with prices, the cultivator, unless he has himself been to the market, normally gets his news by word of mouth from such of his neighbours as may have recently visited the local assembling centre or from the village merchant and peripatetic traders. In these circumstances it is hardly surprising that any market news reaching the producers is likely to be inaccurate and out of date. Nor is it always intelligible on account of the diversity of weights and measures, customary allowances, units of quotations and absence of standards of quality. It is possible, therefore, that where discordant trends occur and price spreads fluctuate in apparently inexplicable fashion these conditions arise as much from defective market intelligence as from the other factors enumerated earlier in this section. If growers are to obtain better prices for the fruits of their labour the speedy dissemination of reliable market information in an intelligible form is a fundamental necessity.

The channels through which market intelligence is disseminated are briefly as follows.

#### (1) GOVERNMENT PUBLICATIONS.

Apart from the questionable accuracy of official price data, the interval which elapses between the dates to which the prices refer and their ultimate publication render the information of historical and academic interest only.

In addition to the defects normal to official records, quotations for rice are of the peculiarly liable to one important drawback, namely, their unintelligibility resulting from meaningless descriptions. For instance, the Punjab Gazette refers to "best quality" and "common rice" while the quotations published in the United Provinces and the Central Provinces Gazettes fall under the heads of "ordinary rice" and "common cleaned rice" leaving the reader to guess commercial variety or varieties to which the rates apply.

In each province the wholesale and retail prices of important staple commodities are collected district-wise by the local authorities and passed on to the provincial headquarters where they are consolidated and published in the local Gazette once a week or fortnightly as the case may be. In one or two provinces such as Bombay and Bihar, the Agriculture Department is responsible for the compilation and issue of official prices the primary data having been first obtained by the Collectors of the various districts. A summarised version of the same price data is also published in the season and crop reports which usually appear many months after the close of the agricultural year to which they relate.

Probably the most important government publication quoting current prices and trade movements and the one which reaches the general public sooner than any other official record is the Indian Trade Journal, published on Thursdays at Calcutta by the Director-General of Commercial Intelligence and Statistics. This journal gives a range of price quotations for a number of commodities which being largely obtained from trade sources direct may be regarded as reasonably accurate. Regular quotations for rice at Calcutta

Rangoon and London are included, while a new series of prices made its first appearance in August 1936. These are harvest prices of 16 important crops based on the average of weekly quotations at 93 centres obtained through non-official agencies, principally the Imperial Bank of India. The quotations which appear week by week relate to *Seeta No. 1* and *Ballam No. 1* at Calcutta, *Big* and *Small Mills Specials* at Rangoon and *Rangoon Two Stars* (a well-known trade brand) in London. The Calcutta quotations are per Bengal (standard) maund (82 2/7 lb.), those of Rangoon per 100 baskets of 75 lb. each (the basis current in Burma) while the London values are in shillings per hundredweight (112 lb.) c. i. f. As regards the harvest prices these are given both for paddy ("rice, unhusked") and rice ("rice, husked") in all the main producing areas and relate to the period of harvesting only. Unfortunately, the descriptions of the qualities quoted are so vague as to detract seriously from the value of what might otherwise be quite useful statistics. For example, the produce is often referred to as "winter rice" or "autumn rice", expressions which cover many hundreds of commercial and thousands of botanical varieties. The quotations are also given in different units of weight, e.g., per standard maund, per hundredweight or per bag of various fillings.

In addition to prices and trade movements, the journal also publishes detailed all-India crop forecasts by provinces and States, as well as weather and crop reports. Foreign crop news are also included from time to time.

Three all-India forecasts for rice are issued annually from Calcutta and are based on estimates compiled by the Directors of Land Records or Directors of Agriculture in provinces and other administrations. The first and second forecasts are made public on or about 20th October and 20th December respectively and cover the autumn and winter crops. The third and final memorandum is published as near 20th February as possible and includes statistics of the summer crop.

## (2) DAILY PRESS.

Practically all the important English dailies and a large number of newspapers printed in the various Indian languages publish commodity prices in their commercial columns together with market reports and other trade and financial items. Much of this information is submitted by the newspaper's own correspondents, but international news agents such as Reuters supply foreign market reports. Quotations for rice appear fairly regularly in several papers and refer mainly to some of the better known varieties grown in the areas served by the paper concerned. It is, however, significant that the prices of paddy are rarely to be found in the daily press or even in trade publications.

Communiqués on agricultural and trade matters both domestic and foreign are issued from time to time to press news agencies by the Bureau of Public Information. A weekly review of the wheat, linseed and rice markets is also prepared on Mondays by the Office of the Agricultural Marketing Adviser to the Government of India and sent directly to the *Statesman* for publication in the Delhi edition, while 18 copies are forwarded to the Associated Press of

India for distribution to that news agency's subscribers. This review used formerly to be broadcast from Delhi but owing to the great expansion of the number and length of news bulletins since the war this service has had to be temporarily suspended.

At Delhi, the Superintendent of Industries is responsible for collecting the current prices of foodstuffs and issues these to the local press. It is of interest to note that the rates are also given for graded AGMARK rice imported into Delhi [produce graded and marked under the provisions of the Agricultural Produce (Grading and Marking) Act, 1937]\*. Steps are also being taken by the Marketing Staffs in certain provinces to supply to the press through the Directors of Public Information a series of prices which can be relied upon for their accuracy. In Bengal, for example, a wide range of locally produced commodities is covered, rice being represented by the trade descriptions *Banktulasi*, *Patnai* and *Mota*. In Bombay, a weekly price bulletin is issued and circulated to district officers and the rural development organisation of the province by the Chief Marketing Officer. The various qualities of rice quoted include five well-known commercial types imported from Burma including *Small Mills Specials* and *Sugandhi*, and eight grades of two Indian varieties one of which is produced in the Bombay Presidency (Bhiwandi, Thana district) and the other termed *Delhi* rice deriving either from the Punjab or the United Provinces†. The six quotations for Bhiwandi rice refer to the fine *Kolamba (Zinia)* variety and cover three new crop grades and their old crop counterparts. An extract from the price bulletin issued on 29th August 1940, will illustrate the nature of the information and give some idea of the price range existing between cheap and highly rated rices and the differences between old and new crop. The quotations are per standard maund of 82 2/7 lb.

				Rs.	A.	P.	Rs.	A.	P.		
Rice (Burma) Special .. .. .	..	..	..	From	4	4	0	to	4	5	0
Small Mills Special .. .. .	..	..	..	From	4	6	0	to	4	7	0
Mill Sugandhi .. .. .	..	..	..	From	4	11	0	to	4	14	0
Media Mandla (Old) .. .. .	..	..	..	From	5	8	0	to	5	10	0
Media Mandla (New) .. .. .	..	..	..	From	5	4	0	to	5	6	0
„ (Desi Bhiwandi)—											
Special (Old) .. .. .	..	..	..	From	8	0	0	to	8	8	0
Special (New) .. .. .	..	..	..	From	6	14	0	to	7	6	0
No. 1 (Old) .. .. .	..	..	..	From	7	7	0	to	7	15	0
No. 1 (New) .. .. .	..	..	..	From	6	9	0	to	6	12	0
No. 2 (Old) .. .. .	..	..	..	From	6	14	0	to	7	6	0
„ (New) .. .. .	..	..	..	From	6	2	0	to	6	3	0
„ (Delhi) (Old) .. .. .	..	..	..	From	9	13	0	to	10	9	0
„ (New) .. .. .	..	..	..	From	8	4	0	to	9	0	0

\*At present the only variety sold in Delhi graded under the AGMARK scheme is the fine scented *Basmati* for which there is a good demand on the part of discriminating consumers.

†See page 49 for the origin of the description *Delhi* rice. The term is indiscriminately applied to the fine *Basmati*s grown in Northern India and may in some places include both the raw and parboiled qualities. If the latter, the produce can usually be identified as *Saharanpur Sela Basmati* milled and exported from the town of that name in the United Provinces.

## (3) TRADE PRESS.

Market reports are contained in trade periodicals of which "Capital" and "Commerce" published in Calcutta and Bombay respectively are typical examples. Institutions such as Chambers of Commerce also issue series of weekly quotations covering all the important commodities handled in their areas. The Calcutta Prices Current and Money Market Report published by the Bengal Chamber of Commerce is a good example and is available on payment to members and non-members. In addition to giving freight and exchange quotations and other financial news, it normally contains import and export figures for the port of Calcutta, weather and crop reports, shipping intelligence, the prices of piece-goods and yarn, metals, salt, kerosene oil and miscellaneous commodities together with nearly 200 quotations for various qualities of agricultural and animal husbandry products. No paddy quotations are given but fourteen qualities of rice are reported\*.

Private agencies and firms also issue periodical market reports and price quotations. Some are compiled for sale, others are sent to clients free of charge. In Calcutta, a certain concern specialises in supplying to subscribers import and export statistics of many of the commodities passing through that port. This information gives the names of shippers and importers and the extent of each firm's trade and is thus of special interest.

## (4) POST, TELEGRAPH AND TELEPHONE.

The post is the most important channel of communication in the internal rice trade. Day-to-day prices of rice are relatively stable and the telegraph and telephone are not used to anything like the same extent as in the case of commodities provided with "futures" trading facilities, e.g., wheat, linseed, cotton, etc. On account of its cheapness the post card is probably the most popular method of conveying market information. A typical specimen and a translation of its contents are illustrated opposite this page.

## (5) RADIO.

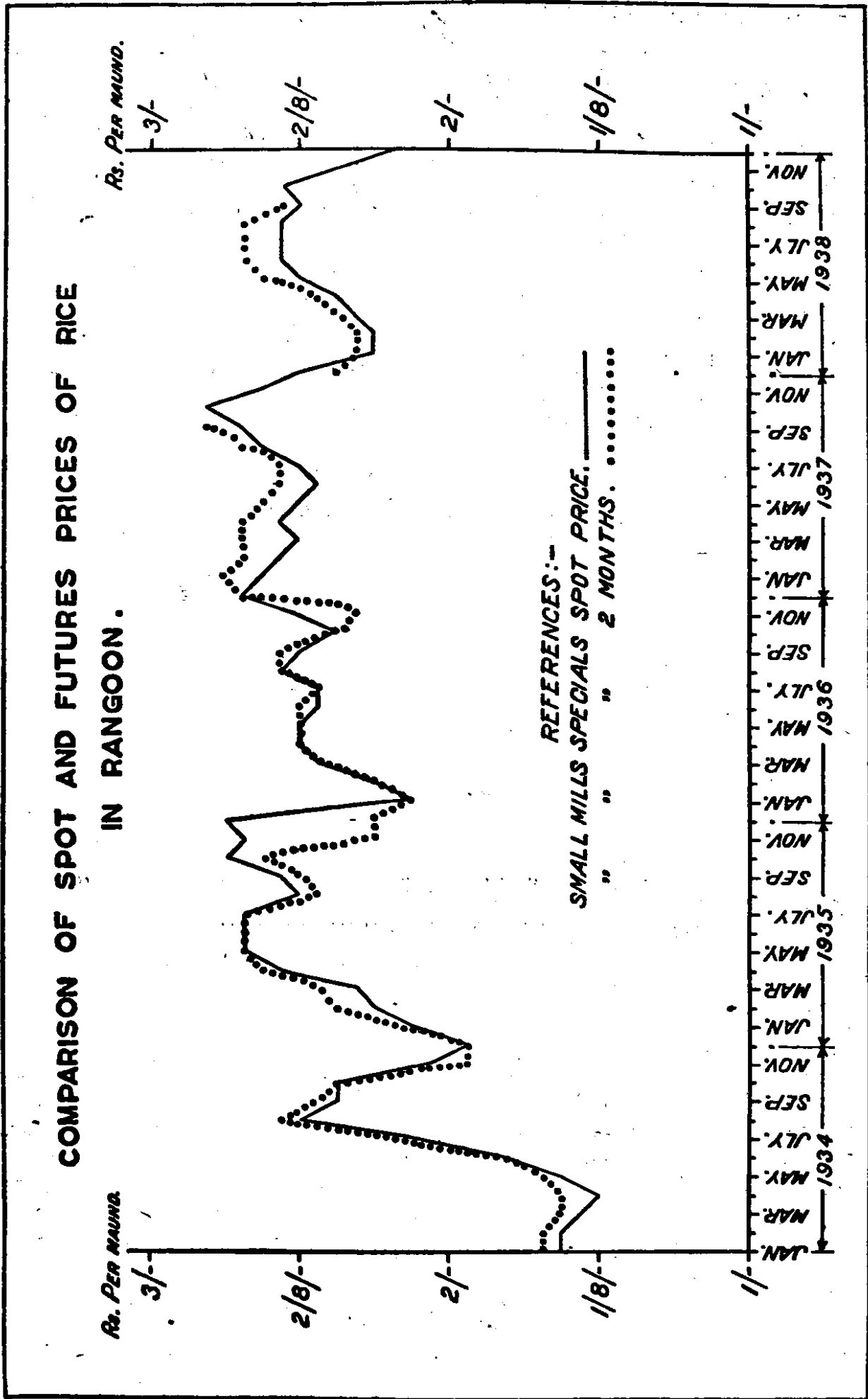
This is a comparatively recent development in India as regards the dissemination of commercial news. As the chain of broadcasting stations now in operation covers practically the entire country† the potentialities of this medium of communication in catering for the needs of the cultivator cannot be over-emphasised. Village receiving sets—the number is still very small—have been provided by the authorities in certain areas and rural development programmes are a feature of more than one broadcasting station. Arrangements made some three years ago by the Central Marketing Staff to provide

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\**Seeta No. 1, Table No. 1, Gross Table No. 1, Nagra, Ballam, Moonghy, Kaala, Kalma (ordinary and mill-cleaned No. 1), Solui, Askuli, Old Hard, Gullan (white) and Rangoon (Small Mills).*

†Transmitters are located at Delhi, Calcutta, Bombay, Madras, Trichinopoly, Lucknow, Lahore and Dacca with Peshawar as a relaying station.







the Delhi Broadcasting Station's rural programme with a daily telephonic service in respect of the prices of a number of food grains at Hapur, an important market in the west of the United Provinces, have been operating so satisfactorily that steps are being taken to institute similar services at other broadcasting centres as, for example, at Calcutta, where sanction has been obtained to include in the rural broadcast a weekly series of market quotations likely to be of value to the growers, as well as a monthly review of the market.

#### (6) CONCLUSIONS.

It will be obvious from the conditions described in this section that considerable scope exists for the improvement of market intelligence. The maintenance of up-to-date price quotations and their dissemination to producers is essential and there should be closer co-ordination between rural development work and the facilities which are now available to ensure the provision of accurate up-to-date price data.

Unfortunately, the system of buying Indian rice on standard contracts is nowhere in vogue. This coupled with the confusing multiplicity of commercial descriptions adds many complications to any comparison of prices and makes it practically impossible to relate values in one market with those in another. However, the recent adoption by small sections of the trade, notably in Madras and in one or two centres in Northern India, of standard grades described under the Agricultural Produce (Grading and Marking) Act, 1937, is a step in the right direction. If the present developments continue, the widespread use of AGMARK grades in various trade descriptions is only a matter of time provided unremitting attention is given to these developmental activities by the marketing staffs. The adoption of these grades must eventually result in some degree of order emerging out of the present chaos in price quotations.

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## BURMA.

## A.—Comparison of prices in Burma and India.

Since practically half of Burma's total exports of rice are consigned to India in an average year it may be of interest to compare the prices of a representative trade description such as *Small Mills Specials* in Rangoon with those of the same variety at an important point of entry into India, say Calcutta.

Following the outbreak of War in 1939, freight rates increased so that the normal price difference between the *ex-hopper* price of *Small Mills Specials* at Rangoon and the price at Calcutta rose to about 13 annas per maund. This is calculated as follows.

	Rs. A. P.	Rs. A. P.
Price of Small Mills Specials per maund <i>ex-hopper</i> at Rangoon in January, 1940 .. .. .		2 14 1
<i>Add charges (per maund).</i>		
Brokerage .. .. .	0 0 2	
Cost of gunny at Re. 0-7-6 per bag (2 maunds) less 4 annas rebate on the used bag = Re. 0-3-6 net per bag of 2 maunds .. .. .	0 1 9	
Labour incurred in bagging, sewing and marking including cost of twine .. .. .	0 0 7	
Interest and exchange .. .. .	0 0 4½	
Fire insurance .. .. .	0 0 ½	
Commission .. .. .	0 0 4	
Burma Rice Merchants' Association's fee including charity .. .. .	0 0 ½	
Boat hire .. .. .	0 0 4½	
River dues and wharfage .. .. .	0 0 4½	
Miscellaneous, including gratuities to shipping clerk, weighman, etc., postage and telegram .. .. .	0 0 1	0 4 1½
Cost f. o. b. Rangoon .. .. .	3 2 2½	
Freight and marine insurance from Rangoon to Calcutta .. .. .	0 5 8½	
c. i. f. Calcutta .. .. .	3 7 11	
Landing charges at Calcutta .. .. .	0 1 2	
Incidental expenses from docks to consignee's godown .. .. .	0 1 0	
Cost <i>ex-godown</i> Calcutta .. .. .	3 10 1	
Seller's commission at Calcutta .. .. .	0 1 0	
Wholesale price at Calcutta .. .. .	3 11 1	

The *pro forma* difference between the Rangoon *ex-hopper* price and the Calcutta wholesale price which as shown works out to 13 annas per maund tallies fairly closely with the actual difference

obtaining between the quotations at Calcutta and Rangoon as will be apparent from the following table.

*Average monthly prices per maund at Calcutta and Rangoon.*

	Calcutta.	Rangoon.	Difference.
	Rs. A. P.	Rs. A. P.	Rs. A. P.
1939—			
October .. .. .	3 11 0	2 15 7	0 11 5
November .. .. .	3 7 0	2 9 4	0 13 8
December .. .. .	3 13 0	2 13 9	0 15 3
1940—			
January .. .. .	3 11 0	2 14 1	0 12 11
February .. .. .	3 11 6	2 14 6	0 13 0
Average .. .. .	3 10 9	2 13 6	0 13 3

The difference shown above relates to somewhat abnormal conditions. Prior to September 1939, gunnies were cheaper and freight was only about three-fifths of subsequent War-time rates with the result that the normal price differential between Rangoon and Calcutta was between 8 and 9 annas per maund. How this compared with the price quotations of the previous period will be seen from the following table.

*Average monthly prices per maund at Calcutta and Rangoon.*

	Calcutta.	Rangoon.	Difference.
	Rs. A. P.	Rs. A. P.	Rs. A. P.
1939—			
June .. .. .	3 1 2	2 8 8	0 8 6
July .. .. .	3 1 3	2 8 0	0 9 3
August .. .. .	3 1 9	2 8 1	0 9 8

The approximate price differentials under War-time conditions between Rangoon and other major Indian ports to which Burma rice is shipped in large quantities are as follows.

Rangoon/Madras approximately Rs. 1-1-0 per maund.

Rangoon/Bombay approximately Rs. 1-2-0 per maund.

Rangoon/Kathiawar (Bhavnagar) approximately Rs. 1-3-0 per maund.

Rangoon/Cochin approximately Rs. 1-1-0 per maund.

These differences are based on freight rates enhanced by 79 per cent in respect of Madras and 62·5 per cent in the case of Bhavnagar and 70 per cent for Bombay and Cochin.

### B.—Seasonal variations.

The diagram facing page 150 illustrates the percentage deviations of the average wholesale prices at Rangoon of four qualities of rice and two of paddy from their annual mean. The curves will be seen to reproduce the same general seasonal trend shown by values of rice and paddy in India. The tendency, therefore, in Burma as in India, is for the price level to be at its lowest during the height of the harvest period from about the end of November to January following a comparatively steep decline having its origin in October. With the completion of harvesting prices tend to rise, steadily and progressively in the case of rice but with a number of intermediate fluctuations in the case of paddy, until the annual high point is reached by the latter in July and by the former in August. Thereafter prices recede, fairly rapidly in respect of paddy but much less so in respect of rice, to touch bottom in December and January respectively when the pressure of impending large supplies begins to make itself felt. On an average the extreme range of variation is 11·4 per cent for rice and 14·3 per cent for paddy. This compares with a seasonal fluctuation of 7·5 per cent and 11·6 per cent respectively for rice and paddy in India. The relatively greater seasonal fluctuations which occur in Burma may be due in considerable measure to the fact that the major portion of Burma's production (65 per cent) being normally exported, the eventual disposal of the local crop is largely dependent upon influence and market factors outside the country, whereas in India the demand is not only inelastic but the vast bulk of domestic supplies have to be supplemented by imports (mainly from Burma) averaging approximately 1½ million tons per annum.

### C.—“Futures” prices.

While there are no “futures” markets for rice (or paddy) in India “futures” trading is carried on in Burma, at Rangoon only. There are no fixed months of delivery and contracts—the units of which are 100 tons—may be entered into for delivery 1, 2, 3 or even 6 months ahead. Although a large number of varieties are handled in the spot or ready market only one quality is tenderable against the “futures” contract of the Burma Rice Merchants' Association, *viz.*, *Small Mills Specials*. There is no “futures” contract for paddy.

Theoretically, “ready” and “futures” prices should move in close sympathy as the latter are normally based on the former *plus* carrying charges such as storage costs, fire insurance, interests, etc. In practice this generally holds good although the expenses incurred in carrying the produce may sometimes exceed the spread between the “ready” and “futures” quotations. This depends entirely on market conditions which are, in the ultimate, created by the views taken by operators. At other times of the year, notably before the beginning of a new season, stocks of old crop have usually fallen to relatively small proportions and new crop prospects may be favourable. In such circumstances the produce which is available for

immediate delivery may be expected to fetch a premium over the "futures" price for delivery of new crop several weeks distant.

Appendix XLVIII which contains the spot prices of *Small Mills Specials* and the "futures" prices for delivery 1, 2 or 3 months ahead, for the 5 year period 1934-35, forms the basis of the diagram facing page 187. For greater clarity the two months delivery price has been selected for comparison with spot values. It will be remarked that "ready" and "futures" prices show a marked concordance of movements. The two months delivery price stands at a higher level than the "ready" price for the greater portion of the year. On the other hand, during the immediate pre-harvest and harvest period which covers, 4 months roughly, from about October to January, the "futures" price is seen to fall below the level of the "ready" quotation. Parity is usually restored by December or January by which time old crop rice has virtually disappeared and new crop fills the market. November is generally the month in which the "futures" contract for 2 months delivery is at its greatest discount. Greater speculative tendencies are involved at this time of the season as new crop values can only be anticipated in the light of current sowings and the outturn likely to result from unpredictable factors such as weather and other natural conditions. This type of market is open to criticism. The existence of this market appears to accentuate the seasonal price fluctuation presumably because there are more sellers than buyers. It has not the stabilising influence of a proper "futures" market. The operations of this market should be examined with a view to improvement.

#### D.—Price differences in respect of quality.

##### (1) RICE.

The rice trade in Burma is largely based on well recognised grades and the comparatively limited number of qualities put on the market (all are machine-milled), are in the main fairly clearly defined. It may be recalled that the more important commercial qualities as described in Chapter I are the *Europe Qualities*, *Small Mills Specials*, *Bazár Quality*, *Small Mills quality*, *Straits Quality* and *Sugandhi* in the raw rice category and *Milchar*, *Full Boiled* and *Long Boiled* in the parboiled. Price differences between these qualities are primarily based on the type of paddy from which the rice is derived and the proportion of brokens, red grains, etc., contained in the finished product. For instance, the qualities destined for the European markets are produced from selected parcels of long, hard grained paddy and are, therefore, comparatively costly. *Europe Super* containing not more than 5 per cent brokens and no red grains ranks dearest, while the somewhat coarse and chalky *Big Mills Specials* quality containing up to 42 per cent brokens of all sizes and a fair proportion of red grains constitutes the lowest grade of rice ordinarily milled in Burma. Of the qualities exported to India, *Big Mills* and *Small Mills Specials* are the most important, *Milchar* and *Sugandhi* occupying a secondary position from the quantitative view point. Other qualities of Burma rices shipped to India are too small to warrant detailed consideration.

Appendix XLIX contains the average monthly prices, from 1932 to 1939, of the four most important qualities shipped to India includ-

ing those of *Brokens No. 3*. These are also illustrated in the diagram facing this page. It will be seen that on the whole *Sugandhi* is consistently the dearest quality imported into India, followed by *Milchar* (steam dried), *Small Mills Specials* and *Big Mills Specials* in that order. Another point of significance is the close degree of sympathy which is so often seen to exist between the variations in the prices of these qualities. This is in marked contrast to conditions in most Indian markets.

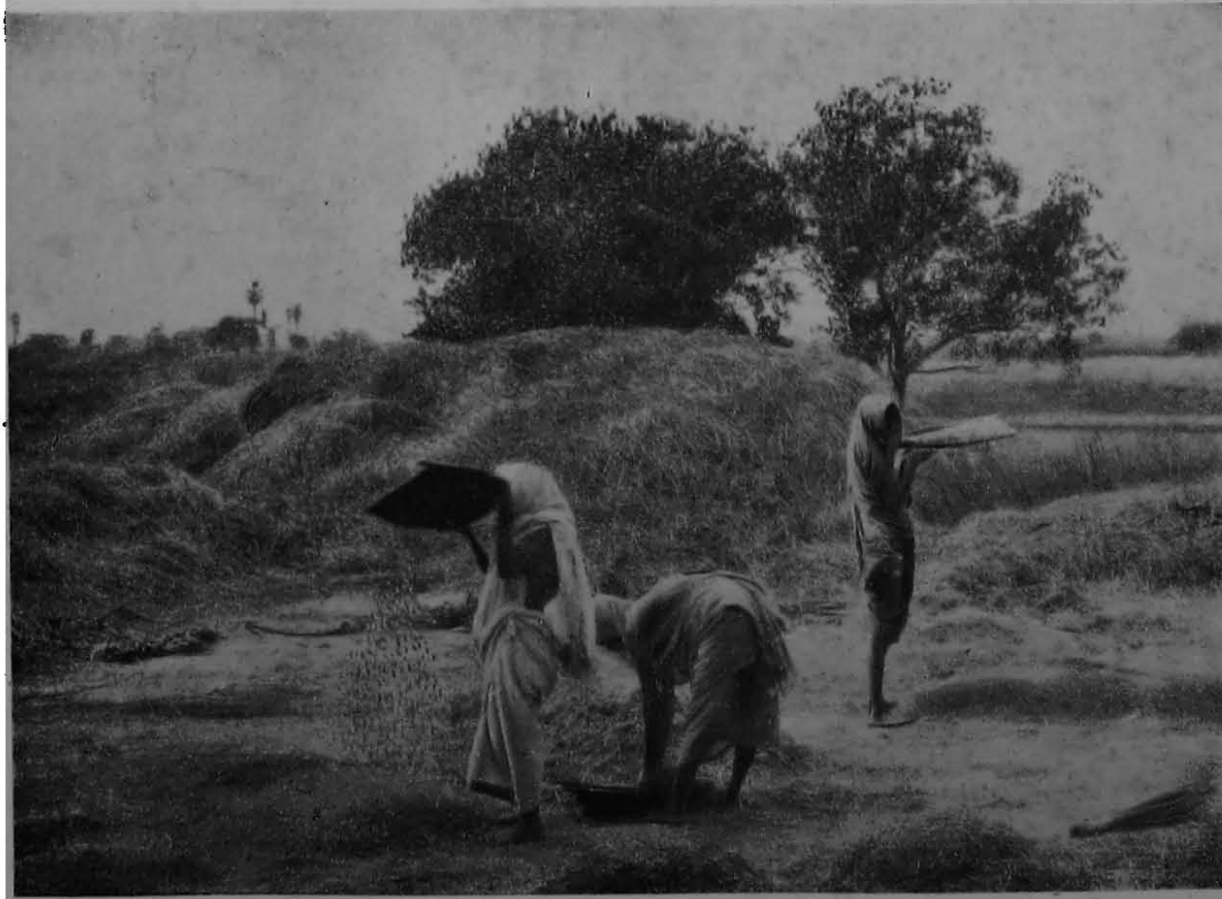
The percentage relationship between the average annual prices of the above four rices, the basic index 100 being applied to the value of *Big Mills Specials*, may be seen from the following table.

*Price relationship between certain qualities of rice at Rangoon.  
(Big Mills Specials = 100).*

	Average price of Big Mills Specials (per maund).	Average price of Small Mills Specials, Milchar and Sugandhi expressed as percentages of the average price of Big Mills Specials.		
		Small Mills Specials.	Milchar (steam dried).	Sugandhi.
	Rs. A. P.			
1932 .. ..	2 7 6	108	106	117
1933 .. ..	1 12 3	106	117	135
1934 .. ..	1 13 9	104	118	117
1935 .. ..	2 7 5	103	111	113
1936 .. ..	2 3 11	109	115	139
1937 .. ..	2 8 3	104	108	121
1938 .. ..	2 4 5	108	108	125
1939 .. ..	2 7 11	104	112	114
Average .. ..	(100)	105	112	123

Comparing *Big* and *Small Mills Specials* it will be observed that during the eight years 1932-39, the price of the latter quality exceeded that of the former within the extreme limits of 3 and 9 per cent. On three occasions in this eight year period the difference was 4 per cent, on two 8 per cent and on one 6 per cent. It should be borne in mind that while *Small Mills Specials* contains approximately the same proportion of broken grains as *Big Mills Specials* none is smaller than one-fourth of a grain and there are fewer red grains. The normal price of *Sugandhi* is appreciably higher than that of the basic quality *Big Mills Specials* and ranged from 39 per cent dearer in 1936 to 13





WINNOWING PADDY.



per cent in 1935. In other years the differences have varied between 17 and 25 per cent except in 1939 when it was 14 per cent. The price of parboiled *Milchar* (steam dried) has been between 6 and 18 per cent higher than that of *Big Mills Specials* in different years. This would appear to run counter to experience in India where parboiled rices are generally cheaper than their raw counterparts derived from the same variety of paddy. It must be pointed out, however, that in Burma parboiled rices are produced largely from the long-grained varieties of paddy belonging to the *Letywezin* and *Ematas* according to the quality of rice to be manufactured. The conditions governing the price relation between raw and parboiled rices in Burma differ from those obtaining in India and values cannot be strictly compared.

The question of price differences between hand-pounded and milled rice does not arise in Burma as the hand-pounded product does not appear to be put on the market.

In regard to differences arising from the age or maturity factor, Burma rices as such, seem not to be stored with this express object in view. However, premiums for old crop (rice milled from old paddy carried over from the previous season's supplies) are paid for a short period after the harvest when rice of the new crop begins to become available. The following table shows that premiums for old rice over new may range up to 18 per cent in the early part of the season.

*Prices of old and new crop Small Mills Specials of Rangoon in December 1936.*

Date (week ending).	Price per maund.				Difference.	
	New crop.		Old crop.		Per maund.	Percentage.
	Rs.	A. P.	Rs.	A. P.		
4th December .. ..	2	6 0	2	12 0	0 4 0	10
11th .. ..	2	7 0	2	14 0	0 7 0	18
18th .. ..	2	8 0	2	15 0	0 7 0	17.5
25th .. ..	2	8 0	2	15 0	0 7 0	17.5

#### (2) PADDY.

Paddy prices in Burma are quoted in terms of suitability for different qualities of rice (e.g., *Small Mills Specials*, *Bazar Quality*, etc.); which depend primarily on the structure and conformation of the grain and on such factors as impurity content, milling quality and the proportion of red, shrivelled grains, etc., present in the paddy. The only available trade quotations are in respect of *Ngasein* ("boat"/"rail")\* and *Medon* or *Meedoung* paddies. The latter type in spite of being more chalky and softer than *Ngasein* carries a premium of about one to two annas per maund on account of its

\* Paddy brought to Rangoon by boat or railway.

higher milling outturn and the better taste and digestibility which it is alleged to possess. This is shown in the following table.

*Average annual prices of Ngasein ("boat") and Medon paddies at Rangoon—1932-36.*

Year.	Average price per maund.				Difference.	
	Ngasein (boat).		Medon.		Per maund.	Per cent.
	Rs.	A. P.	Rs.	A. P.	Rs.	A. P.
1932 .. ..	1	10 1	1	11 2	0 1 1	4
1933 .. ..	1	2 3	1	4 0	0 1 9	10
1934 .. ..	1	4 0	1	4 11	0 0 11	5
1935 .. ..	1	11 0	1	11 10	0 0 10	3
1936 .. ..	1	10 0	1	11 3	0 1 3	5

With reference to the effect of other quality factors on prices all that need be stated here is that the produce of certain areas commands a premium by having proved itself by milling results over a long period, to be superior in comparison with the production of other tracts. This superiority is due mainly to climatic and soil conditions and to the availability of an assured water supply. For example, of the *Ngasein-Letywezin* paddies the *Kanaungtoe* ("boat") quality deriving from the secure lands of the Delta zone in the south obtains Re. 1 or Rs. 2 per 100 baskets (46 lb. each) or 3½ to 7 pies per maund more than "boat" paddy from other areas. Again, as between "boat" and "rail" paddy there is usually a similar difference favouring the plumper "boat" grain drawn from riverine tracts.

Other things being equal, differences in price on account of age occur for a short period mainly in November when new crop arrivals begin to appear and may last up to the first week of December. These differences seem to be in the neighbourhood of 3 to 4 annas per maund or from about 12 to 17 per cent as the following records of three years indicate.

*Difference in price between old and the new crop Ngasein at Rangoon.*

Date (week ending).	Price per maund.				Difference.	
	New crop.		Old crop.		Per maund.	Per cent.
	Rs.	A. P.	Rs.	A. P.	Rs.	A. P.
26th November, 1937 .. ..	1	8 0	1	11 0	0 3 0	12.5
3rd December, 1937 .. ..	1	8 0	1	11 0	0 3 0	12.5
25th December, 1938 .. ..	1	7 0	1	11 0	0 4 0	17.0
9th November, 1939 .. ..	1	11 0	1	15 0	0 4 0	14.7

## E.—Relation between the prices of paddy, rice and derivatives.

### (1) PADDY AND RICE.

In order to examine the price relationship between paddy and rice, *Ngasein* paddy and *Small Mills Specials* rice may be regarded as typical qualities for the purpose as the *Ngasein* paddy group occupies the foremost position in Burma's production, while *Small Mills Specials* which is mainly derived from *Ngasein* paddy is of importance in the export trade. Appendix L gives the average monthly prices of *Ngasein* paddy and *Small Mills Specials* covering the period 1934-39, as well as the percentage relationship between the average annual prices of the two products. It will be remarked that there is much less instability in the relationship between paddy and rice prices in Burma than is the case in India. How far this is due to the greater accuracy of the price records available in Burma cannot be assessed, but it is interesting to observe that in six years ending 1939, the price of paddy worked out at an average of just over 67 per cent of the value of the rice derived from it; the lowest percentage being 64·5 in 1934 and the highest 69·2 in 1938. It is, however, probable that the standardisation of qualities and milling practices in Burma has contributed to some extent in bringing about a much greater degree of consistency in paddy/rice price ratios than unfortunately obtains in India. During the entire period the ratio was at its minimum in December, 1935, and its maximum in December, 1934, the respective percentages being 59 and 77.

Practical men in the trade estimate that at average price levels the normal relationship which the value of paddy should bear to that of rice, basing the reckoning on *Ngasein* paddy and *Small Mills Specials* rice, would be about 65 to 66 per cent. The formula used by merchants in order to arrive at the equivalent price of paddy on *Small Mills Specials* basis is as follows. (Price of 100 baskets of *Small Mills Specials* of rice *ex-hopper* × 42 per cent)—Cost of milling = Price of 100 baskets of paddy (*Ngasein*) alongside hopper\*.

For example, if the price of *Small Mills Specials* rice *ex-hopper* is Rs. 250 per 100 baskets (1 basket = 75 lb.), the price of 100 baskets of *Ngasein* paddy (1 basket = 46 lb.) alongside hopper would work out thus.

Rs.  $(250 \times 42/100)$ —Rs. 4 (average cost of milling 100 baskets of paddy) = Rs. 101. Expressed in terms of rupees per maund, the respective prices of rice and paddy on this basis would amount to Rs. 2-11-9 and Rs. 1-12-4, the latter being approximately 65 per cent of the former. This tallies closely with the actual differences obtained in comparing market quotations over an extended period.

### (2) BROKEN RICE.

The rice milling industry in Burma turns out several grades of broken rice of which *Brokens No. 3* is probably the most important so

\*The paddy price for delivery into the mill will be by the commission payable to the mill broker (say, Rs. 2 per 100 baskets) and the cost of unloading the wagon or boat and removing the paddy into the mill (say, Rs. 1 per 100 baskets) at total charge of roughly 10 pies per maund.

far as exports to India are concerned. The price of *Brokens No. 3* may conveniently be compared with that of *Small Mills Specials* as it is mainly in the milling of this quality of rice, that *Brokens No. 3* has its origin\*. The table below will enable the average relationship existing between the products to be seen at a glance.

*Average annual prices of Small Mills Specials and Brokens No. 3 at Rangoon (1934-38).*

Year.	Average price per maund.		Difference per maund.	Price of brokens expressed as a percentage of the price of Small Mills Specials.
	Small Mills Special.	Broken No. 3.		
	Rs. A. P.	Rs. A. P.	Rs. A. P.	
1934 .. ..	1 14 10	1 3 5	0 11 5	63
1935 .. ..	2 8 8	2 0 8	0 8 0	80
1936 .. ..	2 7 2	1 12 1	0 11 1	72
1937 .. ..	2 9 10	1 14 6	0 9 4	73
1938 .. ..	2 7 3	1 9 11	0 13 4	66
Average ..	2 6 4	1 11 4	0 11 0	71

It will be seen that on an average for the five years the price of *Brokens No. 3* works out as 71 per cent of the price of *Small Mills Specials*, the minimum and maximum differences being 63 and 80 per cent in 1934 and 1935 respectively.

It should, however, be noted that although the price trend of broken rice follows in a general way that of rice from which it is separated, the differences between the prices of the two products are subject to some variation. For instance, as will be observed from the diagram facing page 192, while the maximum difference was Rs. 1-2-3 or about 43 per cent based on the rice price in April 1932, the minimum was 4 annas only or 9.5 per cent in July 1935.

### (3) BRAN.

There are two kinds of rice bran produced in Burma, namely, white bran resulting from the milling of raw rice and boiled bran from parboiled rice. The latter is inferior and sells at about 3 annas to 5 annas per maund cheaper than the white quality. The prices of bran as a general rule move in sympathy with those of rice. The relationship between the values of rice and bran will be gauged from

\**Brokens No. 3* is also produced from the milling of *Basar Quality*.

the table below. This shows that bran is generally a little less than half the price of *Small Mills Specials* rice.

	Average price per maund.		Difference per maund.	Percentage.
	Small Mills Specials.	Bran (white).		
	Rs. A. P.	Rs. A. P.	Rs. A. P.	
1934 .. .. .	1 14 10	0 13 10	1 1 0	45
1935 .. .. .	2 8 8	1 0 3	1 8 5	40
1936 .. .. .	2 7 2	1 2 11	1 4 3	48
Average	2 4 11	1 0 4	1 4 7	44

#### F.—Market intelligence.

*Official.*—The weekly Gazette published by the Government of Burma at Rangoon contains records of wholesale and retail prices of a large number of commodities including rice. Wholesale prices are reported in respect of *Kamakyi*, *Sabanet* and *Ngasein* (*Small Mills Specials*), only the last named quality being quoted regularly. The unit of quotation, as customary in Burma, is 100 baskets (7,500 lb.) and generally no appreciable differences occur as between the Gazette quotations and those reported by the trade, such as, for example, can be observed in India. A fortnightly statement of average wholesale and retail prices of several commodities including paddy and rice at the district headquarters is also published in the official Gazette. While no mention is made of the quality of paddy quoted, rice quotations relate somewhat vaguely to a quality termed "common sort". That quotations, certainly at a number of centres, are not comparable will be apparent from an example taken at random which shows that on 19th July 1938, the prices of "common sort" rice at Rangoon and Maungmya (Wakema) about 64 miles southwest of Rangoon, were Rs. 233 and Rs. 300 per 100 baskets respectively, a difference of Rs. 67 per 100 baskets or over ten annas per basket (75 lb.) which is equivalent roughly to 11 annas per maund. This difference is much too large to be accounted for by transportation costs between the two points and is obviously caused by dissimilarity of quality or defective quotations.

Another important official publication is the Burma Season and Crop Report which under the heading "Prices, trade and stocks" gives a comprehensive review of market conditions and price movements in respect of paddy. Other crops are discussed only briefly.

The Burma crop forecasts are published by the Commissioner of Settlements and Land Records, Burma. There are five forecasts for the rice crop issued from October to February on the fifteenth

of every month. In addition to production data which are expressed in terms of paddy (contrary to the established procedure in India) the third, fourth and the final forecasts also give the estimated exportable surplus in terms of rice including by-products (brokens and bran) converted from the paddy in accordance with the 74 per cent ratio referred to on page 86 in Chapter I.

*Trade.*—Rice and paddy quotations are published, generally in some detail, in most newspapers, Burman as well as English. There is also an important and comprehensive bulletin issued daily by a well-known firm of rice brokers in Rangoon. This gives a very full record of current events in the spot and futures rice markets and also contains information relating to other commodities, rates of freight and exchange and summaries of weather and crop reports as and when issued by the authorities concerned. In practically all cases prices are based on standard qualities and can thus be understood and co-related without difficulty.

Other agencies of price dissemination such as the posts and telegraphs, etc., are used in much the same way as in India, the only difference being that the large export trade entails the more frequent employment of the telegraph than is found to be necessary in India.

#### Note on "a reasonable price" for rice.

The question of the uneconomic price of paddy (and rice) has in recent years been given considerable prominence, particularly in the great rice growing maritime provinces of Bengal and Madras. Such importance was attached to this issue that a committee was appointed by the Government of Bengal in July 1938 "to investigate the problem of improving the price of paddy and rice as affecting the Province and to make recommendations in the matter". The Committee's report was published on 20th September 1939, shortly after the outbreak of War and concluded that Rs. 2-8-0 per maund for paddy would attain the objective of a proper price policy having as its basis the harmonisation of the different economic interests in Bengal\*.

The problem was again the subject of discussion at the third meeting of the Rice Committee of the Imperial Council of Agricultural Research in Delhi on 27th and 28th November 1939, at which the following resolution was unanimously adopted.

"That suitable steps should be taken to maintain the price of rice at a reasonable level and for this purpose the Government of India should be moved to consider the advisability of regulating imports of rice".

It was also decided that the question as to what should be regarded as a reasonable price should be further examined and a definite recommendation made.

Arising out of the above, officers of the Central Marketing Staff held a series of informal discussions with the various trade interests concerned at Calcutta, Rangoon and Madras in December 1939, and

\*Since these conclusions were arrived at, the War has greatly altered the previously existing "normal" relations between the various commodities and has invalidated many of the assumptions in that Report.

January 1940, the outcome of which may briefly be summarised as follows.

At Calcutta, rice millers and shippers, some of whom included large growers, were in general agreement that Rs. 2-8-0, or thereabouts, per maund (82 2/7 lb.) for average quality paddy at mill or assembling centre might be regarded as a reasonable price. On this basis the equivalent price of rice (calculating the average outturn of rice to be approximately 2 units to 3 of paddy and milling costs and overheads to be about 6 annas per maund) would be something like Rs. 4-2-0 per maund *ex-mill*. A typical Bengal variety to which these values would apply would be the well-known *Kalma* rice grown in large volume near Calcutta, particularly in the Burdwan division. It was also the general opinion that if the price of *Small Mills Specials* imported into Calcutta from Burma could be kept at a level of about Rs. 3-8-0 per maund *ex-dock* it would be possible to maintain the price of paddy and rice in the neighbourhood of Rs. 2-8-0 and Rs. 4-2-0 respectively.

After the Calcutta discussions further conversations were held at Rangoon, early in January 1940, with members of the Burma Rice Merchants' Association in order to ascertain the views of the local trade. It was eventually decided that Rs. 100 per hundred baskets of paddy (4,600 lb.) at Rangoon might be regarded as a fair price for the quality (*Ngasein*) from which *Small Mills Specials* are derived. The equivalent of this is about Rs. 1-12-9 per maund. Converted to rice the parity of Rs. 100 for paddy would be equal to approximately Rs. 260 per hundred baskets (7,500 lb.) for *Small Mills Specials*, *ex-hopper* at Rangoon or Rs. 2-13-6 per maund. Delivered at Calcutta this worked out at about Rs. 3-7-0 per maund, a figure which closely approximated the indications previously given by the Calcutta trade.

As regards the maintenance of the price of *Small Mills Specials* at Calcutta, Madras and other exporting centres in India at a reasonable level, it was agreed that this might be achieved by means of a system of regulating exports from Burma by licence, administered by the Burma Government since it was considered that any such scheme could not be worked voluntarily with any prospects of success.

At Madras, the Rice Merchants' Association at that centre expressed the opinion that since Burma broken rice normally constituted the larger share of the total receipts of Burma, rice into Madras port it was this quality which played the most important role affecting the price of local rices. The local trade considered, therefore, that if Burma brokens of the grade known locally as *Broken Ordinary* (*Broken No. 3* produced from milling *Small Mills Specials*) could be kept at a level of about Rs. 3-8-0 per maund delivered at Madras this would allow average quality paddy at large surplus producing areas to be sold at about Rs. 2-8-0 per maund which would enable the rice deriving from such paddy to be marketed in consuming centres such as Madras city at roughly Rs. 4 to Rs. 4-4-0 or Rs. 4-5-0 per maund.

At the time these discussions were taking place the actual situation as regards prices in Madras was briefly as follows. In the third

week of January *Brokens Ordinary* (from Burma) was selling at about Rs. 3-5-6 per maund in Madras city. Relative to this, the then concurrent values of Madras paddies of popular type such as *Konamani* of Coconada ranged from about Rs. 2-4-0 to Rs. 2-12-0 per maund depending upon new or old crop, while the finer varieties were in neighbourhood of Rs. 3 per maund. As regards rice the general level of prices for medium qualities was well up to the Rs. 4 per maund mark. *Molagolukulu* at Nellore was about Rs. 4 per maund while *Konamani* was quoted at Rs. 4-2-0 at Coconada and Rs. 4-6-0 at Rajahmundry.

Having regard to the fact that as compared with Bengal, rice has to be transported greater distances from areas of surplus production to consuming centres in Madras (implying heavier distribution costs), it was considered to be only reasonable to pitch the reference price at Madras somewhat higher than that of Calcutta in order that the Madras grower should benefit to relatively the same extent as the producer in Bengal and the adjacent parts of Orissa whence large supplies of paddy and rice move to Calcutta and its environs. The necessity to do this was patent because of the two annas or three annas per maund additional cost of importing Burma rice into Madras. It was, therefore, suggested that Rs. 3-8-0 might be accepted as a reasonable reference price for broken rice *ex-dock* Madras. This in effect would be approximately *on a par* with Rs. 3-8-0 per maund for *Small Mills Specials* at Calcutta making due allowance for the different conditions prevailing in Madras.

It may be thought that Bombay, as a large importer of Burma rice, should also have been considered when determining a reference price for the imported product. This was deemed to be unnecessary for two main reasons. In the first place Bombay is at a much greater distance from Burma than Calcutta or Madras and it, therefore, costs a good deal more to import rice into Bombay. The parity of Rs. 3-8-0 for *Small Mills Specials* at Calcutta would at the time have worked out at Rs. 3-12-0 at Bombay and considerably more delivered up-country. The general price level of Burma rice in Bombay is thus fairly high relative to Bengal and Madras and on that account its influence on the local product is not of a depressing character. Secondly, Burma rice imported into Bombay is largely consumed in Bombay itself and in the industrial areas and the price at which it is sold does not appear to have any influence on the value of local rices in the rural areas. This is partly due to the fact that the production of rice in Bombay although not inconsiderable on the absolute is, nevertheless, relatively small when compared with Bengal, Madras, Bihar, Orissa and certain other provinces and partly because local production consists of a fairly large proportion of fine high quality rices with which the imported Burma product (mainly *Small Mills Specials*) does not compete.

It will be seen, therefore, that in so far as Bengal and Madras are concerned there was a considerable measure of agreement as to what might be regarded as a "reasonable price", the figure envisaged being somewhere in the neighbourhood of Rs. 2-8-0 per maund for paddy. It may be recalled that a similar conclusion was reached by the Bengal Paddy and Rice Enquiry Committee which stated that a



large number of competent witness held that "if the price of common rice could be increased to about Rs. 2-8-0 per standard maund most of the ills from which the paddy growers of Bengal suffer ..... would disappear".

The critical points appear to be the cities of Calcutta and Madras which are the focal points of the import and distribution of a very large proportion of the rice consigned to the two provinces of Bengal and Madras. It will be readily understood, therefore, that conditions in those two markets vitally affect the whole rice position. Rice millers in Calcutta and Madras considered that they could safely pay Rs. 2-8-0 per maund for paddy if the price of Burma rice imported into India was maintained at a reasonable level, viz., Rs. 3-8-0 per maund both for *Small Mills Specials* ex-dock Calcutta and for broken rice of a quality equivalent to *Brokens No. 3* delivered at Madras.

The trade in Burma also feel that Burman interests would be safeguarded by the maintenance at Calcutta of a price for *Small Mills Specials* not lower than Rs. 3-8-0 per maund. From the informal discussions which took place at the time this was thought to be feasible if Burma undertook to control exports to India by means of licences and reduced or increased shipments to India according as the price of *Small Mills Specials* fell below or went above the parity of Rs. 3-8-0 at Calcutta. Millers and traders in Rangoon, it was gathered, were not opposed to the idea of regulation provided steps were taken to give Burma a larger share of the Indian market by imposing fairly heavy duties on foreign paddy and rice.

Subsequent to the above discussions material changes took place in the price situation. These will at once be apparent from Appendix LI which shows the comparative values of a number of major agricultural commodities (including wheat, gram, linseed, groundnuts, jute and cotton), during the period August 1939 to August 1940. It will be observed that in January 1940, when the question of a reasonable price for rice had just been examined, the prices of all the other commodities had risen to a much greater extent than rice, although with two exceptions in Madras, the price of paddy and rice had already attained a level as high or higher than that specified as representing a "reasonable price". In January, for example, *Small Mills Specials* were quoted at Rs. 3-11-0 per maund at Calcutta. *Mota* (coarse or "common") paddy at Rs. 2-8-0 and *Patnai* (fine) paddy at Rs. 2-15-0.

After January 1940, the positions of both paddy and rice greatly improved relative to the values of the other commodities so much so that by August 1940, paddy and rice showed larger net gains over August 1939, than the other crops the prices of which had all fallen, in some cases precipitously and in one instance (groundnuts) to below the August 1939 level. In August 1940, *Small Mills Specials* stood at an average of Rs. 4-2-9 per maund at Calcutta with *Mota* (coarse or "common") paddy at Rs. 2-12-6 and *Patnai* (fine) paddy at Rs. 3-0-6. In Madras, paddy of the popular *Nellore Samba* and *Punasa* variety was quoted at Rs. 2-9-3 and Rs. 2-15-3 per maund respectively.

*Wholesale prices.]*

### INTER-CHAPTER THREE.

World prices of rice have very little direct influence on Indian prices as a whole, although in the maritime provinces the prices of certain cheap domestic rices, as for instance, *Kazla* in Bengal and *Kusuma* in Madras are considerably affected by fluctuations in the prices of those qualities of Burma rice which are ordinarily imported into India in large quantities such as, for example, *Small Mills Specials* or *Brokens No. 3*, the latter being of special importance in Madras.

In the export trade, the prices prevalent in markets abroad sometimes have little relation to the prices in India on account of the subsequent processing or re-milling the rice exported from India is put to. For instance, in the United Kingdom market, a very wide difference exists between the price of *Seeta* rice—a hand-pounded rice from *Patnai* paddy grown in Bengal—and *Cleaned Patna* rice which is prepared by re-milling *Seeta* rice and giving it a high polish; the price of *Cleaned Patna* is at times double that of *Seeta* rice.

In India there is no such thing as an average price of rice. Any examination of rice prices is handicapped by several factors such as the existence of an enormous number of varieties, the complexities of consumer's preferences, the localisation of production types, the localised nature of demand and the non-existence of any representative type or standards of quality. Relatively few of the many commercial varieties enter into Inter-provincial trade. Another striking feature of the rice trade in this country is that, excepting in the Madras Presidency and a few other places, there are no large

conveniently appointed assembling markets for paddy, and large quantities of the latter never enter the markets at all, being acquired by millers or their agents and traders, directly from the threshing floor. As a result detailed and fairly complete records of paddy prices are not available for a number of local centres, and when available, are frequently found to be biassed.

From the grower's point of view the seasonal depression in prices is a very important factor. In common with other agricultural products the prices of rice and paddy are subject to well-defined seasonal fluctuations which are greatest in the case of paddy. Rice prices are depressed between December and May and lowest generally in January, noteworthy exceptions being the Central Provinces and Assam, where prices are lowest in March and April respectively. These periods on the whole synchronise with large arrivals after the harvest. Taking India, as a whole, the extreme range of seasonal fluctuation in the price of rice averages 7.5 per cent, the provinces with the highest and lowest fluctuations being Assam with 9.7 per cent and the Punjab 2.75 per cent. It is interesting to compare these proportions with wheat in which the highest and lowest ranges were 13.25 and 5.5 per cent respectively.

While the extreme seasonal fluctuation in respect of rice values averages 7.5 per cent, that of paddy ranges from 9.4 per cent in Assam to 21.8 per cent in Madras, averaging 11.6 per cent. The harvest depression is, therefore, particularly marked in case of paddy. This is easily explained by the fact that the primary seller of paddy is invariably the cultivator, while the primary seller of rice may be a merchant, miller or professional dehusker. The average producer has no means of regulating his supplies to the demand, mainly on account of his need for cash at the harvest time and consequent inability to hold the produce.

Rice prices in different markets show little or no tendency to move in close sympathy. Prices at a consuming centre do not necessarily follow closely the market whence supplies are drawn and may in fact show diametrically opposite tendencies. Often the margins earned in distribution specially of the fine rices like *Basmati* are disproportionately high.

The main quality factors on which price differences are based are (a) conformation (fine, medium and bold), (b) raw or parboiled, (c) machine-milled or hand-pounded, (d) variations in grade or quality, (e) age or maturity and (f) colour artificially applied. Generally, fine rices are relatively costly and bold or coarse varieties cheap and medium ones of intermediate values. In Northern India, in the Punjab and the United Provinces and in Bombay, fine rices were found to be, on an average, about double the price of bold, while in Sind and the Central Provinces, fine types were dearer by 55 to 71 per cent than bold rices. The fine rices grown in the above-mentioned areas are generally highly priced scented varieties practically all of which are marketed after careful sifting and dressing which greatly add to their cost. On the other hand, in the Madras Presidency markets the premium commanded by fine over bold varieties has been found to range between 11 and 16 per cent. This may be due to the fact that none of the fine rices in this province appear to possess the characteristics of fragrance so highly esteemed throughout Northern India and many other central and western parts of the country. The price relationship between medium and fine and medium and bold categories is also highly variable. It may, however, be noted that the relationship between fine, medium and bold varieties is not constant owing to the fact that the prices of the trade description in the different categories are liable to fluctuate independently of each other in accordance with the dictates of local supply and demand. Therefore, the ratios given should not be regarded as fixed or

absolute measures, but as an approximate indication only which is subject to wide variations.

If the prices of raw and parboiled rice prepared from the same variety of paddy are compared, it is found that parboiled rices are generally cheaper than their raw prototypes. The evidences available during the survey showed that parboiled rices are cheaper than raw rices by an average of from 8 to 10 annas per maund in respect of fine and medium rices and anything from 1 to 6 annas for the bold category.

Fine and medium hand-pounded rices are generally dearer than machine-milled, with some exceptions of medium varieties. The premium on hand-pounded quality does not always apply to bold rices. It was found, for example, that small premiums were quoted in favour of hand-pounded types of bold rices in some markets, while in others there was no material difference between the two, or the difference if any favoured the machine-milled product.

So far as price relates to differences due to variations in the grade or quality due to impurities, broken grains, etc., it should be noted that with the exception of a number of grade specifications laid down comparatively recently under the provisions of the Agricultural Produce (Grading and Marking) Act, 1937, in respect of certain specified varieties of rices no generally accepted standards of quality are recognised in respect of Indian rices. It was found in a number of instances during the survey that a close degree of relationship could not be established between the quoted price and quality as reflected by actual physical analysis of the produce. For instance, a sample of *Patnai* variety containing an admixture of 21.7 per cent of other varieties and 4.05 per cent of broken grains was valued at Rs. 4-9-0 per maund or only 1 anna per maund below another lot of the same variety containing 5.2 per cent of other varieties and 3.02 per cent broken. Obviously, the disparity in the

qualities of the two samples should have resulted in a much greater difference in price than merely 1 anna. Many such instances occur and seem to indicate that the present system of assessing quality merely by visual examination is not altogether accurate and in the absence of physical standards for reference depends wholly on the eye alone. This is liable to place sellers at a disadvantage as the bargaining power vests more often than not in the buyer's favour. In contrast with this, it is interesting to note price differences based on clearly defined grades under the Agricultural Produce (Grading and Marking) Act, are fairly consistent and intelligible.

Old stored rice (or rice produced from old paddy) generally sells dearer than the newly harvested produce. This is especially so in the case of finer varieties which are held in store with the express object of taking advantage of the premiums which discriminating consumers are willing to pay for well matured produce. In India, as a whole, it may be stated as a point of considerable marketing significance that for one year's storage, 12 to 20 per cent premium is obtained in the case of high quality fine rices and 5 to 10 per cent for others as compared with the price of the new crop.

In many instances rices tinted by the external application of colouring agents are sold at a small premium over their untreated counterparts deriving from the same variety of paddy. Bombay, however, is an exception, where untreated rice often fetches better price than the coloured form. Colour is, therefore, a quality factor mainly local in character and of minor importance, being responsible for differences in prices up to a maximum of 2 annas per maund.

In the case of paddy price differences due to quality are based on (a) conformation or grain size, (b) milling quality, (c) age (in certain areas only) and (d) physical characteristics, such as impurity content, proportion of damaged or defective grains, red grains,

admixture of other varieties and moisture content. As with rice, fine paddies are normally dearest and the bold the cheapest with medium varieties falling between the two extremes, but the difference between fine or medium and bold paddy are somewhat smaller than those of rice.

Milling quality as judged by rubbing a few grains of paddy between the palms of hands or by means of two small wooden boards was found to be responsible for a difference of 4 to 5 annas per maund in the case of fine varieties and 2 to 3 annas in the case of medium and bold types in favour of good samples. Differences arising from this factor are more pronounced in tracts notable for raw rice production.

Premiums for paddy harvested 12 to 15 months previously are paid in respect of a number of fine and medium varieties in the provinces of Madras and Bombay and the States of Hyderabad, Mysore and Travancore.

The presence of foreign matter, defective grains, admixture of other varieties, etc., and moisture content also determine the value of paddy. Unfortunately, no fixed basis of price differentiation respecting these as well as other quality factors is known to exist. As with rice, paddy values also are assessed by visual examination. In many areas, it is customary for allowances to be conceded by the seller to the buyer in the shape of extra weight to compensate for presence of foreign matter, impurities, etc., which is tantamount to a reduction in price. Wherever the system of extra weight prevails the imposition is always observed irrespective of the actual quality of the produce which may be of much higher standard than the average run of quality in the market.

The proportion which the price of paddy bears to that of rice may be anywhere between the extreme limits of 35 and 75 per cent depending upon variety, locality

and market conditions. This relationship is more widely variable in the United Provinces and the Punjab, where the price differences between the high grade fine rices and bold varieties are very marked. On the other hand, in the South and in the major rice growing provinces of Bengal, Bihar and Orissa paddy-rice ratios in respect of the different categories do not differ very widely. The relationship between the prices of rice and brokens displays considerable diversity in different markets and in respect of different varieties. For all practical purposes it may be stated that broken rices deriving from ordinary cheap and medium priced varieties average from about 50 per cent of the value of whole rice, as in Bombay and the Central Provinces to about 65 per cent in Madras. In the case of the highly priced trade descriptions, brokens are relatively more expensive and range from about 60 to more than 75 per cent of the value of the rice. Fragments appear to be valued very roughly at one-third of the price of the rice from which they are separated.

A considerable scope exists for the improvement of market information. If growers are to obtain better prices for the fruits of their labour the speedy dissemination of reliable market news in an intelligible form is a fundamental necessity. The official prices not only lack representative character, but frequently exhibit astonishing and unaccountable fluctuations. It has been found that in most cases official quotations as recorded in the provincial government gazettes do not correspond with the actual prices ruling in the market and are of no use from a commercial standpoint. In the daily and commercial press the units of weights and measures used and the basis of quotations are different in different markets, which makes it impossible to arrive at any conclusion concerning the relationship of prices in different markets. It is also significant that the prices of paddy are rarely to be found in the daily press or in any trade publications. Steps are, however, being taken by the marketing staffs in certain provinces and States.



to supply to the press through the Director of Public Information a series of prices which can be relied upon for a reasonable degree of accuracy.

The radio has considerable potentialities as a medium for the dissemination of market information. The daily broadcast from the Delhi Broadcasting Station of the prices of a number of food grains at Hapur in the rural programme has proved useful and steps are being taken to institute similar services at other broadcasting centres. To ensure proper dissemination of prices to producers, it is necessary to maintain up-to-date price quotations obtained from reliable sources.

Standardisation of qualities is, however, the most essential pre-requisite for any real improvement in the marketing of rice. Unfortunately, the system of buying Indian rices on a standard contract is nowhere in vogue. This coupled with the confusing multiplicity of commercial descriptions adds many complications in any comparison of prices and makes it practically impossible to relate values in one market with those in another. However, the recent adoption by small sections of the trade notably in Madras and some centres in Northern India of standard grades for certain varieties prescribed under the Agricultural Produce (Grading and Marking) Act is a step in the right direction. If the present development continues the widespread use of AGMARK grades in various trade descriptions is only a matter of time, provided unremitting attention is given to these developmental activities by the local marketing staffs. The standardisation of selected varieties through the adoption of these grades must eventually result in some degree of order emerging out of the present chaos in price quotations and would ultimately help producers in securing better prices and an adequate premium for the higher qualities.

In Burma, as in India, the tendency is for the price level to be at its lowest during the height of the harvesting period from about the end of November to January. The annual high point is reached by rice in July and by paddy in August. Thereafter, prices recede to touch bottom in December and January respectively when the pressure of impending large supplies begins to make itself felt. On an average, the extreme range of variations is 11·4 per cent for rice and 14·3 per cent for paddy, as compared with 7·5 and 11·6 per cent in India. There is to that extent more need and at the same time more scope for organised marketing by producers in Burma.

A study of "futures" prices at Rangoon, where *Small Mills Specials* is traded in for delivery 1, 2, 3 or even 6 months ahead, shows that "ready" and "futures" prices show a marked concordance of movements. The "futures" prices, however, stand at a higher level than "ready" prices for the greater portion of the year. On the other hand, during the pre-harvest and post-harvest periods covering 4 months roughly from about October to January when producers are selling the bulk of their produce, the "futures" price is seen to fall below the level of the "ready" quotation, which indicates a greater bearish speculative tendency at this time of the season. This type of market is open to criticism as it appears to accentuate the seasonal price fluctuations and has not the stabilising influence of a proper "futures" market. Its operations should, therefore, be examined by the local government with a view either to its improvement or abolition.

As regards price differences in respect of quality in Burma, it should be noted that the rice trade here is based on fairly well recognised trade descriptions and the comparatively limited number of qualities put on the market are more or less defined. Price differences between different qualities are based on the type of paddy

from which a particular rice is derived and the proportion of brokens, red grains, etc., contained in the finished product. Premiums for old crop (rice milled from old paddy) are paid for a short period mainly in November after harvest when the new crop begins to become available.

Paddy prices are quoted in terms of their suitability for different trade descriptions of rices. Differences in paddy prices also occur on account of the tract from which a paddy is drawn. For instance, "boat" paddy drawn from riverine tracts and having a plumper grain commands a premium as compared with "rail" paddy. So far as the relationship between paddy and rice prices is concerned, it is found that there is a much closer relation in Burma than is the case in India. In 6 years ending 1939, the prices of *Ngasein* paddy worked out at an average of just over 67 per cent of the value of *Small Mills Specials* rice derived from it, the lowest being 64.5 per cent in 1934 and highest 69.2 per cent in 1938. The prices of *Brokens No. 3* averaged 71 per cent of the price of *Small Mills Specials* rice for the 5 years ending 1938, while bran is generally a little less than half the price of this rice.

The prices of the *Small Mills Specials* are noted regularly in the weekly Gazette published by the Government of Burma at Rangoon. Generally, no appreciable difference is found to exist between the Gazette quotations and those reported by the trade. This is in marked contrast to conditions in India. The prices published by the trade are not only in respect of rice but also paddy and being based on recognised qualities can be readily understood and co-related without difficulty.

The question of a reasonable price of rice and paddy was examined by the Central Marketing Staff through a series of informal discussions with the various trade interests concerned at Calcutta, Rangoon and Madras in December 1939 and January 1940. It was found that

Calcutta and Madras being important focal points of the rice trade vitally affect the whole rice position and are, in turn, affected by imports from Burma. Rice millers in Calcutta and Madras consider that they could safely pay Rs. 2-8-0 per maund for paddy, if the price of Burma rice was maintained at Rs. 3-8-0 per maund both for *Small Mills Specials ex-dock* Calcutta and *Brokens No. 3* delivered at Madras. At Calcutta with a price of Rs. 2-8-0 per maund of paddy of typical varieties like *Kalma* the relative price of rice *ex-mill* would be Rs. 4-2-0. At Madras, the paddy-rice parity in respect of popular types like *Konamani* works out to Rs. 2-8-0 and Rs. 4 to Rs. 4-5-0 per maund respectively. The trade in Burma also felt that Burma interests would be safeguarded by the maintenance at Calcutta of a price for *Small Mills Specials* not lower than Rs. 3-8-0 per maund. So far as Bombay is concerned the general price level of Burma rice in Bombay is high relative to Bengal and Madras and on that account its influence on the local rice prices is not of a depressing character.

Subsequent to these discussions, however, material changes took place through the abnormal conditions brought about by the War.

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## CHAPTER IV.—PREPARATION FOR MARKET. INDIA.

Reaping, threshing and winnowing are the only three processes involved in preparing for the market commodities such as wheat, barley, gram, linseed, rapeseed and most of the other heavy staples. In the case of rice, however, these operations constitute only the first step. Since the grain is harvested in the form of paddy, or rice in the husk, it is only edible when the husk has been removed. This is achieved by subjecting the paddy to considerable friction by manually operated devices such as the pestle and mortar (*dhenki*) or the grindstone (*chakki*) or by power driven machinery specially designed for the purpose. Before the paddy is husked, however, it may be steeped in water and then given an application of heat, by steam or other means, with the object of toughening the rice kernel and at the same time loosening the husk in order to facilitate the operation of converting the paddy into rice. This process is known as parboiling.

### A.—Harvesting.

The three main crops of rice to which detailed reference has already been made in Chapter I are known as the autumn (*aus*), winter (*aman*) and summer (*boro*) crops according to the times of harvesting. The autumn crop is usually garnered from mid-September to the end of October, the winter crop mainly in December and January and the summer crop in April and May. As the last named forms only a small fraction of the total production of rice in India, the chief harvesting season which is that of the autumn and winter crops may be said to extend over the greater part of the country from about mid-September to the end of January or sometimes even a little later.

#### (1) REAPING.

Reaping is invariably and entirely done by manual labour, the ordinary sickle being used for the purpose. The normal procedure is to leave anything between three and six inches of the stalk standing in the ground. In some of the northern and western districts of Bengal, however, the prevailing custom is to cut only the upper half of the plants, the lower portion being left for cattle to graze. A similar practice is also common throughout the province in respect of the long-stemmed winter or *aman* crop. In no part of the country was it reported that the plants were pulled up or uprooted as is done in the case of wheat in parts of the Central Provinces and the Deccan.

The right stage at which harvesting should commence is when the crop is slightly under-ripe. Although practical experience is the best guide in judging the right time it has been amply confirmed by enquiry from growers that it is not desirable to allow the ear-heads to mature fully. This causes considerable loss by shedding and, moreover, detracts from the value of the produce as the paddy harvested under these conditions tends to yield a rice with much more broken grains. Observations taken by the Department of

Agriculture in Bombay, suggest that eight days' delay in harvesting increases breakages in hulling by 25 per cent and fifteen days' delay by 50 per cent. These precise times and proportions are probably not capable of application to other large rice growing areas, but there seems to be no doubt that the general principle holds good in almost all the rice tracts. It has, for instance, been noticed in the Punjab that overmature grain generally shows "cracks" across the breadth of the kernel and that breakage takes place during hulling at these points.

Premature reaping is also undesirable as the quality of rice is lowered by the comparatively large proportion of imperfectly developed kernels. Generally, the right time for reaping to commence is indicated when the rice kernels in the lower part of the heads have not entirely hardened and the upper parts of the leaf blades have not turned completely dry.

When cut, the plants are bundled into sheaves and frequently laid out to dry in the sun—a method not entirely to be recommended for reasons given in the next section.

Reaping may be done by the farmer himself assisted by his family, or by hired labour. The services of the latter are engaged on pre-arranged daily wages, in cash or kind, or on share-out basis, depending on the quantity reaped. In these respects the custom varies even in the same district. On the whole, however, payment in kind at a fixed rate or share-out basis is the most common procedure.

## (2) THRESHING.

The practice in handling the paddy subsequent to reaping differs both in regard to the interval between reaping and threshing and the methods of stacking the sheaves prior to threshing. In some regions, as for example, in parts of Madras, on the plains of the Punjab (as distinct from the hill tracts which grow rice), in the western districts of the United Provinces, in the Central Provinces and in Bengal (for autumn or *aus* paddy only) the crop is threshed almost as soon as it has been cut. Elsewhere a certain amount of time is allowed to elapse after reaping so that the grain may dry out properly. This process may aptly be termed "curing" and implies the hardening of the rice kernel within its covering of husk. The period between reaping and threshing varies, therefore, from ten days or a week in the United Provinces, the Central Provinces and Bombay to as much as about two months in West Godavari (Madras), the Kangra Valley (Punjab) and Bengal (in respect of winter or *aman* paddy).

The primary concern of the producer is usually to let the sheaves dry as rapidly as possible regardless of the effect such treatment may have on the ultimate quality of the rice and it seems clear that the technique of handling the crop during this important intervening period and its bearing on the hulling quality of the paddy are not fully appreciated by growers.

The results of experiments undertaken in 1934-35 at the Rice Research Station at Hmawbi in Burma (summarised in Appendix

LII) showed that sun-cracking of the rice kernel is influenced mainly by the treatment of the crop immediately before and after harvest and the weather conditions at that time, and that there is a close connection between the amount of sun-cracking and breakage in hulling. The weather conditions cannot be controlled but it would appear that the paddy is capable of yielding a higher outturn of whole rice if the following points, all of which are practicable, were attended to by cultivators when handling the crop.

- (1) The crop should be harvested before it is over-ripe.
- (2) The sheaves, when left for drying in the fields before carting should not be put on wet ground and they should not be spread out in a thin layer over the ground for drying but in compact bundles so that as few ear-heads as possible are exposed to the direct rays of the sun and to dew.
- (3) When stacked round the threshing floor the ear-heads which are generally exposed should be covered over with a thin layer of straw.

The findings of research on this problem are, however, not conclusive as far as India is concerned and more comprehensive investigations would be useful to determine how far the existing methods of handling the crop prior to threshing can be improved so as to diminish the existing high proportion of broken grains in Indian rice which detracts seriously from the ultimate value of the produce put on the market.

Threshing may be done either manually by beating the sheaves against a block of wood until the paddy grains are separated from the straw, or the sheaves may be laid on the threshing floor and the grain trodden out by bullocks. The former method is common in the Punjab (with the exception of the Kangra Valley), in the western districts of the United Provinces, in Assam (autumn or *aus* crop only) and the western and central districts of Bengal and in parts of Bihar and Orissa. Elsewhere treading out the paddy by bullocks is the normal practice, except where the quantity to be threshed is small and it is, therefore, usually simpler to perform the operation by hand.

Threshing floors are generally sited near the village, on a piece of open flat ground and are prepared by overlaying a mixture of mud and cowdung. Sometimes finely chopped straw (*bhusa*) is added to bind the surface and prevent it from breaking up badly under the hooves of the animals treading out the grain. Brick-laid threshing floors are only met with on government farms.

The sheaves are spread out on the threshing floor in a circular layer up to about a foot in depth. A team of two or more bullocks is then made to walk round and round over the sheaves. The paddy grains are separated from the straw by the pressure and friction of the bullocks' hooves and settle down on the surface of the floor. While treading is in progress the straw is raked from time to time to ensure complete separation. As the straw is stripped of the grain, it is removed from the threshing floor and fresh sheaves laid on. At

the end of this operation the grain is left on the threshing floor mixed with a considerable amount of chaff and some impurities such as a certain amount of dust, lumps of mud and bits of stone, etc.

In certain parts, as for example, in some districts of Madras and in Bombay the sheaves are first beaten by hand and the stalks with some of the paddy still adhering are then placed on the threshing floor for the grain to be finally trodden out by bullocks.

The comparative efficiency of the two threshing systems is difficult to resolve on account of certain contradictions. In Bengal, for instance, two men can ordinarily complete the threshing and winnowing of one acre's produce by the beating process in one day. By adopting the treading out method, three men, one boy and two or three bullocks were stated to be necessary to deal with the same amount of work in the same time. Further, when using bullocks the action of the hooves breaks the straw into pieces and disintegrates the threshing floor surface. Apart, therefore, from having extra work to do in winnowing to remove the chaff and other impurities the resulting straw is of little use for making thatch for which it is in much demand in some of the eastern provinces particularly Orissa. These drawbacks do not apply to the manual process which yields whole straw and cleaner paddy.

Contrary views are apparently held in the Punjab where enquiries have shown that the treading out system is regarded as giving cleaner produce than the beating process although resulting in a greater proportion of broken or fractured grains. The latter system is also discredited in this province on the grounds that it causes a certain wastage of grain through scattering. This objection, however, is capable of being overcome by the simple expedient of erecting a screen. Further precautions by way of providing bamboo matting on which the sheaves may be beaten would reduce the dust and chaff content of the paddy to comparatively small proportions. Since it is probably true that in general the treading-out process results in increased breakage as indicated by the Punjab investigations the manual system would seem to be worth adoption especially as a preliminary to the final treading out of the paddy remaining on the stalks. This method is, in fact, adopted widely in Madras.

### (3) WINNOWER.

Where threshing is done by beating the sheaves on a wooden block, no winnowing is usually necessary and only a little dressing may be required to remove whatever chaff may have found its way into the produce. If the paddy has been trodden out, however, considerable quantities of chaff and dust get mixed up with the grain, necessitating a good deal of labour to remove.

The usual method of winnowing is for the winnower to place the mixture of grain, chaff and other impurities in a tray made of wicker or bamboo strips and then lift the tray above his head allowing the mixture to fall slowly to the ground. The chaff and light impurities are blown away by the wind leaving the heavier grain to fall on to the ground near the winnower's feet (see plate facing page 193). If



there is not much wind the winnower may stand on a stool in order to gain height. If the wind is strong, removal of chaff and dirt is facilitated ; but if the wind is still the air is agitated by other helpers by means of a sheet or blanket. These crude and primitive methods do not always succeed in completely removing the impurities from the paddy.

#### (4) COST OF HARVESTING.

Where hired labour is employed for harvesting the crop the services rendered are paid for by daily wages either in cash or kind, or by giving a share of the crop harvested. Exact comparisons are difficult, if not impossible, owing to the fact that all the three operations which normally constitute harvesting namely reaping, threshing and winnowing, need not necessarily be performed by hired labour. In some cases the reaping may be done by the cultivator himself, aided by his family members, outside assistance being obtained for threshing and winnowing. Conversely, hired labour only may be used for reaping, leaving the other operations to be completed by the grower. The prevailing customs vary from district to district but it is noteworthy that cash is rarely employed to pay for agricultural services the wages in kind and share systems being the most common practice over the greater part of the rice producing tracts. The following examples will give some indication of the variations in harvesting charges in different areas.

In Bengal, the total cost of harvesting inclusive of threshing and winnowing is reported to be Rs. 5-10-0 per acre of paddy reckoning the daily wage rate for an adult at 6 annas per head. In the share system one-fifth to one-sixth of the crop of paddy harvested is handed over to the labourers, the estimated value of which may be taken at between Rs. 5 and Rs. 6. In Bihar and Orissa where payment in kind is the general custom, the average all-in cost of harvesting may be estimated at Rs. 5 per acre. In the United Provinces where both the wages in kind and share systems are common, the inclusive charges for harvesting work out at from Rs. 3-8-0 to Rs. 4 per acre in different districts. In the Punjab harvesting operations are paid for by wages in kind usually at the rate of 1 maund 34 seers of paddy per acre which at current values is equivalent to Rs. 3-12-0 or Rs. 4 in the case of bold and medium varieties and Rs. 5 to Rs. 6 in the case of the fine types.

In Sind the cultivator may reap the crop himself or he may call in hired labour in which case payment is made on a share basis, one-tenth to one-fifteenth of the crop reaped being given for the services performed. Threshing is done by treading out the grain by bullocks. The animals usually belong to the cultivator and little outside labour is employed to carry out this operation. On an average it may be reckoned the total cost of harvesting in this province works out at about Rs. 4-8-0 per acre. In the Bombay Presidency reaping one acre of paddy costs an average of Rs. 2-13-0 if cash changes hands, while threshing by treading out the grain in combination with beating and winnowing entails an expenditure of an additional Rs. 3-8-0 bringing the total cost of harvesting to Rs. 6-5-0. In the Central Provinces where reaping is paid for in kind and threshing accom-

plished by treading out the paddy, the cost of harvesting one acre is estimated at Rs. 5-8-0. In Hyderabad, harvesting charges amount on an average to approximately Rs. 6 per acre.

In Madras harvesting is cheaper than probably in any other part of India. Payments are made in kind and range from about one-seventeenth of the crop harvested, as in Malabar, to one-twenty-fourth in Tanjore the latter including reaping, stacking and threshing but not winnowing. In the Coimbatore area hired labourers receive one-twentieth of the crop harvested for reaping, carrying and threshing, while the same proportion is commonly current in East Godavari for all the three processes of reaping, threshing and winnowing.

#### (5) INTRODUCTION OF IMPROVED IMPLEMENTS.

The physical conditions under which the rice crop is grown in India are such as to preclude the use of any means other than manual labour in the operation of reaping. Rice fields are generally small, of very irregular shape, frequently terraced and enclosed by *bunds* or raised borders to conserve the water supply. It would not be practicable, therefore, to use mechanical reapers. As far as can be ascertained no experiments seem to have been conducted in this direction.

In threshing, the use of labour saving machinery has been tried out by the Department of Agriculture in the Central Provinces. Experiments conducted in 1925-26 showed that the cost of threshing by means of Bon Accord Thresher driven by a 1½ B.H.P. oil engine came to Re. 0-1-3 per maund of paddy, while the corresponding figure in respect of treading out the paddy worked out at Re. 0-2-6 or double.

As regards winnowing a type of winnowing machine made by a firm of engineers in Western India has been experimented with in Hyderabad by the local agricultural authorities. The cost of winnowing the produce of one acre by this machine is reported to be as little as Re. 0-8-0. The Department of Agriculture in the United Provinces has also tried out mechanical winnowers for paddy but no details are available as to the results.

Considerations of initial cost and reluctance on the part of the average cultivator to change the traditional customs inherited from his forbears are the main factors militating against any increase in the use of mechanical devices even if these happen to save labour and prove to be more efficient. There is, however, room for development of cheap mechanical rotary threshers of the type used in Japan.

### B.—Parboiling.

#### (1) METHODS.

Before the paddy is husked it is the custom in many areas for the grain to be first subjected to a treatment which includes steeping in water and the subsequent application of heat by steam or other direct means. This makes the husk more easily removable and toughens the rice kernel enabling it the better to withstand hulling or milling. The outturn of whole rice from parboiled paddy is invariably, and often markedly, greater than from paddy which has not been so treated.

Before describing some of the methods used in the parboiling of paddy it is necessary to distinguish between commercial parboiling and domestic parboiling. Whereas commercial parboiling is important in relation to machine-milled rice, nearly 2·6 million tons or 94 per cent of the total output of parboiled milled rice being put on the market, domestic parboiling is the larger factor as the bulk of the 74 per cent of the hand-husked rice retained for home consumption is parboiled in the households of the growers. The importance of domestic parboiling may be gauged from the fact that probably not less than 10 million tons or two-thirds of the average annual production of 15·3 million tons of parboiled rice is treated in the home.

It is not known when paddy first came to be parboiled but it is fairly certain that in so far as domestic parboiling is concerned the practice is almost as old as the ordinary method of cooking rice by boiling it in water. Commercial parboiling existed on a relatively small scale prior to the War of 1914-18 but has greatly increased in the intervening years until by 1937, some 57 per cent of the total Indian production (*less seed*) is estimated to have been parboiled.

The methods adopted are in all, main essentials, the same but the equipment used and the times of steeping and heating vary in different areas. The crudest and most primitive system is that practised in the home by consumers themselves. In all such cases the paddy is intended for hand-husking and not for machine-milling. The product is placed in a tin canister—the ubiquitous kerosene oil tin is often used—brass utensil or earthenware pot and covered with water. The container is then stood over a fire and the water brought to the boil. When the paddy grain has swollen a little and has become soft, a stage which is usually reached when a few grains have burst, it is regarded as having been sufficiently treated. The surplus water is poured off and the paddy spread out on the floor to dry. A more elaborate method adopted in many parts of Bengal is to bring the paddy to the boil, remove it before it has been on the boil for more than a few minutes, transfer the grain to a cold water steep of from 24 to 36 hours and finally boil it again. After the last boiling it is thoroughly dried and is then ready for husking. In the Muzaffargarh and Dera Ghazi Khan districts of the Punjab the paddy is kept heated in water for a period of about 24 hours over a smouldering fire of paddy husk. It is removed, mixed with a little sand and then roasted in an iron pan for about five minutes over a strong fire. The mixture of paddy and sand is kept well agitated during the roasting process after which it is spread out in the sun to dry out thoroughly before dehusking. A somewhat similar procedure is adopted in the United Provinces.

Commercial parboiling implies the handling of considerable quantities of paddy. In order to do so large cement tanks are used for the steeping of the paddy and cast iron cylindrical containers for the steaming process. Two main systems of parboiling are in vogue which may for convenience be termed the "double" and "single" steaming processes. In the first the paddy is placed dry, in the cylindrical containers into which a steam pipe projects. Steam is introduced under low pressure for about one minute if a light

colour is desired in the finished product or five minutes for a darker or yellow colour. The paddy is then transferred to the steeping tanks, into which cold water is poured and left there for anything between 18 and 36 hours. The water is drained off at the end of the steeping period and the paddy is put back into the steaming cylinders and given a second application of steam for approximately 5 minutes (for a light coloured rice) and for 9 to 10 minutes (for dark or yellow tinted rice). Some small variation in the steaming and steeping times are given but this depends on the skill and experience of the operator. The paddy is now removed and spread out thinly on drying floors. These generally have a surface of cement particularly in the case of all the larger mills. Sometimes, however, the paddy is spread on mats where cement floors are situated in the open air, within the premises\*.

A slight modification is sometimes used to obtain a darker colour in the finished product. After the first steaming the paddy is not immediately steeped in water but is taken out of the steaming cylinders and covered up with gunny bags for 6 to 8 hours at the expiry of which the steeping and second steaming process follows in the normal way.

The second or "single" steaming method consists of steeping the paddy in water for one to three days and following it up with an application of steam for anything up to ten minutes. The paddy is then dried as usual. This method is widely adopted where a light coloured product is desired.

Both methods are used wherever parboiling is done on a large scale but the double steaming process is perhaps more common in Bengal, Bihar, Orissa, Madras and Mysore. The description of the parboiling process given above will be readily followed by reference to the plates facing page 77 and this page, which show parboiling actually in progress in a mill in Bengal.

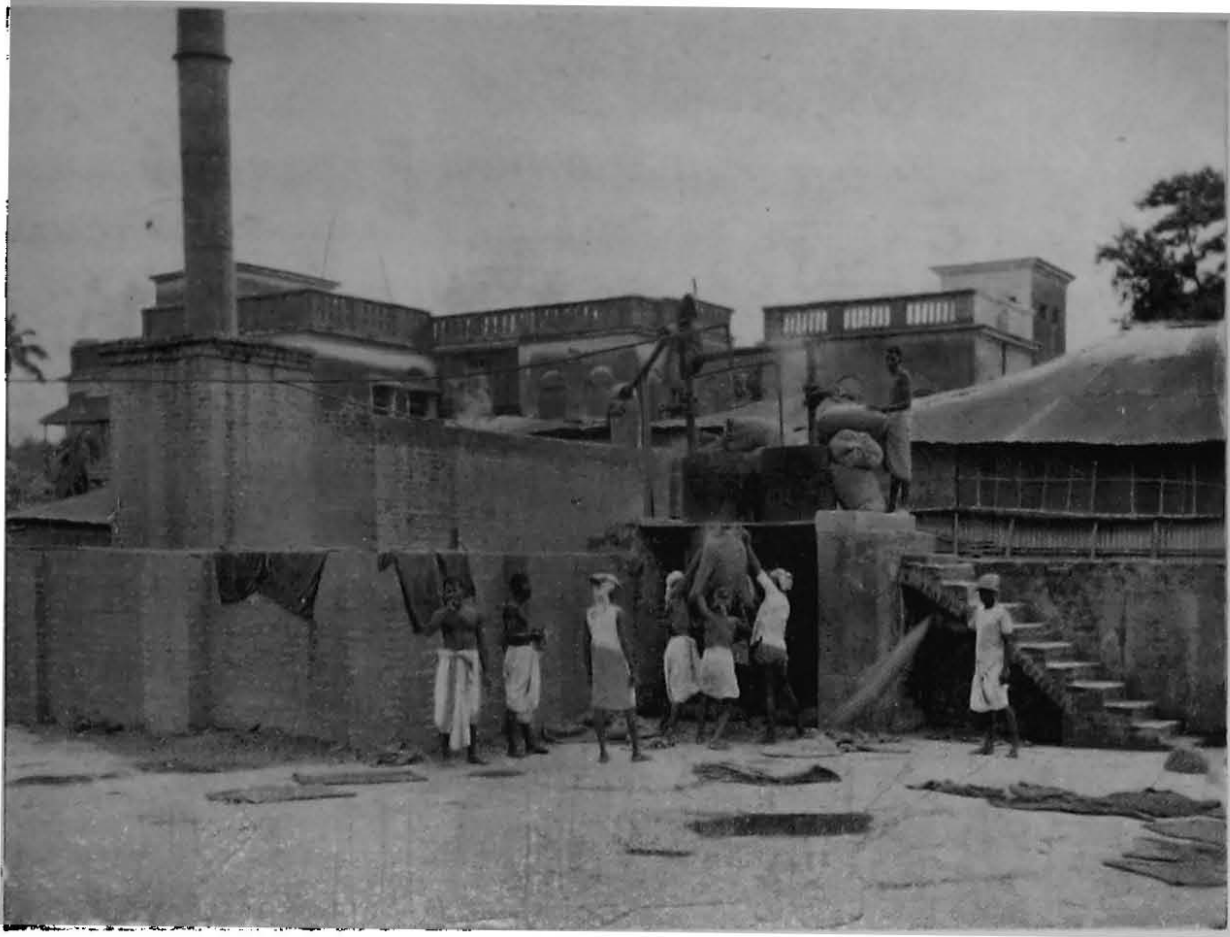
There is yet another system confined mainly to the Saharanpur areas in the United Provinces where high grade fine slender parboiled rice are produced and in the North-West Frontier Province. This does not entail the use of steam, the requisite heat being applied to the previously steeped paddy by roasting it, mixed with sand, in large shallow iron pans over a strong fire.

## (2) EFFECT ON HULLING QUALITY.

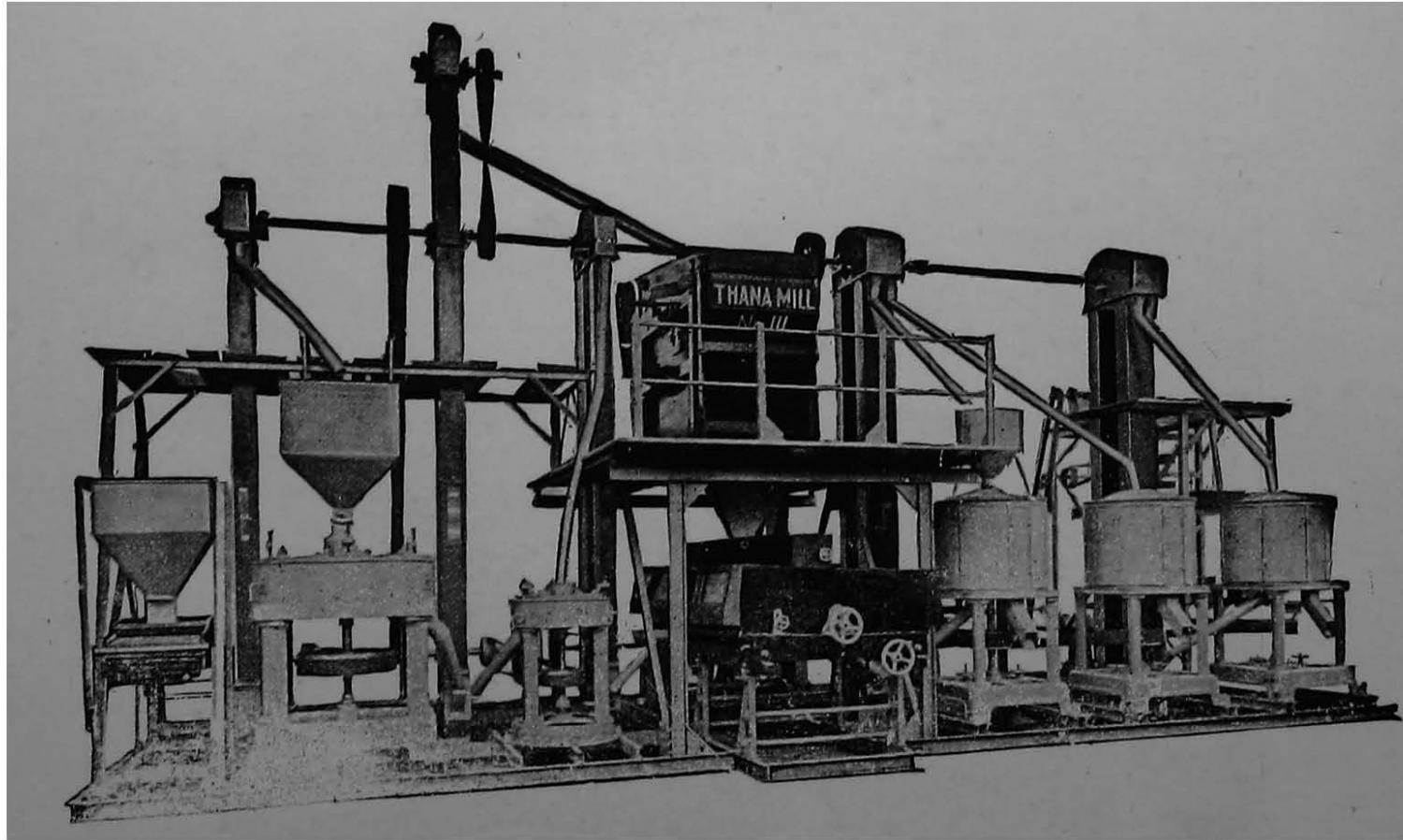
As already noted parboiling results in an increased total outturn of rice as well as reduced breakage in hulling and polishing. It may, however, be remarked that the variations in the methods of parboiling practised in this country, the different lengths of time the paddy is steeped and heated and the varying degrees of efficiency of the equipment employed to convert the paddy into rice, render it impossible to say which is the most efficient system from the point of view of hulling quality. The following extract from a progress report on the scheme

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\*Steam drying is not practised in India except in the Punjab, but is employed on a large scale in Burma where the rice milling industry is up-to-date and highly organised.



ANOTHER RICE MILL SCENE IN BENGAL SHOWING THE STEEPING TANKS AND  
THE PARBOILING OF PADDY ACTUALLY IN PROGRESS.  
Note the steam rising from the parboiling cylinder from the bag of paddy just  
being removed.



A TYPICAL SELF-CONTAINED OR AUTOMATIC RICE MILLING PLANT MANUFACTURED IN INDIA.

*(By courtesy of Messrs. G. G. Dandekar Machine Works, Ltd.)*

of research on "quality in crops with special reference to rice" financed by the Imperial Council of Agricultural Research may be of interest.

"Parboiling invariably improves the milling quality of raw rice. But the milling quality varies largely between different treatments of parboiling. The different varieties of rice also respond very differently on parboiling in regard to milling quality. Longer periods of soaking (48—72 hours) together with steaming at 15 lb. for 15 minutes gave uniformly better results for milling quality with all the varieties studied. Steaming for longer periods results in greater breakages".

### (3) Costs.

The cost of parboiling is included in the cost of milling and is difficult to isolate. Enquiries made, however, show that it varies in different areas according to the nature of the process and the apparatus used. For instance, in the Madras Presidency where parboiling by steam is customary the cost is reckoned at nine pies per maund of paddy. In Sind and the United Provinces where parboiling is effected by a roasting process involving the use of more labour and fuel, the corresponding figure is reported at Re. 0-1-6. In the Punjab also the usual charges are reported to vary from Re. 0-1-6 to Re. 0-1-9, although Re. 0-2-0 per maund is the general rate where parboiling is done on hire. In Bengal parboiling by the single steaming process is estimated to cost about one anna per maund of paddy and about half as much again when double steaming is given but in very large mills with a big turnover this figure would naturally be lower. The individual items of expenditure as quoted by a mill in Madras are reproduced below :—

			(Per maund of paddy).
			RS. A. P.
Filling the steeping tanks .. .. .	..	..	0 0 1
Removing to the steeping cylinders .. .. .	..	..	0 0 1
Steaming .. .. .	..	..	0 0 5
Drying .. .. .	..	..	0 0 1
Removing the dried paddy to the mill .. .. .	..	..	0 0 1
Total .. .. .			<u>0 0 9</u>

### C.—Hulling (conversion of paddy into rice).

The ultimate demand for rice, whether for local consumption or for export, is never in terms of "rough rice" or paddy, and to appreciate the process carried out in a rice mill in converting the paddy of the field into the rice of commerce some knowledge of the structure of the paddy grain is needed.

First comes the outer shell or husk. Within this and forming a thin but closely adhering covering to the kernel is the cuticle or pericarp. The removal of this cuticle discloses an embryo or germ

together with the endosperm which is the embryo's storehouse of food. In actual practice the removal of the closely adhering cuticle from the endosperm almost invariably carries with it the removal of the embryo, leaving behind the white grain which is commercially termed "rice". The husk which constitutes on an average from about 23 to 25 per cent of the whole paddy grain has no food value. The cuticle, together with the germ which is removed with it, constitutes a further 1 per cent or 2 per cent of the whole grain. Being largely composed of fats and vitamins it has a high food value. The remaining 74 per cent to 76 per cent represented by the kernel is mainly starch. With this description of the composition of a grain of paddy in mind it will be possible to examine the process of husking.

In the simplest indigenous method of husking, the paddy is placed in a wooden mortar and pounded by means of a wooden pestle worked by hand or by foot. This cracks the husk disclosing the rice grain and removes much of the inner skin and the embryo. Some of the starchy grain is also broken and powdered in the process. Separation of the whole and broken rice from the husk and dust is carried out by winnowing.

In the modern rice mill, machinery carries out a similar process in a more elaborate way as described in some detail in the next section.

#### (1) POWER DRIVEN MILLS.

(a) *Types of milling plant.*—Two main types of rice milling machinery are used in India. The first is the simple and comparatively cheap horizontal huller of small size and the second the more complicated plant known as the self-contained or automatic sheller in which, briefly, the paddy is sieved and hulled, the products of hulling being automatically separated into husk, whole rices, brokens and bran and the resulting rice finally polished in a pearling cone. An illustration of a typical modern automatic milling plant manufactured in this country is given on the plate facing page 221.

The fundamental principle in the hulling of paddy (and the polishing of rice) is friction. When machinery is employed, friction is applied to the paddy (or rice as the case may be) by one surface revolving within and against another stationary surface. The simplest form of huller is seen in operation in the plate facing this page. The working parts consist of two cylinders (not visible in the plate) fixed side by side on a shaft which is capable of being revolved at high speed, within an outer casing. Both cylinders are grooved, one in such a way as to receive the paddy and the other to discharge it after the husk has been removed. The actual husking is effected by a steel blade set in the outer casing against which the cylinders revolve. The position of the blade is capable of adjustment in order to accommodate different kinds of paddy and to give different degrees of hulling.

Hullers usually work in batteries of two to four but single hullers are often found in rural areas. The first operation is designed



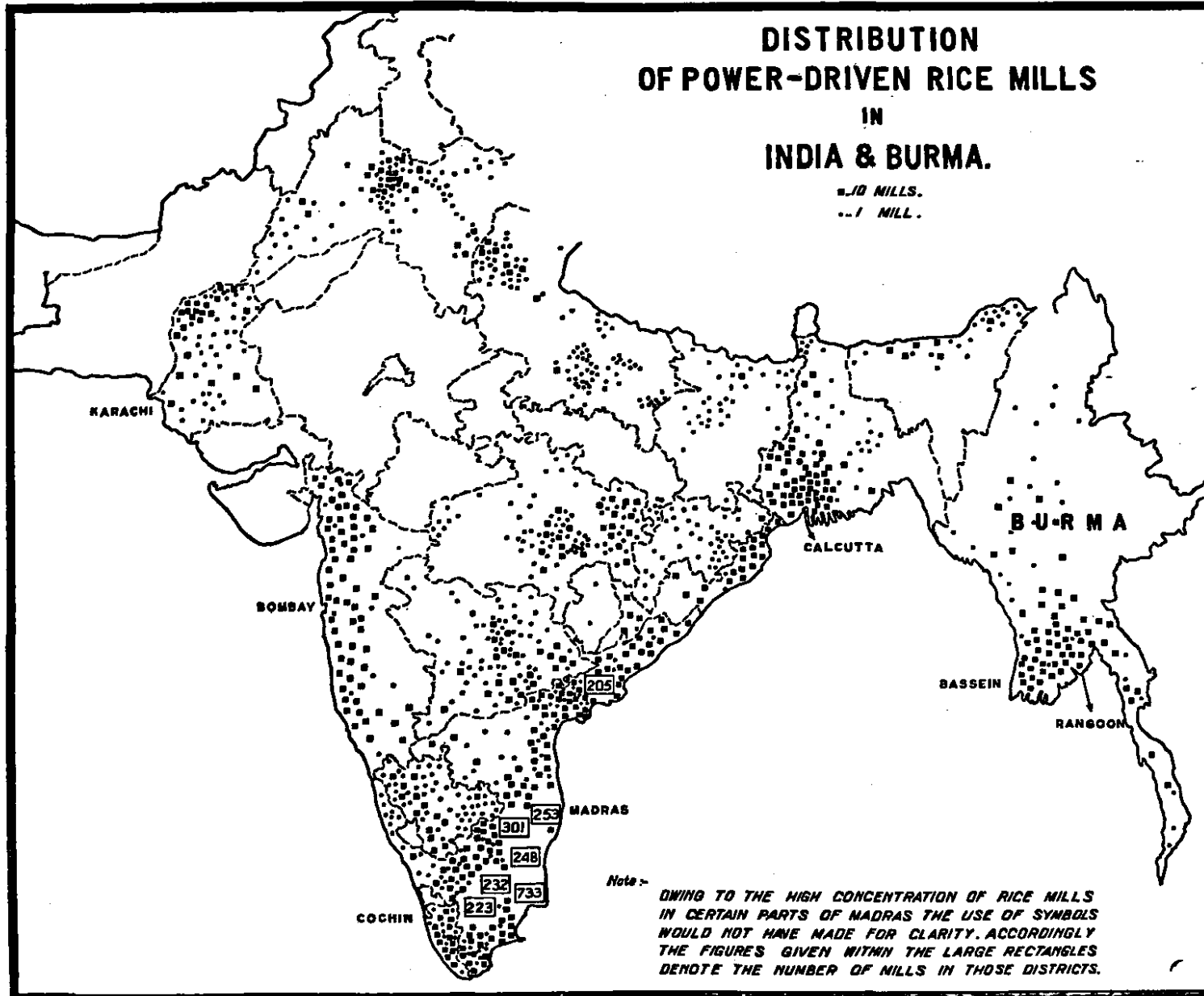


INTERIOR OF A RICE MILL IN BENGAL.

The plant shown here is of the ordinary huller type. Two stages of the hulling operation are clearly visible. The grain being delivered into the basket in the background has only had the husk removed, as its dark colour shows. The second huller has carried the process a stage further by removing the bran and is seen delivering a comparatively white product which is in turn passed through the set of sieves in the left foreground.

# DISTRIBUTION OF POWER-DRIVEN RICE MILLS IN INDIA & BURMA.

■ 10 MILLS.  
● 1 MILL.



*Note -* DURING TO THE HIGH CONCENTRATION OF RICE MILLS IN CERTAIN PARTS OF MADRAS THE USE OF SYMBOLS WOULD NOT HAVE MADE FOR CLARITY. ACCORDINGLY THE FIGURES GIVEN WITHIN THE LARGE RECTANGLES DENOTE THE NUMBER OF MILLS IN THOSE DISTRICTS.

merely to remove the husk and to achieve this a fine or close adjustment is not advisable as it would result in the grain breaking up badly. The paddy is poured into a hopper, the mouth of which is attached to an opening on the top of the outer casing of the huller into which the paddy flows. The friction applied to the paddy by the revolving cylinders against the huller blade cracks the husk and removes it. In the bottom of the outer casing there is an outlet through which the husked rice is ejected together with husk, some unhusked grains, broken grains and bran. The mixture is sometimes sieved to remove some of the unhusked grains, the brokens and bran and may be passed through another exactly similar huller but with a different huller blade setting. This carries the process a stage further by removing some or all the pericarp which is the thin coating of the rice kernel itself. The husk from the previous hulling which is passed into the second huller acts as a "cushioning" or polishing agent. The product which finally emerges contains white rice\* mixed with broken grains, bran and very finely crushed husk, but more often than not the husk is broken up into such small particles by this type of hulling equipment that it is not practicable or worth while to try and separate the two products. The mixture has some food value and is often used to feed cattle, donkeys and horses†. This is sometimes winnowed to separate the bran and husk which is disposed of separately. The rice, that remains, contains whole grains and broken grains of various sizes. Further sifting may be done in order to remove small brokens, but this entirely depends on the miller's choice which is governed by market considerations.

Sometimes three and four hullers are used in series if it is desired to avoid drastic milling resulting in much breakage. If the rice kernel is subject to gradually progressive stages of abrasion it ensures a comparatively large proportion of whole or only slightly broken grains with a fairly good polish. For all practical purposes, therefore, it may be said that this type of huller performs the dual function of husking the paddy and imparting polish.

It is interesting to observe that the above type of huller is used to a much greater extent than the more elaborate automatic plant. As far as can be ascertained it is in fact the only equipment of all the rice mills in Assam, Bengal, Bihar, Orissa, the United Provinces and the Punjab, and preponderates in most of the other rice producing tracts.

A modification of the huller is a huller *cum* polisher arrangement in which the polishing equipment is integral with the huller. These are small machines only slightly bulkier than the huller alone.

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\*The illustration in the plate facing page 222 plainly shows the colour of the product emerging from the two hullers. The farthest one is engaged in the first process of taking off the husk and a very little of the pericarp and the dark colour of the product falling into the basket shows up distinctly. The nearest huller is performing the second stage by removing more of the pericarp as shown by the whiter colour of the product which is seen to be flowing into the basket near the woman attendant's feet.

†It should be noted that the more elaborate milling plant described on pages 224 and 225 separates the husk completely. This has little or no commercial value and where motive power other than steam is employed for which it would normally be used to fire the boilers, or where parboiling is not practised, paddy husk is generally thrown away.

The handling capacity of the average sized huller requiring up to 5 horse power to drive it ranges from about 350 to 500 lb. of paddy per hour and the pre-War (1939) cost of an imported huller of this capacity (without polisher) was about Rs. 650. Locally made hullers, however, can be obtained for about one-fourth of this price or even less.

The second type of milling machinery works automatically with a minimum of manual labour. The following description may be regarded as applying in principle to all similar plants.

On arrival at the mill, the paddy is first of all subjected to a series of sievings and winnowings to remove immature grain and the various kinds of extraneous matter (sticks, straws, sand, stones and lumps of mud) which may have found their way into the produce.

The hulling or "shelling" process comes next, its purpose being to remove the husk from the kernel. The hullers consist of two discs of cast iron, rough coated on their inner surfaces generally with a composition of emery and cement. The lower disc is fitted on to a vertical spindle and can be made to revolve at whatever speed is required, whilst the upper disc is stationary. The paddy is fed through a hole in the stationary upper disc and, entering the space between this disc and the revolving one below, its husk is cracked and removed.

In the setting of these discs to secure the maximum efficiency a good deal of skill is required. At no time is 100 per cent efficiency possible owing to differences in the size and shape of the grains dealt with. A huller set to deal with the "average" grain of the consignment must inevitably pass through it a percentage of small grains which escape abrasion between the discs and remain unhulled, whilst grains which are larger than the average are broken or may have the cuticle and some part of the kernel removed as well as the husk. The products of hulling are in consequence a mixture of husk, husked rice together with some unhusked grains, broken grain and bran.

Winnowing machines or forced draught rotaries separate out the husk. Further winnowing and sieving separates the whole grain (shelled and unshelled) and the larger brokens from the smaller brokens and the bran. The bran from the hullers is sold for cattle feed but the husk has no commercial value. Some of the husk finds a use as fuel for the boilers of the rice mill engines, the rest, being not worth the cost of transport for use elsewhere, are often dumped as unsightly heaps around the mills. During the last fifteen or twenty years, however, the increasing output of parboiled rice has created a demand for paddy husk which is burnt to produce the steam required for steaming the paddy.

The shelled and unshelled whole grain, together with the larger brokens, is then passed on to a "shaker". This consists of rectangular tray forming a smooth and very slightly inclined plane to which a shaking motion at right angles to the incline can be imparted by means of rockers. The surface of the inclined plane is interrupted by a series of plates which are all set about half an inch above the surface of the tray and are arranged to zigzag step pattern from top to bottom of the incline. On the smooth surface of the tray, at

points about half way up the incline, the mixture of shelled and unshelled grain is fed. The shaking motion imparted lengthwise throughout the tray keeps the grains moving on the polished surface, where, by what seems to be a combination of gravity and "slip", aided by the projecting steps, the rough unhusked grain moves up the slope to fall into a waiting receptacle there whilst the smoother husked grains slide downwards for collection at the bottom of the plane.

The unhusked grain is conveyed back to the hullers, while the husked grain, (the *Loonzein* or cargo rice of Burma) is ready for further processing. This, by removing the enveloping pericarp "skin" is turned into white rice.

In preparing white rice a machine called a "pearling cone" is used. This consists of an inverted truncated cone of cast iron, having its surface coated with a mixture of emery and cement and revolving on a vertical spindle. Immediately around this truncated cone is a screen of woven wire, which in its turn is enclosed in an iron casing. The cone is rotated at high speeds, and the outer covering of the husked grain is abraded between the rough surface of the revolving cone and the wire screen, a series of slightly projecting bars of rubber in the wire screen, checking any tendency for the grain to be carried round with the cone and, by causing it to "bank", ensuring that it shall be acted on by the rubbing surfaces. Adjustments of the space between the cone and the surrounding wire screen is carried out by raising or lowering the cone. Great heat is generated in the pearling process and in order to reduce breakage, it is usual to pass the grains through a series of pearling cones in each of which a small part only of the abrading is done.

Pearling is the limit to which processing is normally carried out in India. Where a demand exists for a highly processed rice, the procedure is similar in principle to pearling but less drastic, the cement and emery coated cone being here replaced by drums covered with less abrasive material (sheepskin is the most popular) and the surrounding mesh being of finer wire. Oil or talc may also be introduced during the process to add to the lustre of the grain.

The self-contained rice mill is a more expensive plant than the simple huller. A typical installation manufactured in India and capable of handling 2,200 to 2,800 lb. of paddy per hour was early in 1939 priced at Rs. 10,625 and a larger plant with a capacity up to 3,800 lb. of paddy per hour was quoted at roughly Rs. 14,455. These costs have doubtless increased since September 1939, owing to the War. About 21 B.H.P. is required to drive the former and 31 B.H.P. the latter.

In spite of the relatively high initial cost the self-contained rice milling plant is achieving increasing popularity mainly in the Central Provinces, in Bombay and in parts of peninsular India. It is curious that the eastern and northern provinces have hitherto shown little or no interest in this type of milling equipment.

Until comparatively recently foreign manufacturers practically monopolised the sale of these plants in India. It is encouraging to

note, however, that more than one Indian firm has successfully entered this field of industrial enterprise. The firms concerned are located mainly in the Bombay Presidency.

(b) *Number and location of mills.*—So far as it has been possible to obtain records, the rice milling establishments, large and small (excluding those in which hand-husked or hand-pounded rice is produced) in the provinces and States of India number approximately 8,000. This figure cannot be regarded as a comprehensive one as it has been found impossible to obtain data in respect of large areas in the more remote districts. It is, however, fairly certain that there are not less than 10,000 mills of varying capacity, scattered about the country and in all probability considerably more. They handle annually something like 12 million tons of paddy on an average or roughly 25 per cent of the total Indian crop. The following table shows the distribution of the rice mills in respect of which it has been possible to obtain any definite information and the map facing page 223 indicates the location of these mills in the various provinces and States.

*Number of rice mills in India.*

	Number driven by		Total.
	Oil Engines.	Other forms of motive power.	
Bengal .. .. .	226	345	571
Madras .. .. .	3,100	469	3,569
United Provinces .. .. .	48	133	181
Central Provinces .. .. .	14	329	343
Bombay .. .. .	510	63	573
Sind .. .. .	..	..	271
Bihar and Orissa .. .. .	234	21	255
Assam .. .. .	..	..	138
Punjab .. .. .	..	..	290
Cochin .. .. .	112	..	112
Travancore .. .. .	150	..	150
Mysore .. .. .	37	150	187
Hyderabad .. .. .	112	..	112
Baroda .. .. .	..	..	40

It is significant that rice mills are most concentrated in those districts in which the density of population is high and local production of considerable magnitude. In most instances the surplus producing areas also contain a relatively large number of mills. Madras, for example, reports the existence of 3,569 mills of which no less than 733 are concentrated in the single district of Tanjore, famous for its *Sirumani* rice exports. There are 446 mills in the East and West Godavari and Kistna districts, where a surplus of rice is grown and whence supplies are consigned to all parts of the province, to adjacent territory in the States of Mysore and Hyderabad and even as far afield as Bombay. The rice milling industry of Madras is larger than that of any other province or State in India and handles about 2.9 million tons or 62 per cent of the local crop.

In Bengal only 16 per cent of the crop is machine-milled. As many as 262 mills out of the 571 reported in this province are located in the two districts of Howrah and 24-Parganas in close proximity to Calcutta. These are not only surplus areas but also centres of high consumption. The rice milling industry in Bihar and Orissa comprises at least 255 concerns and deals with 10 per cent of the local production. The mills are concentrated mostly in the Balasore and Cuttack districts of Orissa but there are 6 mills in Patna alone. In the United Provinces, where 181 mills have been reported, only 7 per cent of the local production is machine-milled and rice milling is of special importance only in the north-west of the province, in Saharanpur. Of the 343 rice mills in the Central Provinces where machine-milled rice constitutes 30 per cent of the total crop the majority are located in the Raipur, Bilaspur, Bhandara and Balaghat districts. A very large proportion of the rice grown in the Central Provinces is produced in these tracts. There are 82 mills of which records are available in Assam, 58 being concentrated in Kamrup, Darrang and Sibsagar. The rice mills in Bombay where 55 per cent of the rice production is machine-milled number no less than 573. These mills are concentrated in the Thana and Dharwar districts. In Sind and the Punjab 90 per cent of the production of these provinces is machine-milled. There are 271 mills in the former area, the rice milling industry being very important in Larkana in Upper Sind. In the Punjab there are 290 mills, the majority being located in the Lahore division in the districts of Gujranwala, Sheikhpura and Sialkot.

In regard to the States, the Hyderabad milling industry is located mostly in the Warangal, Nizamabad and Medak districts, while of the 187 mills in Mysore 62, 36 and 27 are concentrated in the Mysore, Shimoga and Kadur districts respectively. Of the 112 mills operating in the State of Cochin 44 are in Trichur district. In Travancore there are 150 rice mills well distributed over the entire territory of the State.

Owing to the varying capacities and degrees of efficiency in India the total number of rice milling establishments in any province or State cannot be regarded as an index of the output of milled rice in that territory. Account must also be taken of the fact that some mills work perennially, others only seasonal or for long or short periods according to circumstances. Bombay, for example, has approximately

573 mills and turns out about 434,000 tons of milled rice. Bengal reports 571\* establishments and an equivalent output of milled rice three times greater than that of Bombay.

It has been possible, however, to assemble detailed information concerning the number and estimated outturn of rice mills in Madras. The relevant particulars are tabulated in Appendix LIX and will enable some idea to be formed as to the great variation in the output of individual mills. Interesting light is also thrown on the types of motive power used to drive these mills. Since the figures given cover a large territory and represent about 40 per cent of the total quantity of rice milled by power driven machinery in India, they may be regarded as typical of conditions in other areas.

The average output per mill, for instance, varies from 140 tons annually in the Anantapur district to 2,380 tons in Kistna and 2,220 tons in East Godavari with a yearly average for the whole province of roughly 800 tons.

NOTE.—It is significant that this figure, independently arrived at, bears out the total estimated all-India production of machine-milled rice given elsewhere as 7.34 million tons. It has, for instance, been reckoned that there are not less than 10,000 rice milling establishments in India and having regard to the fact that the majority of these are small concerns operating with less than four hullers each an all-in average for all classes of mills, including those in Bengal some of which turn out over 4,000 tons in a year, would place the annual average output of milled rice at about 700 tons per mill.

As regards motive power, oil engines are the most popular. In Madras, for example, 3,100 mills are driven by oil engines, 310 by steam and 123 by electricity. Information furnished by oil distributing interests shows that the rice mills of which they had records in 1937 were located as follows.

*Number of oil driven engines used for rice hulling.*

Madras	..	..	..	..	3,100
Bengal	..	..	..	..	226
United Provinces	..	..	..	..	48
Central Provinces	..	..	..	..	14
Bombay	..	..	..	..	510
Sind/Punjab/N.-W. F. P.	..	..	..	..	240
Bihar and Orissa	..	..	..	..	234
Cochin	..	..	..	..	112
Travancore	..	..	..	..	150
Mysore	..	..	..	..	37
Hyderabad	..	..	..	..	112

The trend in the consumption of machine-milled rice has already been discussed in Chapter II. It will suffice to mention here that there has been an increase of 31 per cent or roughly 2.3 million tons in the probable annual output of milled rice in India between 1921 and 1937. Information received by importers of rice milling plant and local manufacturers indicates that sales have diminished in recent years and would seem to point to the rate of expansion of the rice milling industry having slowed down in the past few years.

\*These are the only establishments of which records are obtainable. The list is incomplete for the reasons mentioned earlier.



(c) *Cost of milling.*—The costs of milling vary from one mill to another and from district to district and depend upon a number of factors such as expenditure on labour, fuel, stores, establishment, amortisation, rent rates and taxes and replacements. It is also axiomatic that the greater the output of rice the lower are likely to be the relative costs of production, while the greater the distance which separates the mill from its source of supply of stores and replacements the higher such costs must be. The following two typical examples, one pertaining to a self-contained type of mill and the other to the ordinary huller mill, however, enable some idea to be formed as to the extent and nature of these costs. The figures given are those provided by firms of long standing experience and may be regarded as representative.

(i) Annual expenditure to operate a self-contained type of oil engine driven rice mill fitted with cone polisher and mechanical grader (Thana district, Bombay Presidency).

	Rs.
Labour including engineering staff .. ..	1,320
Supervision and office charges (accounting) .. ..	720
Repairs and miscellaneous .. ..	900
Diesel oil (fuel) and lubricating oil .. ..	1,130
Interest charges .. ..	1,890
Depreciation .. ..	1,470
Total .. ..	7,430

With an average throughput of 40,000 maunds of paddy per year, the cost of milling works out to approximately Re. 0-3-0 per maund of paddy.

(ii) Annual expenditure to run a rice mill operating 4 hullers driven by electric motor (Lahore, Punjab).

	Rs.
Labour including mechanical staff .. ..	550
Electricity charges .. ..	1,250
Supervision and office charges (accounting) .. ..	320
Wear and tear and lubricating oil .. ..	220
Interest .. ..	405
Depreciation .. ..	255
Total .. ..	3,000

In the year during which the above expenditure was incurred the quantity of paddy milled was 28,000 maunds. The cost of milling thus works out at approximately Re. 0-1-9 per maund of paddy. This does not, however, include any expenditure on sieving or grading which is performed by manual labour wherever the rice is milled by the huller system. The average cost of these operations on the quantity of rice obtained from 1 maund of paddy works out Re. 0-0-9. Thus, the total cost of milling including sieving, by a 4 huller plant may be put at Re. 0-2-6 per maund of paddy.

It should, however, be borne in mind that this figure applies to a moderate sized plant of its type producing in this instance fine rices.

Where the rice is passed through one, two or three hullers and the variety handled is a medium or bold one involving comparatively less labour to sieve and grade, the total cost is relatively smaller. It is estimated, for instance, that the lowest cost of hulling a maund of paddy by one huller which gives a less highly milled product comes under normal conditions to about Re. 0-1-6 only.

At the time of writing (in 1940) costs have increased somewhat as compared with 1938-39 and the previous years owing to the enhanced price of fuel, lubricants and replacements, particularly on imported spares. It would, therefore, probably be correct to say that on an average milling costs now range from a little below 2 annas per maund of paddy to about 4 annas according to the type of machinery used and the quality of the rice turned out.

The actual costs as shown in the two examples quoted above are also borne out by rough estimates supplied by rice-millers in various other parts of India. For instance in Assam, Bengal and in Bihar and Orissa, the cost of milling one maund of paddy (excluding par-boiling) was reported to vary from Re. 0-2-6 to Re. 0-3-0 in 1938-39 but is probably a little more at the present time. In the Madras Presidency where the type and size of plant used vary considerably in different districts the milling costs formerly ranged from Re. 0-1-6 to Re. 0-3-0 per maund of paddy but are now very slightly dearer. In Bombay where the self-contained type of mill is found to predominate milling costs were usually reckoned at a flat rate of Re. 0-3-0 but are now probably nearer Re. 0-3-6. In Sind milling is stated to cost between Re. 0-2-0 and Re. 0-2-6, while the general average for the Punjab was Re. 0-2-0. Average costs in the United Provinces are reported to have been Re. 0-3-0 and in the Central Provinces between Re. 0-2-0 and Re. 0-3-0. In Hyderabad milling is usually reckoned at about Re. 0-3-0 on an average. The figures of costs are based on conditions prevailing in 1938-39.

(d) *Hire charges.*—Milling on hire is a common feature of the rice trade in most parts of the country, so much so that a large number of millowners do not trade on their own account but hire out their mills to those who wish to have their paddy hulled and/or polished. In most instances both large and small quantities are catered for.

The question of hire charges is complicated by the fact that the rate charged depends on whether the bran and husk are retained by the mill or returned to the customer. It will also be appreciated that the prices of the various derivatives are an important factor in determining the hiring charge. It has, however, been ascertained that after allowing for the value of bran, etc., if retained by the mill, the hire charges are usually greater than the actual costs of milling and give the miller a margin of profit. For instance, in the Punjab the general rate for milling on hire is about Re. 0-3-0 or an anna or so higher than the actual cost. At Dehra Dun in the United Provinces, where the well-known fine *Basmati* variety is produced only the huller is used. This type of plant does not separate the bran

and the husk, the latter being very finely broken up. This mixture of bran and husk has some food value and is readily purchased by cattle owners and by hillmen for their ponies at prices ranging from 6 to 10 annas per maund. Some of the local mills retain these products and levy no charge whatever for milling. Where cash is paid the charges at this centre are Re. 0-2-6 to Re. 0-2-9 per maund. In Mysore the usual charge is Re. 0-2-0 per maund of paddy with the stipulation that the bran and husk is retained by the mill. Calculating the value of these products obtained from 1 maund of paddy at Re. 0-1-0 the gross hire charge in Mysore would approximate Re. 0-3-0. In the Madras Presidency the average hire charges range between about Re. 0-1-0 and Re. 0-2-9 per maund of paddy according as the bran and husk are retained or returned by the mill.

In the Bombay Presidency and the Central Provinces, however, it was found that owing to intense competition the hire rates charged by many mills often fell below their actual costs. For instance, the general level of hire charges in the self-contained type of mills at Raipur in the Central Provinces as well as in the Thana district in Bombay was about Re. 0-2-0 per maund of paddy which included the value of bran and husk retained by the mills. The low rate may be justified to the extent that it increases the turnover and reduces the overhead charges on the paddy milled for sale on the miller's own account.

## (2) BY MANUAL LABOUR.

(a) *Methods.*—Nearly three-fourths of the total rice grown and consumed in India, i.e., nearly 19·4 million tons, is husked by hand. The bulk is produced by the primitive pestle and mortar (*dhenki*) system.

The mortar usually consists of a large wooden block, generally a tree trunk, in which a cavity several inches wide and deep has been hollowed out. The pestle which is made of hard wood is as large and as heavy as can most conveniently be operated. For use by adults the pestle may be five or six feet in length any correspondingly heavy, but the younger members of a cultivator's family may have their own small light pestles up to about four feet long. The length of the pestle also depends on whether the operator sits or stands to his work. In the former the pestle must obviously be shorter. Pestles may be so shaped about the middle as to afford the operator a good grip with the hands. They are often shod with an iron collar, the rim of which projects a little beyond actual end of the wooden surface. This forms a blunt cutting edge which is reckoned to facilitate the removal of the husk from the paddy. At the same time breakages increase but this does not appear to be regarded as important as much of the rice so prepared is intended for home consumption and is not put on the market.

Where a large or accelerated output is desired two or three pestles may be used on the same mortar in which case the operators strike turn by turn.

When the whole charge has been sufficiently hulled, it is removed from the mortar and winnowed by means of a hand winnowing tray

(*supra*). This separates the rice from the husk. The process is a very rough and ready one as the broken grains other than possibly smallest fragments remain with the rice. After winnowing the product, which normally contains some grains of paddy which have escaped dehusking, is replaced in the mortar and given a further pounding with light strokes in order to complete the process and at the same time impart a little polish to the kernels. The rice which emerges from the second pounding is whiter than the product of the first, owing to some of the pericarp having been removed. A final winnowing is given to separate the bran and the rice is ready for consumption or disposal by sale.

The plate facing this page shows a typical pestle and mortar being used.

In order to handle comparatively large quantities the professional dehuskers generally use a type of *dhenki* illustrated in the plate facing this page. This consists of a short heavy wooden pestle or pounder fixed into the end of a beam 8 to 10 feet in length. The beam is balanced on a fulcrum point in such a way that the leverage required to raise the pestle is comparatively small. The mortar—which may be merely a hole in the ground—is situated directly under the pestle end of the beam which is raised by the operator stepping on the opposite end. As soon as the weight of the body is removed, the pestle end falls heavily into the mortar in which the paddy has been placed. This procedure is repeated continuously until the charge of grain has been husked. Generally after winnowing a final light pounding is given by means of a hand pestle and mortar in order to whiten the rice.

Much ingenuity is often shown in arranging the layout of this type of dehusking equipment in order to entail the expenditure of as little effort as possible on the part of the operators, and to enable the work to proceed as smoothly and expeditiously as possible. In order to obtain the maximum output of rice two or three pestles actuated by the same lever may be worked in a corresponding number of mortars.

The hand pestle and mortar system is only capable of handling small quantities of paddy at a time, not exceeding 10 seers per charge when operated by two women. This takes about 2 hours to dehusk so that one maund or thereabouts of paddy can be treated in 8 working hours. The large *dhenkis'* rate of production is higher but even so cannot be compared with that of the smallest power driven huller. The former, for example, can only deal with about 2 to 4 maunds of paddy per day of 8 hours depending on the number of pestles attached to the beam, whereas the latter's capacity is from 30 to 40 maunds.

In addition to the pestle and mortar system generally employed, paddy may be hulled by means of the hand *chakki* or stone mill. This is the custom in parts of the Punjab and the United Provinces. The *chakki*, which is mainly used to convert wheat into *ata*, employs two grinding stones. Its action is severe and in order to adapt it for converting paddy into rice one of the stones is replaced and in Bombay



HUSKING PADDY BY HAND PESTLE.



HUSKING PADDY BY DHENKI.

The beam with the pestle is on the point of being dropped.

Facing page 233.]



A SMALL VILLAGE HAT AT MOGRA IN BENGAL.



VILLAGERS ASSEMBLED AT MOGRA HAT (BENGAL).  
Each has before him his day's production of hand-pounded rice which is being offered for sale.

for example, a thick wooden disc with a comparatively smooth surface is used instead. In the Punjab the lower stone is covered with a layer of mud about 6 inches thick into which has been embedded the chopped up pith of maize cobs. In the United Provinces the upper stone is replaced by a heavy disc built up of clay mixed with *bhusa* (straw). In the majority of such cases the rice is given a finishing treatment by pestle and mortar, or in a few instances may be taken to a nearby mill for a polish.

(b) *Costs*.—The cost of hand-pounding rice varies in different tracts according to the quality of the work done and the level of wages. For example, in the eastern district of the United Provinces, Re. 0-2-0 per maund of paddy is the general rate whereas in the western districts, notably at Saharanpur, where fine rices are grown and some skill is required to do this operation, Re. 0-8-0 per maund of paddy is quite common. Hand-husking may also be done on contract. At Kashipur, in the east of the United Provinces, for instance, professional dehuskers on being given a maund of paddy are required to return 20 seers (50 per cent) of cleaned rice if the variety is *Hansraj* and 22 seers (55 per cent) if it is *Anjana*. The bran, husk and the remaining rice is retained as their fee. In Bengal the general cost was found to vary between Re. 0-4-0 and Re. 0-5-0 per maund of paddy, while in Bihar and Orissa it is Re. 0-2-0 to Re. 0-3-0. In the Central Provinces Re. 0-2-0 per maund of paddy is the usual rate in the dense rice areas of the eastern parts of the province, while in the districts of sparse rice cultivation the charges are twice as great. In Madras the cost varies from Re. 0-2-6 at Calicut to Re. 0-5-0 in the Ganjam district, the latter being known for the superiority of its hand-pounded rice.

### (3) HULLING OUTTURNS.

Hulling outturns are reckoned not only in terms of total recovery of saleable products (rice, broken rice and bran) but also in the proportions of each. As observed earlier in this chapter, the average paddy grain consists of 23 to 25 per cent husk, 1 to 2 per cent cuticle and germ and 74 to 76 per cent kernel. Normally, therefore, a sample of paddy reasonably free from extraneous matter such as dirt, etc., should yield on hulling roughly 74 per cent of saleable products. The proportions of the various products, *i.e.*, rice, broken rice and bran resulting from the hulling of paddy vary according to the methods used and the type or variety of the grain itself. In Burma where milling practices are reasonably uniform owing to the relatively high degree of standardisation of the two main qualities produced, namely, *Big* and *Small Mills Specials* and where regular records of milling outturns are maintained, the total recovery as well as the proportions of the different products are known with some accuracy. In India, on the other hand, there is not only great variation in the methods of hulling and the efficiency of the machinery used but no records are maintained in the great majority of instances—even in many of the larger mills—and little reliable data are available in respect of recoveries of rice, brokens, bran, etc. This is due to the fact that the hullers and mills are frequently operated

by illiterate or semi-literate persons with only a smattering of mechanical knowledge gathered from practical experience. It is, therefore, only possible to generalise when discussing hulling outturns in India.

Some important factors affecting the outturn of rice are the variety of paddy (rice), harvesting practices, parboiling, hand-pounding and machine-milling. Enquiries in several important areas have revealed that the total recovery of saleable products in the case of fine varieties is generally 1 to 3 per cent less than is the case with bold varieties. The proportion of edible rice, including brokens, is also relatively smaller in respect of fine varieties. Actual milling outturns in a Punjab mill showed that the fine slender *Basmati* yielded 67.5 per cent of rice including brokens, while the bold *Jhona* gave 70 per cent.

The effect on hulling or milling quality of different methods of treatment of the grain during the harvesting has already been described earlier in this chapter. To recapitulate very briefly, it may be regarded as generally harmful to milling quality if the crop is harvested over-ripe and if the cut sheaves are allowed to be exposed to the direct rays of the sun and to the dew. Parboiling toughens the kernel and minimises breakage during hulling with the result that the proportion of whole rice recovery is higher than when raw or untreated rice is hulled. Comparatively less bran is removed when hulling parboiled rice and there is in consequence a correspondingly higher total outturn of rice including brokens.

A few outturns obtained from mills in various parts of the country bear out these facts. In Bengal the outturns of several mills working on different varieties of paddy reveal that parboiled paddy gave outturns of whole rice ranging between 63.3 and 70 per cent plus 1 to 3.3 brokens, but when milling raw untreated paddy the recovery of whole rice fell to between 56.6 and 62.5 per cent and that of brokens increased from 5.0 to 5.8 per cent. The well-known *Patnai* variety was found to yield 66.6 per cent of rice including large brokens when parboiled and 62.5 per cent or 4.1 per cent less, when untreated. Similarly *Banktulsi*, another fine variety grown in Bengal, gave a 65 per cent outturn of rice when parboiled and 60.8 per cent when milled raw. In Sind actual commercial milling outturns showed that the *Kangni* variety parboiled yielded 70 per cent of rice including brokens and only 60 per cent when hulled without previous parboiling. In Mysore the *Mota* variety parboiled yielded 56.1 per cent of rice, including 5.1 per cent of brokens. In contrast the untreated paddy of the same variety gave only a recovery of 51 per cent of rice inclusive of 15.3 per cent of brokens. In the first instance there was a bran yield of 12.2 per cent and in the second 18.3 per cent. Experiments conducted at the Rice Research Station, Nagina, on a fine variety (Selection T. 1) showed that when it was parboiled the recovery was 65.7 per cent of rice and 11.1 per cent of brokens as compared with 60 per cent of rice and 16.5 per cent of brokens from untreated paddy.

Generally hand-pounding gives a higher recovery of rice than machine-milling owing to the fact that in the former process less



of pericarp is removed. The proportion of broken rice resulting from hand-pounding is, however, higher usually than is normally found in machine-milled rice. This is understandable because when the paddy is husked by the pestle and mortar system the grain is subjected to blows of varying intensity whereas in the huller or sheller the abrasion of the husk proceeds steadily, governed by the fixed speed at which the hulling mechanism is made to revolve. Observations made in different areas in which hand-pounding is practised on a large scale show that normally an outturn of roughly 72 per cent of rice including brokens is obtainable from paddy, while the average bran yield is about 3 per cent.

In contrast, machine-milling subjects the rice to more severe treatment which results in the removal of a greater amount of pericarp than is the case with hand-pounding. Consequently the outturn of rice, including brokens, is reduced while the broken grain content is usually relatively less. There are, however, a number of factors each of which play an important part in affecting the outturn of rice obtainable from a given quantity of paddy. For instance, if the grains of paddy to be hulled are not of reasonably uniform size or the paddy consists of mixtures of different varieties of irregular conformation and kernel structure there is liable to be considerable breakage of the rice kernel. Neither the machinery nor the skill of the miller will avail him in his objective of securing a maximum of whole rice if the paddy lacks uniformity. Variations in the size and shape of the grains and in their hardness and softness inevitably mean that hullers and pearling cones, in working down to an average, must work wastefully.

The type of machinery used also affects the outturn of rice. Other things being equal the self-contained type of mill causes less breakage than the single huller as the process of abrasion is carried out less violently. This is the considered opinion of rice millers in general and is confirmed by the observations made during the course of this survey.

The degree of milling has a direct bearing on the outturn of rice. The more the bran is removed the less the outturn of rice. Highly processed rices imply severe milling and as will be seen from Appendix LX, more detailed reference to which is made in the section on Burma the outturn of rice subjected to this treatment is much smaller than when a less finished product is required.

The outturn of rice and particularly machine-milled rice is affected to some extent by seasonal conditions. In the monsoon for example, the tendency is for breakages to increase and outturn generally to decrease. In the cold dry season milling outturns tend to rise partly because the paddy is dried and the outturn of rice shows less loss in weight. No precise details are available in respect of Indian milling results for the reasons already given but some idea of the extent of the possible differences in milling outturns at various times of the year as typified by conditions in Burma where temperatures and humidity are not generally dissimilar from the rice producing tracts of India will be gathered from Appendix LX. With

only one exception milling outturns in cool dry weather are seen to be higher than those of any other season of the year.

Having regard to Indian conditions as a whole machine-milling yields an average of about 68 per cent of rice including brokens, while the bran extraction is roughly 8 per cent. The position in some of the major provinces and States will be seen from Appendix V.

#### D.—Dressing and colouring.

##### (1) METHODS.

In addition to the polish imparted to the rice kernel during the machine-milling and hand-pounding process the grain may be given an external dressing or coating of one or other of a number of substances. As the artificial colouring of rice and the application of materials calculated to improve lustre have already been discussed in Chapters I and II respectively, brief reference to the above practice need only be made here and it should be borne in mind at the outset that the demand for coloured, coated or dressed rices is relatively small and confined mainly to parts of peninsular India and in a much lesser degree to Sind, the Punjab, the North-West Frontier Province and the western districts of the United Provinces.

Colour may also be imparted to parboiled rice. In this case the tint given to the rice is yellow and this is achieved not by any external means but by lengthening the steaming process slightly so that some of the colour in the paddy husk is absorbed into the rice kernel.

Apart from the colouring of parboiled rice attained by prolonged steaming—a practice which prevails for the most part in Bengal, Orissa and Bihar and is done to cater for a special demand, dressing or coating and colouring usually have one or more of the following objects in view :—

- (1) to give an attractive appearance to the rice,
- (2) to produce an impression of uniformity so that any admixture of other and inferior rices may not be readily detected,
- (3) to pass off newly harvested rice as old, and
- (4) to improve keeping quality.

The various agents used fall into two categories, namely, those which give the rice an artificial colour and those which improve the natural colour of the rice by enhancing its whiteness or giving it a gloss or lustre. The former consists of turmeric and yellow and red ochre, the latter of wheat flour, corn flour, talc, powdered rock, salt, castor and groundnut oils and white mineral oil. In all cases the application of one or other of these materials takes place in the finish-castor and groundnut oils and white mineral oil. In all cases, the a product ready for sale.

Turmeric is used in Ganjam (Orissa), Bombay, Sind and the Punjab (where it is normally mixed with four times its weight of wheat flour) and the United Provinces. Yellow or red ochre is the most common colouring agent in Madras and Mysore. Wheat flour is used in Bombay (particularly in respect of rice consumed by the Gujarati community), in the Punjab, in Sind and in the United

Provinces. The method of its application to the well-known parboiled *Basmati (Sela)* of Saharanpur (U. P.) is unique and merits description. A square of thick cotton cloth is suspended from its four corners in such a way that its central portion just touches the ground. Into this is placed two or three bagfuls of the rice which it is intended to polish. Wheat flour is then added in pre-determined quantity and mixed up with the rice. The mixture of rice and flour is now worked together or kneaded by the feet of two or three labourers. From time to time fresh flour may be added depending upon the degree of polish to be given. When it is considered that the rice has been sufficiently worked on it is emptied out of the cloth receptacle and sifted in order to eliminate the residue of the flour. The latter may be used once again if it has not become unduly soiled. This is a somewhat laborious procedure but is apparently well-worth it, as the difference in price between the ordinary rice as obtained directly from the local rice mills and the specially treated article is anything from about eight annas to a rupee per maund in favour of the latter or from 10 to 20 per cent. It is interesting to observe that the local mills do not ordinarily polish their output in this manner. The trade is a speciality handled by wholesale dealers who buy from the mills and have the polishing done on their own premises.

Corn (maize) flour or "American flour", as called in the locality, is used in one or two places in Madras, notably at Kumbakonam in Tanjore. Talc is employed in Bombay and the Punjab where it is mixed with wheat flour in the proportion of one in sixty four parts and used for polishing parboiled rices. Talc is also regarded as a preservative as it is claimed that the high polish affords no grip to the mandibles of weevils and other insect pests. The use of talc is, however, not widespread. Powdered rock salt is sometimes used as a dressing and preservative in Northern India and particularly with the *Daudzai* parboiled rice grown around Peshawar.

Castor oil and white mineral oils are used in Bombay and Baroda. There were no recorded instances of these oils being used in other milling areas although it is possible that the practice is carried on in a few mills. Both the oleaginous materials mentioned used create translucency and are claimed to prevent damage by insects.

#### (2) Costs.

The costs of dressing and colouring are extremely variable owing to the large number and varieties of materials used for the purpose. A few typical examples of costs may be quoted. A merchant in Sialkot (Punjab) whose rice is dressed on contract pays Rs. 7-13-9 to have this operation done on 20 maunds of rice. The cost in this case works out at Re. 0-6-4 per maund. The rice to which this treatment is given is the fine Punjab *Basmati* and the premium obtained was stated to average not less than 8 annas per maund. Where very high polish is given larger premiums ranging up to a maximum of Re. 1 are not uncommon. In the United Provinces at Tanda (Rampur State) the cost of dressing works out at 3 annas per maund. In Madras where the comparatively cheap yellow or red ochre is used colouring costs only 9 pies per maund on an average.

## BURMA.

### A.—Harvesting.

The harvesting of the main or winter crop which covers about 97 per cent of the total acreage under rice in Burma commences about the end of November and is everywhere in full swing during the next five or six weeks. Prior to harvesting, threshing floors (*talins*) will have been made in the fields or on the out-skirts of villages, the cultivators grouping their threshing floors together for security and companionship. A threshing floor is made by clearing and, when necessary, levelling the ground for a space of 20 yards or so square and by plastering this space with cowdung in order to create a hard smooth surface. To this the sheaves are brought and, after drying, are laid two or three sheaves deep around a central stake with heads pointing inwards. Cattle are then driven slowly round the stake to tread out the grain. As the grain is trodden out by the cattle, the straw is removed from the threshing floor and the grain swept into heaps. Winnowing follows (usually by hand), and as this progresses the grain is re-heaped on the threshing floor to await disposal. The right stage of harvesting and the recommended methods of handling the crop subsequent to reaping, as indicated by experiments undertaken at the Rice Research Station, Hmawbi, near Rangoon have been summarised on page 215 and need not be repeated here. Fuller details of the results of these investigations with special reference to the effects of different harvesting practices on breakage on milling will be seen in Appendix LII. It may be remarked that in Burma the position of research and experimental evidence on the question of harvesting treatment as affecting hulling outturns appears to be well authenticated and is at all events clearer than the position in India.

The charges of harvesting in Burma are usually paid in kind and do not differ greatly from those in India. The normal rates per acre for the various operations are as follows.

	Payment in kind in baskets of 46 lb. each.	Cash equivalent.	Rs. A. P.		
			Rs.	A.	P.
Reaping .. .. .	3.80		3	1	9
Carting to the threshing floor .. .. .	0.36		0	4	9
Threshing .. .. .	2.60		2	1	9
Winnowing .. .. .	0.32		0	4	0
Total .. .. .	7.08		5	12	3

### B.—Parboiling.

The procedure in Burma is much the same as in India except that larger units are employed. In this process the paddy is steeped in large brick tanks for periods from one to three days in water which

is initially steam heated to between 140°F. and 180°F., the bolder-grained paddies being given the longer periods and the higher temperature. The period of steeping varies also with the season. After steeping, the paddy is transferred to cylindrical containers in which it is subjected to steam at low pressure for a period of three to seven minutes, the bold paddies again being given the longer time. The paddy is then removed and spread thinly and evenly on mats around the mill to dry before being milled in the ordinary way. Steam drying is practised on a fairly large scale and is the quicker method of driving off the moisture, but is responsible for imparting a peculiar sour smell which appears not to be objected to by the consumers of this type of rice. This smell, however, largely disappears on cooking. This treatment tends to make the grain rather yellow in colour. Steam dried rice is generally sold at lower prices than sun-dried and its comparative cheapness is a factor which outweighs most other quality considerations.

The effects of parboiling on hulling quality have already been referred to in the section on India.

There is a good demand for parboiled rice of all grades and colour. This is due in part to the fact that the less drastic milling leaves in the rice a higher food value and in part to the fact that parboiling confers on it better keeping qualities after it has been cooked. For these reasons it is acceptable to coolies working on plantations and estates where life is strenuous and where the facilities for preparing a mid-day meal are limited.

The average cost of parboiling in Burma is estimated at Rs. 8 per 100 baskets (7,500 lb.) of rice which works out to about Re. 0-1-5 per maund of rice or a little more than 1 anna per maund for paddy.

### **C—Hulling (conversion of paddy into rice).**

#### **(1) HAND-POUNDING.**

Same systems are employed as in India and the pestle and mortar is commonly used where this method of husking is in vogue. Little or no hand-husked rice is put on the market in Burma so that this method of converting paddy into rice has no commercial significance.

#### **(2) MILLING BY POWER DRIVEN PLANT.**

The mills operating in Burma are mostly of the self-contained type fitted with pearling cones. A description of such a plant and how it works has already been given on pages 224 and 225.

As regards the number and location of the rice mills in Burma it may be observed that in the early days of rice-milling in Burma, mills generally were large and they were concentrated at the ports. Even as recently as 40 years ago, in 1894, out of a total of 54 mills in the whole province, 21 were in Rangoon town and 26 in the coastal districts of Amherst, Akyab and Bassein. Since then, improvements in small rice-mill design and the development of the transport services

of the province have encouraged enterprise, and in addition to the big mills at the ports, numbers of small mills are now to be found dotted all over the country. There are to-day in Burma more than ten times as many rice-mills as there were 40 years ago. The spread of mills, zone by zone, is shown at ten-year intervals in the following statement.

*Number of mills in Burma.*

Zones.	1894.	1904.	1914.	1924.	1934.
Lower Burma Wet Zone—					
Sub-Zone 1* ..	8	11	10	11	16
Sub-Zone 2† ..	13	16	41	69	76
Sub-Zone 3‡ ..	33	86	177	320	422
Mid-Zone .. ..	..	4	18	43	50
Upper Burma Dry Zone ..	..	..	17	61	68
Upper Burma Wet Zone ..	..	..	..	4	5
Total ..	54	117	263	508	637

Fully 99 per cent of the rice mills of the province are steam driven. The fuel employed is almost exclusively the paddy husk for which no other important use appears to have as yet been found. Steam, therefore, represents for the paddy mill a very economical form of motive power.

(3) COST OF MILLING.

In regard to the cost of milling no definite information could be obtained from the local establishments. The rates of hire charged, however, are well-known and vary from Rs. 3 to Rs. 6 per 100 baskets (4,600 lb.) of paddy according to the size of mill. Some of the large Rangoon mills with big turnover and consequently low running costs are prepared to work on comparatively low hire charges. The rates of hire demanded by the small mills especially in the up-country districts are higher. The range of charges for Burma as a whole, therefore, works out from about ten pies to Re. 0-1-9 per maund of paddy.

It will be observed that the hire charges levied in Burma are distinctly on the low side when compared with the rates prevailing in India and it may be possible that in a number of cases hire charges as in India may sometimes be lower than actual costs. The almost

\*Akyab, Kyaukpyn and Sandoway.

†Thaton, Amherst, Tavoy and Mergui.

‡Henzada, Hanthawady, Tharrawaddy, Pegu, Insein, Rangoon, Maubin, Pypon, Myaungmya, Bassein and Salween.

universal use of steam as the motive power for driving the rice mills and the utilisation of paddy husk, as fuel is a factor which to a large extent may be responsible for cheaper running costs.

#### D.—Hulling outturns.

In Appendix LX are given outturn statements showing from a representative mill the percentages of the various mill products which are to be expected when milling for the various grades, both raw (white) and parboiled.

The data contained in this Appendix are of special interest as the four qualities of rice produced are milled from the same paddy. The parboiled *Milchar* quality shows an outturn of rice, depending on the season, of from 70·78 to 71·61 per cent, the raw or untreated *Small Mills Specials*, from 61·19 to 64·36 per cent, the fairly high grade *Europe No. 2* quality from 47·41 to 54·07 per cent, the *Europe No. 1* quality from 39·37 to 42·04 per cent and the *Europe Super* quality 28·20 per cent. The proportion of brokens is in inverse relation to the outturns of whole rice; milling the *Milchar* quality results in from ·41 to 1·17 per cent of brokens, *Small Mills Specials* from 3·87 to 6·05 per cent, *Europe No. 2* quality from 11·37 to 17·53 per cent, *Europe No. 1* quality from 21·66 to 24·75 per cent and *Europe Super* 34·19 per cent. The extraction of bran is of course much greater in the case of the *Super* quality than for the parboiled *Milchar*, the respective proportions being 10·85 and 2·59 per cent.

In these statements, however, the figure shown as indicating the quantity of paddy put in must be accepted with reserve. Usually paddy is not actually measured before milling. The quantity put into the mill is calculated after milling from the total outturn of saleable mill-products (*i.e.*, rice, brokens and bran, exclusive of cow bran) which come out.

In milling *Loonzein* and "parboiled" rices the custom is to reckon that the husk, etc., is 11 pounds in each 46-pound basket; for other grades of rice milled the allowance is 12 pounds per basket. The number of pounds of paddy put through is, therefore, arrived at by taking the total outturn of saleable mill products in pounds and multiplying this by 46/35 for *Loonzein* and "boiled" millings, and by 46/34 for others. The figure for total paddy put through, which in this way is expressed in pounds, gives, when divided by 46, the figure for paddy put through in terms of baskets.

The above is the basis of the current practice of taking the total outturn of saleable products in pounds and dividing by 35 in the case of *Loonzein* and parboiled and by 34 in the case of other millings to obtain a figure which expresses in baskets the quantity of paddy originally put through.

35/46 represents a milling outturn of 76·09 per cent saleable products.

34/46 represents a milling outturn of 73·91 per cent saleable products.

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The proportions in which the various components of the saleable products appear will depend partly on the quality of the paddy and partly on the degree of milling given.

The foregoing description of the operations of rice-processing enables some understanding to be obtained of the miller's needs. Usually from the paddy at his disposal his object is to produce whole-grained rice with a minimum of brokens. To this end his mills are equipped and to the setting of the machinery, the hullers and the pearling cones, he brings all his skill and experience.

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[*Preparation for market.*

#### INTER-CHAPTER FOUR.

The grain is harvested in the form of paddy (rice in the husk) and is not edible until the husk has been removed. The preparation for market, therefore, involves, besides reaping, threshing and winnowing, a further process of dehusking by hand operated or power-driven machinery. Before the paddy is husked, however, it may be processed by parboiling which consists of steeping the grain in water and applying heat by steam or other means.

The crop should be harvested when it is slightly under-ripe. If the heads are allowed to mature fully, there is considerable loss by shedding, and such paddy tends to yield a rice with more broken grains. On the other hand, premature reaping is also undesirable as the quality of rice is lowered by the larger proportion of imperfectly developed kernels. Generally, the right time for reaping is indicated when the rice kernels in the lower part of the head have not hardened completely and the upper parts of the leaf blades have not turned completely dry.

After reaping the primary concern of the producer is usually to get the sheaves dry as rapidly as possible regardless of the effect which such treatment may have on the ultimate quality of the rice. The technique of handling the crop during this intervening period and the danger of spoiling the hulling quality of the paddy are not fully appreciated by growers. The results of experiments in Burma show that sun-cracking of the rice kernel is caused mainly by the treatment of the crop at this stage and that there is a close connection between the amount of sun-cracking and breakage in hulling. So far as India is concerned, however, research is necessary to determine how far existing methods of handling the crop prior to threshing can be improved so as to diminish the high proportion of broken grains in Indian rice.

which at present detracts seriously from the ultimate value of the rice in the market.

Threshing may be done either manually by beating the sheaves against a block of wood until the paddy grains are separated from the straw or by bullock treading. The beating process is probably not only more economical, but also gives cleaner paddy as compared with the bullock treading process in which considerable quantities of chaff and dust get mixed up with the grain.

The cost of harvesting inclusive of threshing and winnowing varies from Rs. 3-8-0 to Rs. 6 per acre in different rice tracts. The use of mechanical reapers is not practicable owing to the fact that rice fields are generally small, of irregular shape and frequently terraced and enclosed by *bunds* to conserve the water supply. The use of labour saving machinery has been tried by the Department of Agriculture in a few provinces with some success and there appears to be room for development of cheap mechanical rotary threshers of the type used in Japan.

Before paddy is husked it is the custom in many areas to subject the grain to parboiling treatment. Parboiling results in an increased total outturn of rice as well as reduced breakage in hulling and polishing. Soaking the grain for 48 to 72 hours and thereafter steaming at 15 lb. pressure for 15 minutes is supposed to give better results for milling quality. The cost of parboiling varies from 9 pies per maund of paddy in the Madras Presidency, where parboiling by steam is customary to Re. 0-1-6 per maund in Sind and the United Provinces, where parboiling is effected by a roasting process involving the use of more labour and fuel.

Dehusking by the manual process is done by placing the paddy in a wooden mortar and pounding it by means of a wooden pestle worked by hand or foot. The cost of

dehusking by this method varies in different areas according to the quality of work done and the level of wages. In the eastern districts of the United Provinces, for instance, 2 annas per maund of paddy is the general rate, whereas in the western districts notably at Saharanpur where fine rices are grown and the operation requires some skill, 8 annas per maund is common. In Bengal, the cost varies from 4 annas to 5 annas and in Bihar and Orissa from 2 annas to 3 annas per maund. In the Madras Presidency, the charges range from Re. 0-2-6 at Calicut to 5 annas in the Ganjam district, which is known for the superiority of its hand-pounded rices.

In milling by power two main types of machinery are used in India. The first is the simple and comparatively cheap horizontal huller and the second the more complicated plant known as the self-contained or automatic sheller. Hullers usually work in batteries of two to four, but single hullers are also found in small villages.

It is interesting to observe that a set of 3 or 4 hullers is used to a much greater extent than the more elaborate automatic plant. A typical installation of the latter manufactured in India and capable of handling 2,200 to 2,800 lb. of paddy per hour was priced at Rs. 10,625 early in 1939, while an average sized imported huller capable of handling 350 to 500 lb. of paddy per hour cost Rs. 650, locally made hullers being available for about one-fourth of this price or even less.

Although the initial cost of the self-contained rice milling plant is relatively high, it is achieving increased popularity mainly in the Central Provinces, in Bombay and in other parts of peninsular India. It seems unfortunate that the eastern and northern provinces have hitherto shown little or no interest in this type of milling equipment in spite of its relatively high efficiency in the way of less breakage of grain and recovery of bran without wastage, in comparison with the huller system.

From the figures which it has been possible to obtain

during this survey, it is fairly certain that there are at least 10,000 rice mills of varying capacity, scattered throughout the country and in all probability there are considerably more. They handle annually something like 11 million tons of paddy, *i.e.*, about 62 per cent of the marketable surplus or roughly 25 per cent of the total production.

The cost of milling including sieving by a four huller plant may be put at Re. 0-2-6 per maund of paddy, while the cost of the less highly milled product from a single huller would come to about Re. 0-1-6 only. The cost of milling by an automatic plant having a capacity of 40,000 maunds of paddy per year works out at approximately 3 annas per maund of paddy.

Milling on hire is a common feature of the rice trade in most parts of the country. The question of hire charges is complicated by the fact that the rate charged depends on whether the bran and husk are retained by the mill or returned to the customer. In many cases it was found that hire charges worked out at an anna or so more per maund of paddy than the actual milling cost.

Hulling outturn is reckoned not only in terms of total recovery of saleable products (rice, broken rice and bran) but also in the proportions of each. Normally, a sample of paddy reasonably free from extraneous matter should yield on hulling roughly 74 per cent of saleable products. Some important factors affecting the outturn of rice are the variety of paddy, harvesting practices, parboiling, hand-pounding and machine-milling. Enquiries in several areas have revealed that the total recovery of saleable products in the case of fine varieties is 1 to 3 per cent less than in the case of bold varieties. Parboiled paddy gives a higher outturn of whole rice than raw untreated paddy, the proportion of broken rice being much less in the former than in the latter. Hand-pounding gives a higher recovery of rice than machine-milling owing to the fact that in the former process less

of bran is removed. The proportion of broken rice resulting from hand-pounding is, however, higher than in machine-milled rice.

In addition to the polish imparted to the rice kernel during machine-milling or hand-pounding the grain may be given an external dressing or coating with substances like turmeric, yellow and red ochre, wheat flour, corn flour, talc, powdered rock salt, castor and groundnut oils and white mineral oil, the chief object of the application being to improve the appearance of the product. Where colour or flour or both are applied, the object in many cases is also to conceal defects like the presence of red grains, under-milled grains, etc.

In Burma, the charges for harvesting do not differ greatly from those in India. The average cost of par-boiling there is estimated at about Re. 0-1-5 per maund of rice or a little more than 1 anna per maund of paddy. Practically the whole of the marketable surplus of the rice crop amounting on an average to 4·4 million tons of paddy (*i.e.*, 83 per cent of the production), is machine-milled. The mills operating in Burma are mostly of the self-contained type. Nearly 99 per cent of the mills are steam-driven and the fuel employed is almost exclusively the paddy husk. In regard to the milling no definite information is available. The range of hire charges for Burma as a whole, however, ranges from about 10 pies to Re. 0-1-9 per maund of paddy, which is distinctly lower than the rates prevailing in India.

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**CHAPTER V.—ASSEMBLING.**  
**INDIA.**

**A.—Methods of assembling and the relative importance of the different agencies concerned.**

(1) GENERAL.

India is a country predominantly of small holdings. The assembling of produce from the fields constitutes one of the chief marketing services and is of special importance since it is at this stage that the grower converts his produce into cash. The various persons or agencies engaged in the assembling of the rice crop—either as paddy or rice—may belong to one or other of the following categories.

- (a) Cultivators.
- (b) Growers who collect the produce of other cultivators.
- (c) Landlords or *zamindars*.
- (d) Village merchants or *banias*.
- (e) Itinerant merchants or *paikars* and *farias*.
- (f) Wholesale merchants or *kachcha* and/or *pucca arhatiyas*.
- (g) Professional dehuskers.
- (h) Rice mills' agents.
- (i) Co-operative organisations.

The estimated proportion of the rice crop assembled as paddy and as rice by the various agencies in the main producing areas as given in Appendix LXI may be summarised as follows.

*Approximate proportions of the marketable surplus assembled or disposed of as paddy and as rice.*

	Assembled.		Direct distribution in the villages and periodical markets.	
	Paddy (in terms of rice).	Rice.	Paddy (in terms of rice).	Rice.
	Per cent.	Per cent.	Per cent.	Per cent.
Bengal .. .. .	45	43	5	7
Madras .. .. .	80*	10*	2	8
Bihar and Orissa .. .. .	38	52	2	8
United Provinces .. .. .	38	38	16	8
Central Provinces .. .. .	28	62	..	10
Assam .. .. .	60	28	2	10
Bombay .. .. .	76	12	..	12
Sind .. .. .	98	..	2	..
Punjab .. .. .	98	..	2	..
Hyderabad .. .. .	75	20	..	5
Mysore .. .. .	89	7	..	4
Travancore .. .. .	81	16	..	3
All-India average .. .. .	57*	32*	4*	7*

\*These percentages have been rounded off for convenience and will be found to differ very slightly from those given in Appendix LXI.

The figures show that some 61 per cent of the total marketable surplus of the Indian crop is assembled as paddy and 39 per cent as rice. Included in these proportions are 4 per cent paddy and 7 per cent rice, quantities which are directly distributed in the villages and small *hats*\* or *shandies*\* which are periodically held in the rural areas.

The most important provinces and States in which the crop is mainly assembled in the form of paddy are the Punjab, Sind, Bombay, Madras, Assam, Hyderabad, Mysore and Travancore. It is significant that with the exception of Assam and Travancore the greater proportion of the local production is machine-milled. Where hand-husking methods are widely practised as, for example, in Bengal, Bihar, Orissa and the United Provinces a considerable cottage industry has developed and this explains the comparatively large proportion of the marketable surplus of these tracts which is assembled in the form of rice.

(a) *Cultivators*.—The grower always prefers to market his produce himself when possible, but his freedom of action is limited by a number of factors, the chief of which is probably his financial condition. Poor local communications and the distance of the village from the nearest assembling market constitute other handicaps. Having regard to the primitive conditions in the rice growing areas, it is not surprising that the proportion of the marketable surplus actually brought to the assembling markets by the producers themselves is relatively small and in fairly normal conditions averages 13·6 per cent only for the whole of India, or the equivalent of about 1·56 million tons. This figure comprises 6·8 per cent paddy and about the same proportion of rice. In addition, a certain amount of paddy and rice is sold directly by growers in retail lots to consumers and other small buyers in *shandies* and *hats* in the villages and towns. The quantity involved would appear to approximate 220,000 tons of paddy and 285,000 tons of hand-pounded rice, the proportions to the marketable surplus working out at 1·9 and 2·5 respectively. Altogether, therefore, the grower may be reckoned to handle directly some 2 million tons or 17·4 per cent of the total marketable surplus.

As Appendix LXI shows, conditions vary from area to area. In the Punjab, for instance, as much as 35 per cent of the crop is estimated to be brought to the market by growers, in the form of paddy while at the other end of the scale only 3 per cent is directly marketed by producers in Travancore, 5 per cent in Sind and 9 per cent in Bihar and Orissa, 4 per cent being in the form of paddy and 5 per cent hand-pounded rice.

As an example of the wide range of conditions prevailing even within one province it may be stated that in the United Provinces, direct sales of paddy by producers average 9 per cent of the provincial marketable surplus, but in certain markets such as Saharanpur, Kashipur and Haldwani at least 50 per cent of the arrivals are brought in by the growers themselves, the rest being accounted for by other agencies such as petty landlords, wholesalers and rice millers' agents, etc. Similarly, in regard to rice, the growers them-

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\*These are periodical markets. The term *shandy* is current in South India and *hat* in the North.

selves normally dispose of 8 per cent of the marketable surplus by direct sales but this is a feature only of some of the eastern districts of the province, particularly the tracts adjoining the Nepal border where the dehusking of paddy is a cottage industry of some magnitude. More than 50 per cent of the marketable surplus hereabouts is sold directly by producers, as much as 62·5 per cent being reported in one market (Shoratgarh).

(b) *Growers collecting the produce of other cultivators.*—The activities of this section of the agricultural community are confined mainly to Assam, the United Provinces, Madras, the Central Provinces and Hyderabad. The produce is mostly handled in the form of paddy although in Assam a number of enterprising growers concentrate only on hand-pounded rice which they collect from others and bring to the market. Taking India as a whole, a little more than 2 per cent of the total marketable surplus or 242,000 tons are handled by this class of persons, about 150,000 tons being in the form of paddy. The largest individual quantity disposed of through this channel occurs in Madras and amounts to 94,000 tons of paddy and 31,500 of hand-pounded rice, 3 and 1 per cent respectively of the provincial marketable surplus. In the Central Provinces, in areas of dense rice cultivation such as the Chattisgarh division, individual growers known as *kochias* may buy the produce of smaller cultivators with cash obtained by them on short term loans from the village *bania* or wholesale merchants in adjacent assembling markets. This agency is, however, responsible for a small proportion only of the total quantity of paddy or rice assembled.

(c) *Landlords or zamindars.*—Most of those who collect their rents and recover loans in kind, also function as assembling agents chiefly, however, in the marketing of paddy. Of the 782,000 tons or 6·8 per cent. of the total marketable surplus in India normally handled by this agency 667,000 tons or 5·8 per cent consists of paddy and of the remaining 1 per cent 81,000 tons comprises hand-pounded rice and 34,000 tons machine-milled. Landlords play an important role in the assembling of paddy in Madras, 471,000 tons or 15 per cent of the local surplus being their share. With the exception of Sind where the proportion of the local surplus which passes through this channel is not inconsiderable (15 per cent) the quantity being relatively small (41,000 tons), the landlord is not a factor of any great significance in the other major rice growing areas, his share ranging from practically nil in Bengal and Assam to 13 per cent of the local marketable surplus in Travancore.

(d) *Village merchants or banias.*—Village merchants constitute one of the most important assembling agencies throughout the country. The village *bania* enjoys a unique position of power in the rural areas chiefly on account of the assistance, financial or in kind, with which he is able and generally willing to provide the cultivator in times of necessity—for a consideration. Appendix LXI shows that approximately 15·2 per cent of the total Indian marketable surplus is estimated to be assembled by this agency, nearly half or 909,000 tons comprising paddy and 839,000 tons rice of which 678,000 tons are hand-husked, and 161,000 tons machine-milled. In addition, roughly 140,000 tons of hand-pounded rice or about 1·20



per cent of the total marketable surplus appear to be disposed of by the village merchants in the villages and small periodical markets. The greater proportion of this latter quantity changes hands in Bengal, Bihar, Orissa and Madras.

The village *bania's* share in the assembling of paddy was found to range from the 4 per cent of the local marketable surplus in Mysore to 20 per cent in the Punjab with an all-India average of a little less than 8 per cent. In regard to rice, it is noteworthy that the village *bania* is specially concerned in the assembling of the hand-pounded quality, the quantity marketed by this agency being more than 4 times as large as the volume of machine-milled rice which normally passes through his hand. Bengal, Bihar and Orissa are three of the main areas notable for the production of hand-husked rice, turned out for the most part by villagers and professional dehuskers as a cottage industry. Large quantities of this product inevitably find their way to the village *bania* who is frequently interested in financing the workers and in consequence more than 78 per cent of the total hand-pounded rice assembled by *banias* as a class is concentrated in these three provinces.

(e) *Itinerant merchants*.—This class of trader operates on a large scale in Bengal, Bihar and Orissa and Madras and to some extent also in Assam, the United Provinces and the Punjab. In Bengal, Bihar and Orissa, they are generally known as *farias* or *beoparis*. They operate in some cases, with their own capital and others with funds borrowed from *arhatiyas* or *arhatdars*, large wholesale merchants in assembling and distributing centres. In the Punjab the itinerant merchants are usually identified as *ghumars*—a community associated with pottery making. These *ghumars* assemble a very substantial proportion of 40 per cent of the marketable surplus of this province.

Taking India as a whole, it may be reckoned that some 2 million tons constitute the total quantity of paddy and rice handled by this agency. This represents close on 19 per cent of the total Indian marketable surplus. 1.1 million tons are assembled in the form of paddy and roughly 980,000 tons as rice, all hand-pounded except for 56,500 tons of the machine-milled product assembled by peripatetic dealers in the Central Provinces. Of the total quantity of paddy about 42 per cent or 485,000 tons change hands through the *farias* or *beoparis* of Bengal, 18 per cent or 204,000 tons in Madras and 10 per cent or 120,000 tons in Bihar and Orissa. As regards rice, itinerant merchants in Bengal, Bihar and Orissa take a particularly large share of the 760,000 tons estimated to be handled by this section of the trade. In the former province some 491,000 tons passes through these channels and in the latter two areas about 269,000 tons. Practically the entire quantity, both paddy and rice, assembled by itinerant merchants is collected directly from the producers in the villages and from cottage industry workers in the case of hand-pounded rice.

(f) *Wholesale merchants, kachcha and pucca arhatiyas*.—For a full description of these types of traders reference may be made to the Reports on the Marketing of Wheat and Linseed (Marketing Series Nos. 1 and 8). Suffice it to say here that the former is a per-

son of small means acting mainly as an intermediary between the primary producer and the buyer in wholesale assembling market. For his services he receives from the seller or the buyer or sometimes from both a commission which may vary in different markets from 12 annas to Rs. 1-9-0 per cent. The *pucca arhatiya*, on the other hand, may be an individual or a firm trading with its own capital generally and buying produce in the assembling markets mainly to be consigned to inland centres of consumption or to the terminal markets and sometimes for export abroad.

In many instances the functions of *kachcha* and *pucca arhatiyas* overlap. It is not possible, therefore, to estimate the share of each agency separately. The wholesale merchants section of the trade which is involved in the assembling of paddy and rice is very large and is estimated to handle nearly 2.21 million tons of which 1.62 million tons is in the form of paddy and the balance of 586,000 tons hand-pounded rice. The largest individual quantity of paddy which passes through this channel is 755,000 tons or 24 per cent of Madras' marketable surplus. Next in importance is Bengal with 543,000 tons representing 14 per cent of the local total surplus. Bengal is also worthy of note as the area in which wholesale merchants handle the greatest proportion of hand-pounded rice, some 387,700 tons being assembled by this agency out of an all-India total of 586,000 tons.

(g) *Professional dehuskers*.—Another fairly important category of assembling agents includes the professional dehusking class. These persons purchase paddy direct from the producers or in the village *hats* or *shandies* and after converting it into rice—invariably by hand-pounding, dispose of the husked product in nearly wholesale assembling markets. This type of assembling agency is to be found mainly in Bengal, the United Provinces, Bihar and Orissa. As a community they are made up of different castes or professions. For instance, in the United Provinces in the areas of small production the professional dehuskers are known as *kutanharas*\*. In the neighbourhood of Kashipur this occupation is monopolised by *malis*† and particularly *banjaras*‡ who buy paddy from the villages, have it husked by their women-folk and sell the rice along the whole of Terai or submontane tract bordering the Himalayas. Similarly the famous fine rices of Tanda (Rampur State) are not actually the produce of that place but are assembled in the form of paddy by the *banjaras* from Buxar area (Naini Tal district) and re-distributed as husked rice throughout the Rohilkhand and Meerut divisions, a small quantity being sent outside the province. The professional dehuskers in the United Provinces market something like 111,000 tons of rice or nearly 16 per cent of the local marketable surplus.

Taking India as a whole, about 664,000 tons of hand-pounded rice or nearly 6 per cent of the total Indian marketable surplus are handled in an average year by this section of the industry. This figure comprises 380,000 tons assembled in the markets and about 284,000 tons distributed directly to consumers in the rural areas in the various *hats* or periodical markets which are such an

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\*Literally those who dehusk paddy.

†*Mali* = Gardener.

‡*Banjaras* = Nomads.

important feature in the economic life of Bengal, Bihar, Orissa, Assam and the adjacent tracts. In Bengal, probably not less than 280,000 tons pass through this channel.

(h) *Millers and mills' buying agents.*—In the main rice growing areas, millers or their buying agents play a fairly active part in the assembling of paddy from the primary producer. Milling representatives make periodical visits to the villages, *hats* and other points at which paddy tends to gravitate in order to buy their requirements direct from cultivators or the village merchants and peripatetic traders. Advances of money may be made to the producers even before the crop has matured thus binding the growers to bring their harvest to the mill as and when required.

A fairly organised system obtains in certain districts of the Madras Presidency—notably in Kistna, Godavari and Guntur, where wholesalers and millowners meet the producers and village brokers at some conveniently central place in the town known as Macha Chavadi. Samples of the different varieties of paddy offered for sale are then displayed for examination, by prospective buyer. The price and other conditions of sale having been settled the produce is delivered at the wholesaler's or the miller's godowns as quickly as possible. In the Tanjore and other southern districts of this province the villagers and cartmen take their produce to *pettais*, a kind of parking place for vehicles adjoining the rice mills. Here sales are negotiated through brokers whose fees on an average work out at annas 2 per bag.

All told, some 1·50 million tons of paddy or 13·1 per cent of the total marketable surplus in India are assembled directly by mills or their agents. Of this quantity Madras claims the largest share with 629,000 tons or 20 per cent of the provincial surplus. Other areas where mills are an important assembling agency are Bengal with 302,000 tons, Bihar and Orissa with 134,000 tons and Bombay with 127,000 tons. The last figure represents 45 per cent of Bombay's marketable surplus.

It may be noted that the rice milling industry is the second largest agency assembling paddy and with a close second to the wholesale merchant or commission agent category.

(i) *Co-operative organisations.*—The co-operative movement plays a very limited and inefficient part in the assembling of paddy and rice, so much so that as far as could be ascertained not more than about 20,000 tons mainly consisting of paddy, are assembled through this agency. A brief description of a few of these organisations and their *modus operandi* may be of interest.

In Bengal, a Central Co-operative Paddy Sale Society was registered in 1928, with its headquarters in Calcutta. The shares are valued at Rs. 50 each and the paid up capital amounts to nearly 6,000. Its membership consists of 10 village co-operative sale and supply societies located in the producing areas. It deals mainly in members' produce, chiefly paddy and rice, but non-members are also allowed to dispose of their produce on payment of a small commission, but are not, however, entitled to a share in any profits. The society advances 75 to 90 per cent of the current market value against produce received from the various affiliated sale and supply

societies, the balance being adjusted after final liquidation. A commission of 9 pies per maund is levied in the case of paddy and 3 annas in the case of rice.

The affiliated sale societies serve as feeder organisations the underlying principles of business being much the same. For instance, the Co-operative Sale and Supply Society at Nawabganj dealing principally in paddy, with a membership of 15 individuals and 10 rural credit societies, transacts business on behalf of both members and non-members on lines similar to those of the main organisation at Calcutta. Part payment is made to the extent of 70 per cent of the current value of the paddy, which is despatched to Calcutta to be sold through the central society. On receipt of the railway advice, the latter remits 75 per cent of the value of the goods at current market rates to the Nawabganj Society, the accounts being finally settled in December.

The total quantity of produce handled by the central society during the 5 years ending 1937-38 averaged about 4,000 tons or 110,000 maunds annually of which 45 per cent belonged to members and the rest to non-members. The Gusava and Nawabganj Paddy Sale Societies are among the most important feeder members sending about 90 per cent of their supplies for sale through the central organisation. It is interesting to observe that the Gusava Society had only 133 members in 1925-26. In the following year the Society installed a rice mill and the number of members rose to 456. The business turnover as indicated by the quantity of paddy purchased from members as well as sale proceeds more than doubled. In subsequent years although there has been no appreciable increase or decrease in the number of members, there appears to have been a steady expansion in the business of the Society. For instance, in 1939-40 the purchase of paddy and sale proceeds amounted to Rs. 2,04,118 and Rs. 2,32,430 respectively, as compared with Rs. 52,566 worth of paddy purchased in 1925-26 with sale proceeds amounting to Rs. 49,062. The Society has been able to give rebate to members varying from  $1\frac{1}{2}$  pies to Re. 0-3-1 per maund of paddy in different years, in addition to dividends ranging between Rs. 5 and Rs.  $12\frac{1}{2}$  per cent.

Another sale society in Bengal which deserves particular mention is the Parbatipur Co-operative Paddy Sale Society registered in 1938. The organisation operates on a wide area divided into several zones each zone comprising 20 to 25 villages. Members are advanced crop loans up to Rs. 25 and are required to sell their paddy to the society at whatever market rate may be prevailing at the time. During the year 1938-39, the society purchased 30,382 maunds of paddy valued at Rs. 40,395. Twenty five per cent of this quantity was of the fine variety and seventy five per cent bold. 20,000 maunds of paddy was sold locally, 6,000 maunds in Calcutta and 2,000 maunds in other districts. On an average the society earned a profit of 1 to  $1\frac{1}{2}$  annas per maund. The society rents a *pucca* floored godown with a storage capacity of 1,000 maunds while proposals are under consideration to put up a rice mill at Parbatipur with a hulling capacity of 500 maunds of paddy per day.

In the Madras Presidency, crop loan and sale societies which numbered 117 (in 1936-37) handle several types of farm produce including paddy and rice. It is estimated that approximately 3,000 tons of the latter are sold through these organisations. The office and the godown of such societies are generally situated in the business quarters to which the members can conveniently bring their produce, store it in the organisation's godown and obtain advances pending final sale. The produce of each individual grower is kept and sold separately. When prices are considered to be favourable the produce is sold by the society with the prior consent of the member or members concerned, loan dues and a small commission being deducted from the gross sale proceeds and the balance paid to the member.

In the Central Provinces, a scheme is in operation for the provision of warehousing facilities closely associated with the co-operative movement. A sum of Rs. 20,000 was set aside for the purpose, out of the total grant originally made by the Central Government for rural development and three godowns have been completed at Bilaspur, Drug and Raipur in the Chhatisgarh division, the most important rice growing tract in the province. At all the three centres growers' co-operative associations have been formed and registered under the Co-operative Credit Societies Act, the godowns being utilised for the storage of members' produce. Growers are entitled to membership of the co-operative association on purchase of one share valued at Rs. 5 payable over a period of 5 years. Each member is required to sell at least 4 bags of rice through the association and, in order to meet the establishment charges, pay the association 2 annas for every bag of rice sold, each bag being reckoned to weigh 2½ maunds net. The association usually sells the produce through a commission agent, the commission charge of 12 annas per Rs. 100 and handling or *hamalage* at 12 annas per 100 bags being debited to the cultivator.

Each association holds one share valued at Rs. 5 in the Central Co-operative Bank by reason of which it is entitled to membership of the bank's local branch and to financial accommodation against stored produce.

The grower enters into a contract with the association in respect of the fulfilment of the loan obligation incurred by the latter on his behalf.

Loans are advanced to the extent of 75 per cent of the value of the produce at current prices, at an interest of 4½ per cent per annum, the goods remaining in possession of the bank until they are disposed of and the loan is finally redeemed by the association.

The godowns are supervised by the Department of Agriculture through the local Deputy Directors of Agriculture, who are also responsible for looking after the affairs of the co-operative associations. Efforts have been made by these officers to secure concessional octroi rates in respect of produce intended for storage in the government godowns. As a result, the municipal authorities at Bilaspur have agreed to permit such produce to enter municipal limits free of charge, the octroi being payable only if the produce

is removed for sale within the town precincts including the local *ganj* or wholesale market. At Raipur a special concession has been granted to the growers' association in the shape of a reduced charge of 6 annas per hundred rupees worth of goods, the normal levy being 8 annas. Growers are allowed to enter municipal limits with their produce on production of a pass issued by the association, which maintains a deposit of Rs. 250 with the municipality in order to cover the octroi expenses incurred by producer members. All these growers' associations at present deal chiefly in rice only but it is intended, however, that warehousing facilities be gradually extended to other commodities.

In the Bombay Presidency there are only two Co-operative sale societies dealing in paddy on behalf of their members—one at Palghar and the other at Chikli in Surat. The former was established in 1927 with the object of arranging sales and making advances on the security of paddy belonging to its members. The society has a share capital of Rs. 3,200, a reserve fund of Rs. 532 and a membership of 69 cultivators. It is financed by loans obtained from the Bombay Co-operative Bank as well as deposits from members and non-members, but it transacts business on behalf of members only. Advances are given to cultivators up to 75 per cent of the market value of the produce at an interest charge of Rs. 9-6-0 per Rs. 100 per annum.

From the foregoing account of the development of co-operative marketing in this country so far as it affects paddy and rice, it will be apparent that the movement has made little headway in India.

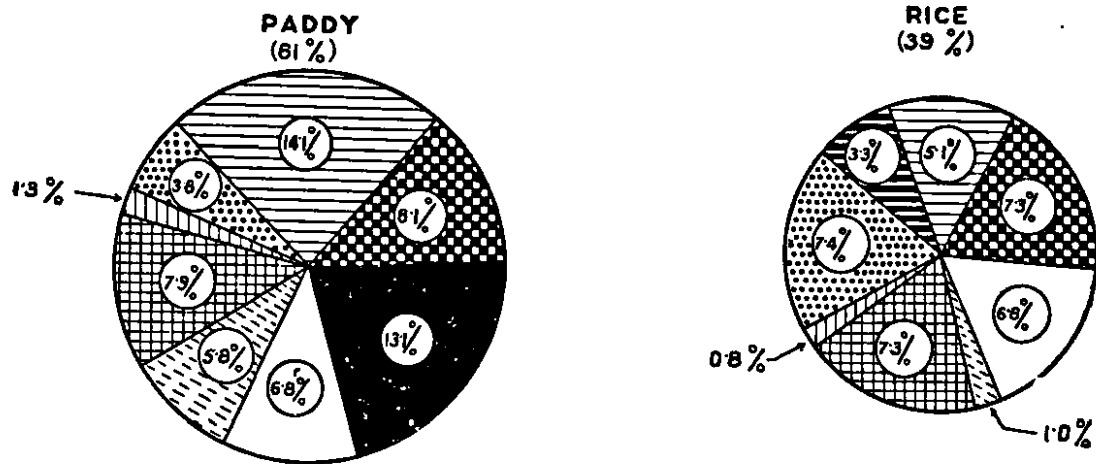
(2) SUMMARY AND TABLE.

The following table based on Appendix LXI summarises the previous discussion and shows the relative importance of the different agencies in the assembling of paddy and rice. This is also depicted in the diagram facing this page.





	Paddy.		Rice.				Total.	
	Quantity (thousand tons).	Percentage.	Quantity (thousand tons).			Percentage.	Quantity (thousand tons).	Percentage.
			Hand-pounded rice.	Milled rice.	Total.			
Growers .. ..	782	6.8	575	207	782	6.8	1,564	13.6
Landlords .. ..	667	5.8	81	34	115	1.0	782	6.8
Village merchants ..	909	7.9	678	161	839	7.3	1,748	15.2
Cultivators collecting the produce of others .. ..	150	1.3	69	23	92	0.8	242	2.1
Itinerant merchants	931	8.1	782	58	840	7.3	1,771	15.4
Professional dehusk-ers .. ..	..	..	380	..	380	3.3	380	3.3
Wholesale merchants	1,621	14.1	586	..	586	5.1	2,207	19.2
Rice mills .. ..	1,497	13.1	..	..	..	..	1,497	13.1
Co-operative societies	20	0.1	..	..	..	..	20	0.1
<b>Total .. ..</b>	<b>6,577</b>	<b>57.2</b>	<b>..</b>	<b>..</b>	<b>3,634</b>	<b>31.6</b>	<b>10,211</b>	<b>88.8</b>
Direct distribution in villages and <i>shandies</i>	437	3.8	851	..	851	7.4	1,288	11.2
<b>Grand total (marketable surplus) ..</b>	<b>7,014</b>	<b>61</b>	<b>4,002</b>	<b>483</b>	<b>4,485</b>	<b>39</b>	<b>11,499</b>	<b>100</b>





## DISPOSAL OF THE MARKETABLE SURPLUS OF THE INDIAN RICE CROP.


*(Drawn to Scale)*



**ASSEMBLED BY :-**

 *Growers.*  
 *Landlords.*  
 *Village Merchants*  
 *Cultivators collecting the produce of other growers.*

 *Itinerant Merchants*  
 *Wholesale do.*  
 *Rice Mills.*  
 *Professional dehuskars.*

 *Distribution in the villages and shandies.*

It will be observed that of the 61 per cent of the total marketable surplus marketed in the form of paddy 57.2 per cent or about 6.5 million tons (in terms of rice) are assembled at wholesale assembling markets. The largest share amounting to 1.62 million tons (14.1 per cent of the total marketable surplus), is handled by wholesale merchants making direct purchases in the villages through their agents. The rice mills follow closely with 13.1 per cent of the total marketable surplus or some 1.5 million tons, practically all of which is also acquired in the rural areas from producers direct. Itinerant traders and village merchants jointly account for another 16 per cent or 1.84 million tons, in roughly equal proportions. Growers and landlords rank fourth and fifth respectively, the respective shares of these two agencies being placed at 6.8 per cent and 5.8 per cent of the marketable surplus or the equivalent of some 0.78 and 0.67 million tons. Cultivators collecting the produce of other growers play a very small part in the assembling of paddy and handle only 0.15 million tons or 1.3 per cent of the marketable surplus. Co-operative organisations handle the insignificant quantity of something like 20,000 tons only.

The supplies of paddy assembled are ultimately purchased by wholesale merchants and rice mills, in addition to the quantities acquired by these agencies directly from growers and others in the rural areas and with the exception of a very small proportion used for the manufacture of parched products, practically the entire volume of paddy thus reaching the assembling or milling centres is converted into rice at the mills.

The remaining 3.8 per cent of paddy equivalent to roughly 0.44 million tons does not pass through the assembling stage, being disposed of mainly by growers and peripatetic traders in the villages, *hats* or *shandies* to retailers, grain parchers and direct consumers.

Out of the 4.48 million tons or 39 per cent of the rice crop marketed in the form of rice 31.6 per cent or 3.6 million tons are brought to assembling centres and the rest directly disposed of in the village markets in the same way as paddy. In regard to the 3.6 million tons actually assembled, village merchants and itinerant dealers share in equal proportions 1.68 million tons or 14.6 per cent of the marketable surplus. A little more than 0.20 million tons of the above quantity are purchased by these two agencies from growers as paddy to be converted into rice by having the paddy machine-hulled on hire, the product being eventually marketed as milled rice. The remaining 1.48 million tons or thereabouts are assembled in the form of hand-pounded rice, the paddy having been converted into rice by growers, professional dehuskers, etc. Next in importance, growers themselves assemble over 0.57 million tons of hand-pounded rice and nearly 0.21 million tons of milled rice converted on hire, making a total of 0.78 million tons or 6.8 per cent of the marketable surplus. Wholesale merchants through their representatives collect 5.1 per cent or 0.59 million tons of hand-pounded rice, while professional dehuskers assemble another 3.3 per cent or 0.38 million tons which they originally purchase as paddy. The shares of landlords and cultivators collecting the produce of other growers



account for another 1 and 0·8 per cent respectively of the marketable surplus. The quantity involved is 0·21 million tons of which three-fourths are assembled as hand-pounded rice and the remaining collected in the form of paddy and marketed after machine-hulling as milled rice.

Some 0·85 million tons or 7·4 per cent of the marketable surplus directly distributed as hand-pounded rice in villages are shared by growers, professional dehuskers and village and itinerant merchants together, more or less equally.

Taking both paddy and rice together the movement of the crop from the village to the various points of assembly is performed by wholesale merchants, itinerant merchants, growers, rice mills, landlords, professional dehuskers and cultivators collecting the produce of other growers in that order of importance, the grower's share being 13·6 per cent and that of other agencies taken together 75·2 per cent out of a total of 88·8 per cent of the marketable surplus actually assembled (see table on page 256).

In so far as 75·2 per cent of the market arrivals is assembled by other agencies, the price received by the producer in the village or at the point at which he parts with his goods is always less and sometimes appreciably so, than the price at the assembling centre, the difference representing the cost of transport and the assembler's margin. Leaving out of account the cost of transport which naturally depends on the distance separating the village or holding from the market, a very rough approximation based on a number of personal observations made in the major rice producing tracts would seem to place the net return to the cultivator-seller in the village at from 6½ to 12½ per cent less than that obtainable at the assembling market.

## B.—Markets.

### (1) NATURE OF MARKETS.

Any place or locality in which persons congregate with the object of buying and selling any kind of article, agricultural or otherwise, may be termed a market. In India, a larger variety of agricultural commodities are handled in practically every market for primary products and it is rare to encounter a market in which only one type of produce is traded. Markets may be broadly classified under the three main heads of (i) primary, (ii) secondary and (iii) terminal. The following is a brief description of the markets associated with the rice industry. Fuller descriptions have already been incorporated in the Reports on the Marketing of Wheat and Linseed.

(a) *Primary or village markets.*—These are found in practically all the rice producing areas and are known as *hats* in the United Provinces, Bihar and Orissa, Bengal, Assam and the Central Provinces and as *shandies* in the Madras Presidency and South India generally. *Hats* and *shandies* are periodical markets, usually held once or twice a week near a village or township and last for one day only. Producers as well as landlords and village merchants bring their produce to these markets and sell it through brokers and commission

agents to wholesale merchants or direct to mills' agents. In the Central Provinces, where weekly *hats* are a dominant feature of rural life, considerable quantities of paddy and rice are brought to the markets by *kochias* (growers collecting the produce of other cultivators) where they are disposed of to wholesale merchants who re-sell their purchases subsequently in the wholesale assembling markets known as *ganjs*. In most of the other producing areas in Northern India, notably in Bihar and Orissa, Bengal and Assam, a considerable volume of paddy and hand-pounded rice changes hands in the villages or at the weekly village *hats*. The greater proportion of this rice is hulled in the homes of the producers and in many instances the quantities brought to the market by individual growers are so small as to constitute a headload only. This will be clearly seen from the plates facing page 233 which shows a typical village *hat* in Bengal and a number of cultivators squatting with their daily output of hand-pounded rice which they are offering for sale. In certain places, such as Hubli and Dharwar in Bombay the weekly bazár is held on Sundays for the convenience, it was reported, of members of the professional public who prefer to buy their requirements direct from the producers. Wholesale merchants also visit these bazárs to buy hand-pounded rice from the cultivators.

(b) *Secondary markets*.—In contrast to the temporary village *hats*, the secondary markets, known generally as *mandis* or *ganjs*, provide a permanent place for the daily transaction of wholesale business. These markets are situated in urban centres, often connected by rail and metalled roads and serving a radius of anything up to perhaps 20 miles or more. From the functional point of view, however, it is sometimes difficult to draw a clear line of distinction between the two classes of market in as much as the larger permanent market may itself play the role of a primary market, especially if it is located in the heart of a producing area.

The lay-out of secondary markets varies considerably. The important rice *mandis* of the Punjab, such as Gujranwala, Kamoke, Wazirabad, Sialkot and Hafizabad, for example, are rectangular in shape enclosed by shop premises and residential quarters. Of comparatively recent origin, this type of market is characteristic of the Punjab and is found mainly in the canal colony areas. The rectangular market is also a feature in parts of the United Provinces contiguous with the eastern and south-eastern districts of the Punjab and in a few places in the Central Provinces, such as Raipur and Drug.

In contrast to these systematically laid out markets there are numerous markets all over India which show no signs of having developed along an orderly plan. Merchants' places of business and godowns are scattered about in different parts of the town intermingling with residential quarters occupied by a variety of trades. Saharapur, an important rice centre in the United Provinces, is an example of this type of a market. In several towns, however, wholesale merchants' and commission agents' shops are concentrated in one locality, lining both sides of a street or main thoroughfare. Examples of this kind are to be found all over the rice producing areas.

The size of the market varies according to the volume of business transacted therein. A typical example is that of Bihar, a province in which there are 241 principal markets the number of shops varying from 10 in the case of the smaller ones to over 50 in the larger markets such as Patna. Most of the buildings are either of brick construction throughout or the walls may be made of bamboo slats, the structure being roofed over with tiles or corrugated iron sheets. In this area markets are often situated in the most congested part of the town, little attention being paid to sanitation and other hygienic amenities the provision and maintenance of which lies primarily with the municipalities or local boards. In this respect conditions in Bihar are typical of conditions in most other parts of India.

(c) *Terminal markets.*—The expression terminal market is usually associated with a port market but may be defined for general purposes as a market in which the produce is either finally disposed of direct to consumers or processors or is assembled for shipment to foreign destinations. In the case of wheat and linseed the term was applied with particular aptness to the port markets of Calcutta, Bombay and Karachi where large quantities of the commodities in question are processed and consumed locally and assembled for export abroad. In the case of rice, however, there are a number of inland markets which function to some extent as terminal markets since the produce is received there from other sources near and far and either disappears into local consumption or is re-distributed in the surrounding areas. Lahore, Delhi and Cawnpore are good examples of this type of market.

For the purpose of this report, however, the more rigid interpretation of a terminal market has been adopted and the expression applied to such ports as are actively associated with the import and export trade in rice and paddy. The most important of these are Calcutta, Madras, Bombay, Karachi and Cochin.

In Calcutta, there are several markets in different parts of the city within municipal limits. These are at Chetla in Tollygunge, Ramkrishnapore, Beliaghata, Ultadanga, Kulf, Jagannath Ghat and Chitpore. Imported Burma rice is usually handled at Chetpore and at the Kidderpore docks. The other markets named are primarily concerned with the indigenous product. Trading is done through brokers who visit the docks and mills in the outskirts of the city during the mornings and take samples of the various lots offered for sale. Later in the day these are shown to the prospective buyers in their offices in the business quarter of the city, Clive Street, Burra Bazár area, etc. If a transaction results the goods are taken delivery of and transported to the buyers godown wherever they may be located. There are no fixed hours of trading. The Port Commissioners, Calcutta, permit the use of part of a shed in the Kidderpore docks by members of the Calcutta Rice Merchants' Association as a kind of trading ring or place of business for transactions in imported Burma rice.

In Bombay, rice stocks are largely held in privately owned godowns at Dana Bunder and in the godowns which line the streets off Frere Road in close proximity to the docks. Goods received by

sea are generally removed from the dock warehouses as soon as possible to avoid the relatively heavy rent charges made by the port authority on goods which lie in their premises in excess of the free periods. The Bombay Rice Merchants' Association's premises are housed in an upper storey of a large godown situated a few yards away from one of the main dock gates and surrounded by other similar privately owned warehouses. The Gauthi Rice Merchants' Association is located in the Masjid Bandar area not far away, but this institution is a relatively small one and its members are concerned mainly with local rices. The system of trading in Bombay is much the same as in Calcutta with the exception that no paddy is handled there being no rice mills in Bombay city itself. Brokers move from office to office with samples and there is no common meeting ground for buyers and sellers to congregate and transact business. A certain amount of trading may be done in the street outside the premises of one or other of the associations from time to time but this only occurs fortuitously if a few buyers and sellers happen to meet by chance and have orders in hand. Much the same sort of conditions prevail at Karachi and Cochin, the latter port being an important clearing house for imported rice and the location of the branches of many distributors or wholesale merchants. Owing to the distances separating the offices of buyers and sellers business is mostly transacted over the telephone wherever this means of communication is available.

## (2) OWNERSHIP AND CONTROL.

Business in paddy and rice is carried on in the wholesale markets along side trading in all kinds of food grains, oil seeds and other agricultural products such as, for example, *gur* (jaggery). The ownership and control of these markets have been described exhaustively in the Reports already published on the Marketing of Wheat and Linseed and need not be repeated. It may, however, be recalled that markets are usually owned either privately or by local bodies such as municipal boards, district boards or notified area committees. In some cases the right to hold a market or *hat* on private land is acquired by the owner by long usage.

In privately owned markets, typical of which are Ghaziabad, Benares and Lucknow (Daliganj) in the United Provinces, the shops, godowns, and other premises are let by the owner on monthly terms to merchants, commission agents, brokers, etc. In certain districts of the United Provinces the entire market place may be leased out with authority to the lessee to collect tolls. Basti and Naugarh are owned by *zamindars* who levy tolls or taxes directly or indirectly on the commodities handled in the market. A very large number of such *zamindari* markets are to be found in the rural areas of the United Provinces and particularly in Bihar and Bengal.

The markets owned by the local administered bodies are generally managed by a committee, or an association such as a municipal committee, district board or an association of merchants or brokers acting as the lessee. In the Central Provinces, for instance, every rail-head town in the rice area has a wholesale market which belongs to the municipality. All the important roads of the town usually converge towards the market, which consists of a large open square

enclosed by an iron fence or masonry wall. In the north of the province, the market square is bordered by merchants' shops and godowns. Many of the markets in the area of intense rice cultivation are stone paved and have covered sheds to protect the produce from the rain. Some storage accommodation is set apart for hiring out to those who wish to keep their goods within the market precincts. The *gunj* offices are also located within the market. The municipality derives part of its revenue from the *gunj* by taxing all produce coming into it for sale, or by licensing market functionaries, e.g., commission agents, brokers, weighmen, etc. The normal charge on arrivals into *gunj* varies between 2 and 3 annas per cart. Commission agents, brokers and weighmen are charged a licence fee which, for example, may amount to Rs. 24, Rs. 12 and Rs. 6 per annum respectively as at Raipur. There is, however, no uniformity in the incidence of these charges, each market having its own rates. As far as could be ascertained only a small percentage of the revenues obtained from the municipal markets is actually spent on increasing the amenities of the market itself and the bulk of the income thus realised is used for town improvements.

In the Punjab, the important markets in the rice growing areas such as Sheikhpura, Hafizabad and Kamoke resemble the markets of the great canal colony areas farther south in which sites of shops and godowns were originally auctioned by the government when the markets were created. The buildings subsequently erected on them belong to private owners. The open space in the centre surrounded by merchants' shops and godowns belongs, however, to the government. Market practices governing the purchase and sale of commodities in all such markets are usually controlled by a committee or association of local traders known sometimes as a *panchayat*.

In certain towns of the Bombay Presidency, paddy markets consist of open spaces the use of which is allowed by the municipality either free as at Nadiad in Gujarat, or for a small fee as at Sirsi in Karwar district, where 3 pies per cart is charged in addition to the octroi duty of Re. 0-1-3 per bag. There are, however, no special markets for rice in the presidency and rice is usually sold along with other grains. In the Bombay city, however, there are two special bazárs for rice—one for imported Burma rice and the other for local or *desi* rices. The godowns of Burma rice are situated in parallel lanes near Carnac Bunder and are privately owned, but the site belongs to the Bombay Port Trust. Godowns for local rices which are also privately owned are situated in a thoroughfare known as Bhat (rice) Bazár in Mandvi.

All the markets in the Madras Presidency are governed by the provision of the Municipal Local Board Act and Municipal Markets Act of 1920. The owners of private markets are required to obtain licences. Many periodical markets (*shandies*) belong to the local district boards are under their control. The market of Masulipatam is managed by a registered society.

In Assam, a large majority of the *hats* are under local boards and are leased out by auction to private individuals. There are, however, a number of markets in Sylhet district which belong to *zamindars*.

## (3) REGULATED MARKETS.

In a number of markets, mainly in Northern India, the standardisation of market charges and procedure has been carried out by the local trade associations and merchants' committees or *panchayats*. Although there are no producers' interests represented on such bodies the fixation of market deductions may be regarded as having contributed considerably towards minimising malpractices. Unfortunately, conditions are less satisfactory in other parts of the country, for example, in Bengal, Bihar, Orissa, Assam, in many districts of the United Provinces and in other regions in Central and peninsular India where organised trading is generally conspicuous by its absence. With a view to protecting the interests of cultivators and reducing the opportunity for malpractices, such as wrong weighments, excessive deductions in weight, repudiation of bargains on frivolous grounds, etc., various attempts have been made to establish by law regulated markets. Of these the typical examples are to be seen in the Bombay Cotton Markets Act, 1927, the Hyderabad Agricultural Produce Markets Act (1929-30), the Madras Commercial Crop Markets Act, 1933 and the Berar Cotton and Grain Markets Act of 1897 (later amended in 1932). For a detailed discussion of these and subsequent legislative measures and the benefits of regulated markets reference may be made to a special report on the subject which is at present under preparation. It may, however, be mentioned here that these measures provide for growers' representation on the market committees which are empowered to issue licences to brokers and weighmen to inspect and control weights, to arrange market procedure so that the fixation of price is done in public and to ensure the keeping of returns or accounts in such a manner as to render their submission practicable daily, weekly or monthly under the provisions of the relevant Acts. The settlement of trade disputes is also an important function of the market committees. The regulation of markets effect a certain amount of control over market practices, market charges, trade allowances, etc.

So far as the rice crop is concerned, markets legislation has not been applied except in the case of Hyderabad, typical regulated rice markets being Warangal, Nizamabad and Bhainsa. The Madras Commercial Crop Markets Act has been applied only to groundnuts, tobacco and cotton. The Hyderabad Act is more comprehensive and is applied to all agricultural commodities. The Berar Cotton and Grain Markets Act is in practice found to govern cotton in the main and although the Act bears the title "Grain", its rules are only applied to grain in three small markets. The Central Provinces Agricultural Produce Act, 1935, has, therefore, been devised to apply the principle of regulation to all the grain markets in the province. This Act was passed in November 1935 and is also modelled on the lines of the legislations already in force in Bombay and elsewhere. It is intended to supersede the managements of markets by local bodies, such as, for example, those of Raipur. Drug and Nagpur which hitherto have been affected by the provisions of the Municipal Markets Act, applicable to grains, oilseeds, cotton, fruits, etc. The Markets Acts which until comparatively recently were in existence in the Central Provinces and Berar, Bombay, Madras and Hyderabad

were the direct outcome of recommendations made by the Royal Commission on Agriculture (1928) to the effect that well regulated markets for all produce were essential and that in all provinces Local Governments should take the initiative in establishing regulated markets under provincial legislation. The point was again emphasised at the Conference of Ministers from provinces and States on Agricultural Marketing held in Delhi in November 1938.

The position regarding the further extension of market legislation in those provinces and States in which Markets Acts are already in operation may be briefly summarised as follows.

(i) **Central Provinces and Berar.**—During 1938 and 1939 no new markets were established under the Act. 43 regulated cotton and grain markets were, however, established in the past and are now being administered under the Central Provinces Cotton Market Act, 1932 and the Central Provinces Agricultural Produce Market Act, 1935. In the rice tract the wholesale markets are at present under the control of the municipalities and are being fairly well managed. It is not, therefore, considered necessary at present to bring them under the purview of the Act. The markets in the wheat tracts are, however, not in a satisfactory condition, and proposals are under the consideration of the Provincial Government for the establishment of regulated wheat markets under the Central Provinces Agricultural Produce Act, 1935. Proposals are also under consideration for the establishment of further regulated cotton markets.

(ii) **Bombay.**—The Bombay Cotton Market Act is already in force. Under this Act the regulation of 12 additional cotton markets is under consideration. The Bombay Agricultural Produce Market Act has been passed.

(iii) **Madras.**—The extension of the Commercial Crops Act to all agricultural commodities and the establishment of more regulated markets in the presidency is receiving attention. The Act has been extended to tobacco in Guntur area (comprising Guntur district and the Bezwada *taluk* of Kistna district), groundnuts in South Arcot district and cotton in Nandyal and Adoni markets. Market Committees have been established at Cuddalore in South Arcot, Bezwada, Guntur, Nandyal and Adoni.

(iv) **Hyderabad (Deccan).**—The Hyderabad Agricultural Markets Act already exists and has been in force in some of the markets for over 6 years. Six more markets have been brought under the Act. The extension of the Markets Act to other centres of agricultural trade is under consideration.

The position in regard to the introduction of regulated markets in provinces and States where none existed before is as under :—

**Provinces—Bengal.**—The Bengal Agricultural Produce Markets Bill, 1939, was introduced in the Bengal Legislative Assembly on the 11th July 1939, and circulated for eliciting public opinion. It was referred to a Select Committee on the 19th December 1939. The second reading of the Bengal Agricultural Produce Markets Bill was taken up on the 12th August 1940, but owing to other pressing business its further consideration was postponed till the next session of the Assembly to be held in November.

**United Provinces.**—The United Provinces Agricultural Produce Markets Bill was introduced in the United Provinces Legislative Assembly in 1938. The Bill was referred to a Select Committee and the Provincial Marketing Officer was asked to study the regulated markets in existence in the various provinces and States in India and to submit a report thereon. An exhaustive report was submitted. Unfortunately this line of development received a check owing to the resignation of the provincial ministry.

**Punjab.**—The Agricultural Produce Markets Act, 1939, is already in force in the Punjab. Rules have been prepared for the establishment of regulated markets.

**Sind.**—The Sind Agricultural Produce Markets Act was passed and steps taken to frame bye-laws and establish a few regulated markets in the province.

**Bihar.**—The Bihar Markets and Dealers Bill which was introduced in the Bihar Assembly on the 5th May 1939 was circulated for opinion. The opinions received were given consideration but the proposals had to be abandoned for the time being owing to the resignation of the provincial ministry.

**Orissa.**—Acts and Rules in vogue in the different provinces and States along with the constitution and the organisation of the markets in the province were studied with a view to drawing up proposals for the regulation of markets. The scheme was, however, shelved temporarily owing to the resignation of the provincial ministries.

**Assam.**—An Agricultural Produce Markets Bill was prepared in Assam for submission to the Assembly.

**North-West Frontier Province.**—The Agricultural Produce Market Bill was passed and the necessary rules formulated.

**States—Mysore.**—The Agricultural Markets Bill was passed by the Mysore Legislative Council in June, 1939. The possibility of starting certain regulated markets was under consideration.

**Patiala.**—The fixation by government of market charges payable to the different market functionaries and for the registration of *kachcha arhatiyas* (commission agents) and *dalals* (brokers) was being considered.

**Baroda.**—The application of the Regulated Markets Act to Bodeli in the Baroda district and to Amreli in the Amreli district for cotton has been notified. The Rules and Bye-laws under the Act have been published. The Bodeli Market was opened on the 22nd December, 1939.

**Gwalior.**—Rules and regulations are in force governing the markets for agricultural produce including animal husbandry products, such as ghee. The market operators are licensed and charges, etc., fixed. There are 36 regulated markets managed by committees of elected members. The establishment of a regulated market at Gulabganj (district Bhilsa) has been sanctioned. The regulations were extended to cover more markets at suitable centres.



**Bahawalpur.**—The Bahawalpur State Agricultural Produce Markets Act was under the consideration of the Durbar.

**Travancore.**—A Bill for regulation of markets was taken into consideration by the State Government.

**Jodhpur.**—A draft Act for the regulation of markets has also been under the consideration of the authorities concerned.

### C.—Market functionaries.

Before discussing the market practices and the methods of sales obtaining in the wholesale markets, a brief description of the main market functionaries is necessary. *Arhatiyas* or *arhatdars* (commission agents and merchants), *dalals* (brokers), *tolas* (weighmen) and *palladars* or *hamals* (labourers) are the four important market functionaries.

The *arhatiya* or commission agent has already been described earlier in this chapter. Its synonym *arhatdar* is, however, rather loosely used in Bengal, Assam, Bihar and Orissa and is taken to apply to dealers of all kinds. They are generally established at the large assembling centres and play an important part in financing *beoparis* or *farias*, the majority of whom it may be recalled are cultivators by profession and take up trading as a subsidiary occupation when the harvesting season is over. The commission earned by *arhatiyas* is generally known as *arhat* or *arhatdari* and in some instances as, for example, in Bengal cover storage costs incurred on behalf of the client.

#### (1) DALALS (BROKERS).

The main function of these intermediaries is to bring buyers and sellers together. In the rice trade brokers do not necessarily act solely on behalf of one party and in some markets it is found that both buyers and sellers employ their own brokers. In most cases the broker assumes no responsibility for the due fulfilment of the transaction. Experience has shown that brokers do not always maintain an impartial role but have more to gain by satisfying buyers. Brokerage is usually payable on a percentage basis on value and is known as *dalali*.

#### (2) TOLAS OR WEIGHMEN.

A *tola* may be an employee of the *arhatiya* or commission agent in which event he is either paid on a salary basis or receives a commission. In some markets, however, the *tolas* form a distinct class of their own and recompense themselves for their services by charging a fee or commission, known as *tolai*, on the quantity of the produce weighed. In others the *kachcha arhatiya* himself may attend to the weighing of the produce. It will be recalled that weighmen employed in the regulated markets in Hyderabad, Bombay, Berar and elsewhere are licensed and the scale of charges fixed.

#### (3) PALLADARS OR HAMALS.

*Palladars* or *hamals* are labourers who fetch and carry in the market. They load and unload in the carts, wagons, lorries, etc., assist in weighing clean and dress the produce, stack the bags and generally make themselves useful. They are paid according to the work done and their wages are known as *palladari* or *hamali*.

In addition to the above, a horde of lesser functionaries and hangers-on may be found in almost every large market. Many of the persons are not directly concerned with the handling of the produce or the conduct of business, some of their vocations being those of watermen, night-watchmen, sweepers, messengers, domestic servants of the *arhatiyas* and unpaid assistants in *arhatiyas'* shops whose main object appears to be picking up market information on which to gamble. Where local usage permits and services are actually rendered, these persons are generally paid in kind. It is often also customary for employers to provide free board and lodging.

#### D.—Market practices.

##### (1) GENERAL.

These vary from place to place and have acquired recognition by long usage and tradition although in general principle they do not differ greatly. Market legislation in Bombay, Madras, the Central Provinces, Berar and Hyderabad has improved matters to a certain extent by fixing market charges and licensing the various functionaries. But such enactments have not yet been adopted on a sufficiently large scale. The rice industry, however, has not been affected by markets legislation except possibly in a few small markets in Hyderabad. The market *panchayats* or associations of traders in certain markets have helped in some measure to standardise market procedure; but here too the extent of organised trade, certainly so far as the indigenous varieties are concerned, is so small as to be almost negligible.

##### (2) HOURS OF BUSINESS.

There is little variation in the hours of business in the different markets. Up-country transactions generally take place in the morning and the markets are over by afternoon. The latter part of the day is taken up in weighing over the produce bought earlier in the day and in settling accounts. In a number of small markets or *hats* in Bengal and the adjacent areas, trade may be particularly brisk in the afternoon as growers and professional dehuskers do not usually arrive until fairly late in the day. This was a practice particularly noticed in village markets for hand-pounded rice around Calcutta, the custom having probably developed to suit the convenience of the large numbers of consumers who work in the city but live in the suburbs and villages in the environs and return home in the late afternoon. In some of the regulated markets, as for instance in the Bombay Presidency, the market committees are empowered to regulate the hours of business. In the terminal markets, the usual hours of business are from 10 A.M. to 5 P.M. or 6 P.M. but transactions may be made at any hour of the day or night mutually agreeable to the parties concerned.

##### (3) METHODS OF SALE.

The sellers generally bring in their produce in carts the previous evening or early morning and park themselves in the market or as near as possible to the premises of the *arhatiya* or commission agent whose services they intend to avail of in the disposal of their goods. As a rule, the *arhatiya* who negotiates sales on behalf of the seller may be assumed to have previously given financial or other accommodation to the latter who is practically bound to go to his creditor.

*Arhatiyas* may also employ touts to solicit the patronage of incoming sellers who are met on the road leading to the market, near the octroi or terminal tax post.

Paddy is usually brought to the assembling markets in bulk in carts, while rice is generally packed in gunny bags. On arrival, the paddy may either be dumped in heaps in front of or near the *arhatiya's* shop or the produce may be left in the cart pending examination by prospective buyers. Rice arrivals are frequently unloaded and stacked. The *arhatiya* invariably represents the seller and is expected to obtain the latter's consent, if he happens to be there, before the transaction is concluded.

Bids may be offered in one of the following three ways depending on local custom : (a) under cover, (b) by auction, or (c) by open offer or private treaty.

(a) *Under cover*.—The buyer or his representative indicates the price he is prepared to pay by clasping the hand, of the *arhatiya* or seller's agent under cover of a cloth and pressing or manipulating the fingers. Each finger (the thumb is excluded) represents a definite value. Thus, for instance, the ruling rate of a commodity on a particular day is Rs. 8 per maund and an offer of Rs. 9 is to be conveyed, the transaction will be completed in two successive clasps. In the first each of the four fingers will represent Rs. 2 and in the second Re. 1. In some cases the bid may be conveyed in a single grasp as, for example, when an offer of Rs. 22 is to be made, the buyer may use only two fingers denoting Re. 1 each, Rs. 20 having been taken as the basic rate for the commodity. The procedure, i.e., the number of fingers held and the number of pressures given vary from place to place but as far as could be observed misunderstanding rarely occur since the custom of each market is well-known to the local operators. The cover system is common in many up-country markets and notably in Bombay and the Central Provinces and in Madras. The seller is usually consulted by the *arhatiya* before he accepts the highest offer and the name and offer of the highest bidder are generally publicly announced. The single bid system is in vogue in many markets especially large assembling centres where the quantities handled daily in the season are considerable and must be disposed of in the course of the day. In such cases once the offer is made, it is final. Thus much time is saved and a larger volume of business gone through than if repeated bids were entertained.

(b) *By auction*.—In this system the *arhatiya* auctions the produce at a particular time of the day when all the intending buyers or their agents assemble near the produce. This system is common in some of the markets in Bombay, Hyderabad, Mysore and in Northern India, while in Madras it is rarely found. In regulated markets as, for instance, in Gwalior State, the rate at which the produce is finally knocked down to the buyer is reported to and recorded by the market committees.

(c) *Private treaty*.—This system is common in a number of markets in Madras, Bombay, the Central Provinces, the United Provinces, Hyderabad and Mysore. The buyers may come to the sellers' agent at any time convenient to them and make their bids or they may make their offers to the *dalal* or broker when he comes round with samples of the produce.

The advantages and disadvantages of the various systems discussed above have been briefly reviewed in a number of marketing reports already published and are being dealt with in the report on markets and fairs now under preparation. Suffice to say that the method of bidding under the cloth has been frequently criticised and the secrecy which it implies invites such criticism, but there would seem to be no serious objection to the practice if the final bid is openly declared.

#### (4) BASIS OF SALE.

The basis of sale in the case of paddy is subject to deductions on account of impurity content, milling quality and moisture. The first and last factors are generally judged by ordinary visual examination and "feel". While milling quality is ascertained in a rough and ready manner usually by dehusking a few grains of paddy between the palms of the hands. In certain areas as, for instance, in Bengal and Bihar fixed deductions irrespective of the actual quality or condition of the produce are made by the buyer to compensate for loss in weight arising from admixture of impurities and drilage. In Bengal, these deductions (known as *dhalta*) generally amount to 1 seer of paddy per maund or 2.5 per cent.

The appraisal of the individual quality characteristics after visual examination is a feature of the trade in rice (as distinct from paddy). The system is unobjectionable when the price has been mutually settled and the obligations of both parties honourably discharged, but the practice is reprehensible when, as may not infrequently happen further deductions often on frivolous grounds, are claimed by the buyer when the goods are delivered.

#### E.—Market charges.

The rice crop reaches the assembling markets in the form of paddy or rice in the husk as well as the husked product and has to pass through a number of agencies before it reaches the final consumer. In the markets a number of deductions are leviable either in kind or in cash from the sale proceeds due to the seller. These deductions constitute the remuneration earned by the various agencies engaged for the services rendered by them in handling the produce and negotiating the business. This section discusses the merchandising expenses which are incurred by the producer on the first stage, i.e., from the time the goods enter municipal or market limits to the time it reaches the buyer's godown. The various market deductions or customary charges prevalent in some important markets are given in Appendices LXII to LXVII and, it will be observed, have been reduced to a uniform basis (per Rs. 100 worth of produce). These statements include market deductions for paddy or rice, or both, in particular markets according to the form in which the major portion of the crop is marketed. The main deductions and the manner of their incidence are as follows.

##### (1) COMMISSION AND BROKERAGE.

Commission or *arhat* (*adat*) and brokerage or *dalali*, are the commission agent's or broker's fees, and may be payable either by the seller or by the buyer or sometimes by both. The charge is usually made in cash and varies considerably. In certain markets

in Bengal, for instance at Daspara, Chetla, Hili and Bayahat, commission is payable by the seller in the case of paddy sales and averages Rs. 1-3-8 per Rs. 100 worth of produce, while in respect of rice transactions it is payable by the seller in certain markets only, *e.g.*, Chapai Nawabganj in the Malda district, and by the buyer as at Boga in the Bakarganj district. The rates of commission in these markets are Re. 1 and Re. 0-5-0 per cent respectively.

In Madras the *arhatiya's* commission is usually paid by the buyer and amounts to approximately Re. 0-10-0 per Rs. 100 worth of paddy. In Bombay, commission is paid by both seller and buyer. At Alur, for instance, each party has to pay Rs. 1-8-0 per cent. In the Central Provinces this charge may be borne by the seller or by the buyer according to local usage. Where the item is debited against the seller it may be Re. 0-15-3 as at Gondia or Rs. 1-7-3 at Damoh, while the buyer pays Re. 0-5-4 per cent only at Drug. In a number of markets in the United Provinces such as Gonda, Naugarh, Shoratgarh, Basti and Cawnpore, the buyer pays the *arhatiya's* commission which varies from 4 annas to Re. 1 per cent, while in Dehra Dun, the well-known place of origin of the costly fine scented *Basmati* rice the seller and the buyer each pay 12 annas and Rs. 4-6-0 per cent respectively, the latter charge being the highest found in any market. In Bihar commission is payable by the seller; the average being Re. 0-14-9 per cent for rice and Rs. 1-6-6 for paddy. In the Punjab, the seller pays Rs. 1-6-9 and the buyer 12 annas per cent.

#### (2) HANDLING CHARGES.

These include such payments in cash or kind as are made to the labour employed in cleaning, loading or unloading, weighing or measuring and filling and stitching the bags. Women are often engaged to sift or clean the produce and collect the sweepings. These charges are borne by the seller, but the cost of removing the produce to his godown after weighment or measuring is met by the buyer. Handling charges vary and depend upon the local rates for labour and extent of the services rendered. In Madras, for example, handling in respect of paddy was found to range from 10 annas per cent at Coconada to Rs. 1-3-10 in Kumbakonam. In Orissa it was only Re. 0-3-9 per cent at Balasore.

#### (3) DHALTA, KARDA OR DANE.

*Dhalta, karda or dane* are for all practical purposes, synonymous for deductions in kind payable by the seller in order to compensate the buyer for loss in weight on account of impurities, driage, etc. It will be recalled that where they are in vogue these deductions are automatically made whether or not the condition of the produce actually justifies the allowance. In some areas as, for instance, in the United Provinces and Bihar the incidence of these deductions is greater in respect of paddy than rice. In three markets the average for rice worked out to Rs. 2-3-6 per cent extreme limits being Re. 0-10-6 at Shoratgarh and Rs. 3-15-0 at Cawnpore. As regards paddy the item came to Rs. 4-13-8 at Cawnpore.

#### (4) BROKERAGE.

The item of brokerage is found to be charged mainly in Madras, the United Provinces and the Punjab. In the two first named areas

brokerage may be payable by both the seller and the buyer in the case of paddy ; the average charge being Re. 0-14-11 and Re. 0-9-11 per cent in Madras and Rs. 1-8-10 and 4 annas per cent in the United Provinces. When rice is involved a seller in the United Provinces may pay Re. 0-3-9 per cent as at Basti or as much as Rs. 1-10-3 per cent at Cawnpore. In the Punjab the charge is very small and average 2 annas only in the case of paddy.

(5) CHARITIES (DHARMADA).

Deductions under this head for contributions towards charitable objects are made in cash and are variously known as *gowshala*, *mandir*, etc., the former term having reference to institutions in which cattle are kept and the latter to temple charities. The amounts collected by the commission agent may be apportioned at his discretion to any charitable purpose. It was observed, for instance, that mendicants of whom a very large number infest the markets rarely leave a commission agent's shop empty handed even if it meant giving the insignificant sum of one pice (3 pies). There is reason to believe, however, that considerable sums frequently lie to the credit of these *dharmada* accounts with various establishments, the funds being used for trading purposes and not for the objects for which they were primarily and ostensibly collected.

Charity allowances are payable both by the seller and the buyer in Madras, the United Provinces, Bengal and Hyderabad while in Bihar, Orissa, the Central Provinces and the Punjab, it is generally payable by the seller only. The average rates of deductions vary from Re. 0-1-2 per cent in the United Provinces to as much as Re. 0-15-10 per cent in the unregulated market of Jangaon in Hyderabad.

(6) MISCELLANEOUS.

In addition to the above-mentioned deductions, a number of other minor allowances are levied which in the aggregate are liable to assume considerable proportions. The sweeper, the waterman, the *arhatiya's* cook and other employees all have to be provided for usually by the seller, who is obliged to part with the recognised deductions from his produce before what is left is weighed over to the buyer. These impositions work out at Rs. 1-1-0 per cent for paddy in the Punjab and to Rs. 2-2-0 for rice and Rs. 3-5-2 for paddy in the United Provinces.

(7) TAXES LEVIED BY URBAN ADMINISTRATION, LOCAL BODIES, MARKET COMMITTEES OR OWNERS, ETC.

In many markets the administrative local bodies or owners of the markets levy taxes variously known as octroi duty, terminal tax, toll or vehicle tax on agricultural produce. In case of large markets contracts are awarded to the highest bidder for the collection of these taxes. In the Central Provinces, where markets are controlled by the local bodies, the tax levied on rice varies from Re. 0-3-7 per cent in Gondia to Re. 0-10-3 per cent in Damoh. These taxes are usually payable by the seller. In the United Provinces, the system of levying these taxes varies. In the western districts, for instance, it is levied in the form of a toll per cent or pack animal while in the eastern districts it takes the form of an octroi duty on arrivals. In the six markets under examination it was observed that the extent of the imposition ranged from 5 annas per cent in Gonda to 12 annas per cent in Cawnpore and Dehra Dun.

In Bengal and Bihar, the *zamindars* who own the land on which periodical *hats* or markets are held levy a tax on all goods assembled in the market. This is known as *zamindari*. Boga market for instance, is owned by the *saha zamindars* of Dacca and in it sellers have to pay a toll at 6 pies per maund on paddy or rice or roughly Re. 1 per cent. In Motihari market in Bihar, the toll and taxes payable by the seller work out at Re. 0-9-2 per hundred rupees worth of produce.

In Hyderabad, where a number of regulated markets exist, the local market committee charges toll tax. At Warangal, for instance, which is a regulated market the toll tax amounts to Re. 0-8-4 per cent for paddy and Re. 0-6-3 per cent for rice.

In addition to the legitimate duties which have to be paid under these heads, the seller is often obliged to tip the municipal employees at the terminal barriers or octroi posts, if he is to avoid the inconveniences to which he is liable to be subjected. The incidence of the taxes is, therefore, in practice heavier than it appears to be. Reference has already been made in the Report on the Marketing of Wheat to the desirability of attention being drawn to the hampering effect of these various tolls on marketing. That the octroi is frequently "more than the traffic can bear" is clear from the fact that in more than few instances markets have been driven outside municipal boundaries.

#### (8) SUMMARY.

It will be clear from what has been said that the individual market charges in different areas bear no relations to one another. This is clearly brought out in Appendix LXVIII. Summarising these charges, for example, average handling charges up to the time the produce is weighed range in the case of paddy from Re. 0-3-6 per cent in the United Provinces to Rs. 2-3-1 in Hyderabad and for rice from Re. 0-3-1 per cent in Bombay to Rs. 1-3-4 also in Hyderabad. Other items show similar divergencies. The total admitted charges are by far the highest in the United Provinces where they amount to 13-89 per cent of paddy and 9-56 per cent for rice exclusive of municipal tolls or taxes which are 0-50 and 0-56 per cent respectively. The lowest average charge occurred in Orissa, the average for two markets being 1-59 per cent for paddy and 1-65 per cent for rice. The high market charges in the United Provinces are due to the practice of levying them in kind particularly on account of weight and quality allowances and it is interesting to observe that charges on wheat and linseed in this province were also found to be greater than in any other area.

Another point of significance which emerges is with only one exception the greater proportion of these expenses invariably borne by the seller, the buyer's share being relatively small and in some instances nil.

Where it has been possible to obtain comparable figures, it will be seen that charges on paddy are as often as not greater than those on rice and may be accounted for by the fact that the incidence of such charges is heavier when calculated against the relatively lower value of paddy.

The benefits obtained by growers when marketing the produce in a regulated market is clearly brought out in the data shown under Hyderabad in Appendix LXVIII. At regulated and unregulated markets the charges payable amount to 3.96 and 4.62 per cent respectively in the case of paddy, and 3.34 and 6.66 per cent in the case of rice.

#### F.—Finance of assembling.

##### (1) BY VILLAGE BANIA, SAHUKAR, MAHAJAN, ETC.

These expressions are more or less synonymous and are generally taken to refer to the village merchant who in addition to trading in commodities also conducts a money-lending or banking business. These persons wield great influence in the rural areas as they are the source—often the only source—of credit for the cultivator. In many areas, however, as for example, in the United Provinces, Sind and Bombay, the village money-lender has a competitor in the shape of the landlord or *zamindar* who may also play the role of financier. Well-to-do peasants and itinerant dealers such as the *banjaras* in the Terai districts of the United Provinces also advance loans to a small extent as a side line to their normal occupation.

So far as short term credit is concerned for current needs including expenses on seasonal agricultural operations and subsistence, the cultivator borrows in cash as well as in kind, the latter usually for seed requirements. The rate of interest and terms of repayment depend on the kind of loan and the financial standing of the borrower, but repayment of the loans is always demanded immediately after the harvest.

Loans of grain are almost invariably repayable in kind and are rarely commuted into cash. The rate of interest on such loans varies from 25 per cent in the *sawai* system (one and a quarter) to 50 per cent in the *deorhi* (one and a half). The former is by far the more common rate, the *deorhi* system being reported only in a comparatively few areas. (See Chapter XI). Over and above the interest a further margin of 10 to 12 per cent is apparently earned by the village merchants in the Warangal district of Hyderabad State and probably elsewhere too, by using a smaller measure at the time of advancing the loan and a larger one at the time of repayment.

Cash loans for short periods are generally advanced on the personal security of the borrower with or without the execution of a promissory note or thumb impression of the borrower in the lender's account book. The personal security factor is generally nominal for the creditor, while advancing the loan has his eye on the cultivator-borrower's crop and regards that as the real security. The rate of interest and terms of repayment in the case of cash advances in different areas are as follows.

In Bengal, no interest may be charged on a cash loan provided the cultivator makes the repayment in kind in which case the price of paddy (in terms of per maund or a fixed quantity in liquidation of the debt) for delivery at harvest time is stipulated at the time of making the loan. The price so fixed is generally much lower than the expected-harvest price. An alternative condition of repayment



is for the cultivator to undertake to sell his produce to the creditor at the harvest time at 3 to 4 annas per maund less than the current price prevailing at the time. These systems of repayment in kind are known in the province as *dadan*. In case a cultivator does not repay in kind he is required to pay interest at the rate of  $\frac{1}{2}$  to 1 anna per rupee per month which works out at 37 $\frac{1}{2}$  to 75 per cent per annum. In Bihar and Orissa, the village *bania* makes advances at 12 to 25 per cent interest per annum to reliable growers but makes a point of acquiring the produce of his clients at a very favourable price when the harvest comes round, the borrower fearing to lose his creditor's goodwill. In Madras, the rate of interest charged by the village merchant is reported to vary from 12 to 30 per cent. In most cases the cultivator is made to agree verbally before witnesses, or in writing, to sell his produce to the creditor at harvest and the price eventually paid in such cases is 5 to 10 per cent lower than the market price ruling at the time. Conditions in Hyderabad are much the same.

In Bombay, the usual rate of interest is 18 to 24 per cent with the obligation to sell the produce to the creditor at harvest. Often a cash loan at the time of advance is commuted into a grain loan at a price considerably below the expected harvest price and a fixed quantity of produce delivered at the harvest. An actual case of this type noticed during the course of enquiries in this survey in Thana district showed that the difference between the cash value of the loan and the value of paddy delivered on the basis of the current harvest price represented 80 per cent interest per annum. In the Central Provinces, the rate of interest is 18 to 36 per cent with the usual obligation and all that it implies, while in Sind, the rate of interest on cash advances varies from 18 to 37 per cent. Frequently, small cultivators obtain cash advances by selling the standing crop outright two to three months before harvest, which is tantamount to commuting the cash loan, at a favourable price to the creditor, into kind as is customary in Bombay and Bengal.

In the United Provinces, the rate of interest charged by the village money-lender in the rice tracts is generally 18.75 to 37.5 per cent per annum, the loan being repayable at harvest in the form of produce. In the Terai districts of the province, bordering the foothills of the Himalayas, a good deal of bartering takes place, the *banjaras* giving the producer cloth and other necessaries in exchange for the latter's paddy. These transactions usually result in the creditor earning at the rate of 50 per cent per annum.

The village merchant also finances the itinerant dealer (*banjara*, *beopari*, etc.), but owing to the latter's better financial position, risks are less serious and the rate of interest charged is probably half that demanded from the cultivator. In Assam, the relations between the village merchant and the *beopari* are on a profit sharing basis locally known as *beopar batura*. The merchant advances the money and *beopari* assembles the produce from the villages to sell it at a wholesale market, the resulting profits being divided in equal proportions.

From the above description of the short-term finance of the rice grower it is clear that the latter, in addition to paying an excessively

high rate of interest even allowing for the serious risk which the creditor may be running, has to part with a considerable proportion of his produce soon after the harvest, at very low values in comparison with what he would have obtained, had he been in a position to market it independently. Herein lies in a large measure the justification for growers' co-operative paddy loan and sale societies.

(2) WHOLESALE MERCHANTS, COMMISSION AGENTS AND RICE MILLS.

These agencies take part in the finance of assembling by advancing funds to village merchants and peripatetic traders or *beoparis*, which enable the latter to operate in the rural areas in direct contact with producers. Loans are made on personal security, but the terms depend entirely on the reliability and trustworthiness of the borrower and the business relations which have previously existed between the parties. The rate of interest on such loans, however, is generally from 9 to 12 per cent per annum. In return for these facilities the debtors bring the produce, which they have collected, to their respective creditors who may buy it themselves or act as commission agents by selling it to other buyers.

Rice millers themselves do not play as large a part in financing the assembling of paddy as wholesale merchants and commission agents except possibly in the provinces of Bengal, Bombay and in Hyderabad. There are, however, large merchants who maintain close contact with mills and these firms may, if suitable terms are arranged, pass on their purchases to the mills, the producer or itinerant merchant giving delivery direct to the mills. Well-to-do cultivators having well-established connections in a wholesale market may also be financed on similar terms as village merchants, etc.

Frequently, the village merchant and *beopari*, and even producers receive advances of cash from the wholesale merchant or commission agent on the security of the produce brought to the market and stocked in the custody of the latter. Such advances are, generally, in the neighbourhood of 75 per cent of the value of the goods at the current market price and the rate of interest charged for the storage period is 6 to 9 per cent per annum. When the goods are finally disposed of, the advance *plus* interest is adjusted and rent of godown also charged if the period of storage exceeds the minimum number of free days varying from seven to fifteen in different parts of the country. Cash advances on the security of stocks are generally resorted to in a weak market, with the object of waiting for a rise in prices.

The operations of wholesale merchants and commission agents at assembling centres are often financed by *shroffs* and indigenous bankers through the medium of promissory notes or *muddati hundis* or long terms drafts or bills of exchange at 4 to 12 per cent interest per annum depending on individual circumstances and money market conditions. Advances are also obtained from the joint-stock banks on the security of produce. *Shroffs*, however, play a more prominent part in the finance of distribution and a full description of their activities is given in Chapter VIII.

**(3) BANKS.**

It has been mentioned that the banks give loans to merchants on the security of the produce stocked under their own lock and key in their own godowns or in approved godowns belonging to the merchants themselves. Such advances are based on 75 per cent and in some cases 66 per cent of the current value of the produce and the funds placed to the credit of the borrower's account may be drawn at the latter's convenience. Should values rise and any such increase in the price level be considered likely to remain for an appreciable period the borrowing limit of the client may increase proportionately. Conversely, if prices fall, the bank requires the borrower to refund as much of the original advance as may be necessary to maintain the margin fixed by the bank between the sums due to the bank and the open market value of the pledged goods. A specimen agreement form used by a bank is given in Appendix LXIX and shows that the goods deposited must be insured against fire. Policies against theft may sometimes be taken out. The period of storage normally entertained extends up to the next harvest and the rate of interest ranges between 5 and 10 per cent per annum in different areas. In view of the comparative immunity of paddy from deterioration in storage and the customary seasonal rise in price, banks might well consider the provision of more extensive facilities for making advances against paddy at harvest time.

**(4) CO-OPERATIVE SOCIETIES.**

The co-operative movement in India has developed mainly on the lines of credit organisations. The number of credit societies in 1937-38, for example, being roughly 84 per cent out of a total of 95,706 agricultural societies of all kinds. Although the purely credit institutions are not directly concerned with the finance of assembling their utility wherever they exist, is not inconsiderable in so far as they provide comparatively cheap credit to their members for current needs and thus enable them to market their produce independently. If these societies could be enabled to advance loans to members on the security of their produce on the same lines as those adopted by the commercial banks in their relations with business concerns, the members would be able to obtain better prices by spreading their sales over a longer period.

The grain *golas* of Bihar and Orissa are a special feature of local co-operative credit and are not met with in any other area. These *golas* are primarily grain societies concerned with making loans of grain to members, particularly for seed purposes, the improvement of the quality and purity of seed being one of the subsidiary objects of such societies. The actual working capital is raised by charging an admission fee of one rupee per head and a contribution in kind of 1 maund of paddy (or other produce) per year for 5 years, the latter being refundable after this period, without interest. While some of the *golas* are affiliated to central co-operative banks, most of them operate independently. Advances are primarily intended to be made in kind but cash credit may be given on a limited scale.

The total number of co-operative grain *golas* in Bihar and Orissa in 1936-37, was sixty seven of which 23 were in Bihar and the rest in Orissa. Judged from the profits made and the reserve funds accumulated of which details need not be quoted here, these institutions appear to have been not unsuccessful ; but so far as the improvement of seed and the maintenance of purity are concerned, the *golas* have been able to achieve little or nothing as at the time of repayment the grain is accepted without discrimination as to quality and purity. If the co-operation of the Agriculture Department could be secured in this matter, the utility of the societies would be enhanced and the spread of seed of better quality and germinating capacity accelerated.

Co-operative sale societies for paddy and rice where they exist, are empowered to advance money on the security of produce to the extent of 75 per cent of its value, the rate of interest charged varying from 6 to 9 per cent.

Having regard to the size of the Indian rice crop and the scope for co-operative endeavour in practical marketing problems the part played by co-operative societies in financing the assembling (and distribution) of this important food grain is, to say the least, disappointing.

#### (5) OTHER AGENCIES.

Revenue collection by government in cash is often cited as one of the reasons which impels the cultivator to part with his produce soon after the harvest at a time when prices are at their lowest. From this view point the working of the Kashmere Valley Food Control Department is worthy of reference. The department collects 1/8th of the crop of the cultivator and pays him cash (sometimes in advance of delivery) free of interest in two instalments whereby he is enabled not only to meet his revenue and thus save himself from the nightmare of the money-lender but also leave a cash balance for his other needs. The system appears to be working well as revenue collection is facilitated, complaints are rare and default in delivery is negligible. The organisation draws its supplies from 1,556 villages comprising close on 50,000 holdings and 200,000 cultivators. There are 25 collecting and 36 distributing centres.

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## BURMA.

## A.—Methods and agencies of assembling.

Numbers of people, whose occupation during the rest of the year may be anything, visit the threshing floors at harvest time in the capacity of agents or jungle-brokers. They pass from threshing floor to threshing floor and from village to village, examining samples, assessing quantities and finding out by enquiry what amounts will be free for sale and at what price offers will be considered. This information they pass on to their principals, receiving for it and for subsequent service in connection with the purchase of the crop a commission of from Re. 1 to Rs. 2 on each 100 baskets of paddy bought. The principals for whom they work may be local dealers or speculators buying to store for a price rise, or local millers who will mill the paddy at once or later according to their view of likely movement in the rice market, or they may be agents buying on contract for the big mills in Rangoon, Bassein and Moulmein. These latter are usually (and loosely) termed "big brokers" (*pwea-gyi* or *daing-pwea*) to distinguish them from the humbler "jungle brokers" (*taw-pwea*).

As the mill brokers, their agents and the agents of numerous speculators travel from threshing floor to threshing floor and from village to village, canvassing the areas in which they have established connections, some will buy outright whilst others will content themselves with obtaining from the paddy owners, both growers and stock-holders, promises to sell certain quantities of paddy at a certain price per 100 baskets, fixing a date and hour up to which the promise shall hold good. In these transactions the onus of warning the brokers of any change of mind before the date and hour fixed rests with the prospective seller, but this right is exercised only if no money has changed hands by way of sealing the contract. In actual practice, where broker and paddy seller are known to one another through transactions in previous years, it is seldom that the right to withdraw from the deal is exercised. The next phase is for the agent to approach his principal and, armed with such purchases as he has made outright, and with his options on paddy at various places, to bargain for a flat rate for the aggregate. The rate, when it is agreed upon, is usually for delivery at the principal's godown and is always quoted exclusive of brokerage. In the case of miller and big broker, when a bargain has been struck, a contract is signed for delivery within a stipulated time. Usually the sum which the rate represents for the whole transaction is handed over to the broker and with this he or his deputies tour the district, converting the previously obtained options into actual sales and arranging for these to be bulked with any paddies previously bought outright or acquired in settlement of loans.

In tracing the passage of the paddy from the *talin* or threshing floor to the mills, names descriptive of their chief functions have been given to the main intermediaries concerned, but it must be remembered that none of them confines his attention to one par-

ticular function and that each usurps the function of the others as opportunity for profit shows itself. The land-owner with his stock-holding and his traditional added occupation of money-lender is one example; the village trader, who, in his sales of groceries and general stores gives credit redeemable in paddy and thereby manages to combine with his normal trading business the added functions of money-lender and speculator, is another; whilst the broker who though accepting a commission and possibly an advance from the buyer, delivers to that buyer paddy at a price which may or may not bear any relationship to the price at which the seller has parted with it, is the third.

In the interior, paddy is sold by volume, the unit of measure being the basket. The prices ruling in Rangoon are generally known in the larger villages, either through the press or through the passing on of information orally.

In purchasing the paddy on the threshing floor or from any stockholder in the jungle, the broker buying for the mills usually makes an arrangement which may or may not be allowed for in the purchase price, for the transport of the paddy bought either direct to his principal or to the nearest point on river or rail from which it can be despatched. There the paddy is accepted by the broker or his agent for transshipment to the mill. Conveyance from this point may be either in the mill's own gigs and trucks or by hired transport. In general, whatever the means used, the paddy remains the responsibility of the broker until its final acceptance at the mill godown.

The work of "brokering" as applied to paddy consists, therefore, of rather more than is connoted by the term in its western sense. With the paddy broker there is seldom any question of handing over to the seller, in return for brokerage, the actual price paid by the buyer. The paddy broker is usually in fact not a broker but a trader, and, like every other trader, the margin between his buying and selling price is the reward for his astuteness.

For his trading, however, he is more often than not in the favourable position of being able to do his purchasing with the money of the ultimate buyer, and at the same time receive from that buyer in the form of brokerage a retaining fee (varying from Rs. 2 to Rs. 4 per 100 baskets of paddy purchased) to augment or make good the gains or losses of his trading.

The broker's usefulness to the miller is unquestionable. He provides that intimate knowledge of local conditions which the miller lacks; his existence ensures from the jungle a smooth and regular inward movement of supplies so necessary to economical milling.

In the matter of cost he is not expensive to the miller. His cost, like that of every other part of the milling process, is merely a debit made from the price at which rice can be sold to arrive at the price at which paddy can be bought, and it is on the paddy producer that his cost ultimately falls.

It has sometimes been suggested that the broker is a parasite battenning on the cultivator but the question of finding an efficient substitute for him remains to be solved—a channel through which supplies could find their way to the mills as smoothly but at less cost. The milling industry is not likely to object provided the substitute is efficient. Mills are not bound to the broker by any sentimental attachment as is evidenced by the fact that in various parts of the Delta, jungle-buying agencies with fixed delivery points under direct mill supervision have already been set up during the past few years in an attempt towards closer contact between the mills and the paddy growers. But even to these delivery points it is found that the paddy is seldom brought in by the growers direct and brokers are still found necessary.

Some attempts at paddy assembly on a co-operative basis have been made. The main obstacle to the successful functioning of these societies for assembly and joint sale is the difficulty which members have in raising money for their immediate needs after harvest while waiting for their crop to be disposed of. Lack of confidence in their managing committees and the difficulty of finding reliable managers and graders have also been obstacles in the way of their success. The most successful of the attempts made is perhaps that of the Sittang Colony Area which is composed of groups of cultivators settled by government between 1915 and 1923 on land formerly under forest in the Sittang estuary. The total area of Colony land is about 110,000 acres worked in blocks of 40 to 50 acres each by some 2,500 colonists who are grouped into 79 societies, which are affiliated to the Sittang Colonies Banking Union. The Union maintains several depots at convenient points and two rice mills at Rangoon. These collecting centres function as points of assembly to which the members bring their paddy for despatch to the Union's mills at Rangoon, where it is converted into rice. This product is disposed of by the Union through the same trade channels as the other mills. A close study of the affairs of this whole organisation has clearly established the fact that the producer gets a better price for his paddy by co-operative milling and selling than otherwise. A fuller account of the working of the Union has been given in Appendix LXX, which quotes extracts from a recent bulletin issued by the Agricultural Credit Department of the Reserve Bank of India.

#### **B.—Finance of assembling.**

In the Report of the Burma Provincial Banking Enquiry Committee (1929-30), with a paddy crop value at about Rs. 42 crores\*, the amount borrowed by landlords and cultivators for current expenditure repayable at harvest was estimated at Rs. 16 crores. Two-thirds of this it was reckoned, came from the Chettiar community. The demand for this money arises from all classes connected with cultivation. The hired labourer approaches the season with nothing but his strength and willingness to serve. For this he expects to be fed and housed and be given an agreed number or baskets of

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\*At Rs. 160 per hundred baskets.

paddy at harvest time. More often than not he will expect to be able to draw from time to time for the support of his family small sums of money against the paddy wages due to him at harvest. The employer himself and particularly if he be a tenant-cultivator, often approaches the cultivating season almost as empty handed as the man he hires. And he, in addition to providing for his hired labour, must make provision for his own family and for the beasts, implements and seed required for cultivation. To the extent to which he is not able to provide these he, if a tenant, looks to his landlord, or, if an owner, to an outside agency to make good the deficiency. Borrowings by the cultivator are, therefore, the order of the day.

Landlords throughout the Lower Burma area seem to accept the principle that they should finance their tenants. Indeed, without this financing it is doubtful whether they would get tenants. Moreover they do not seem averse to the custom and for most of them the lending they do is possibly quite as profitable as the actual letting of the land. Money-lending has thus in the Delta become a corollary to land-owning. The money lent, however, is often only in part the land-owners. Much of it is borrowed by them from Chettiers on the security of land and houses or jewellery. On fully secured property of this nature the Chettiar will lend at rates of  $1\frac{1}{2}$  to  $1\frac{3}{4}$  per cent per month. Money obtained at this rate, augmented by any spare capital of his own, the landlord passes on to his tenant at rates which usually lie between  $1\frac{3}{4}$  and  $2\frac{1}{2}$  per cent per month. Owner-cultivators who deal direct with Chettiers may get slightly better rates than tenant-cultivators borrowing from their landlords, but for small cultivators, whether owner or tenant, of the same reputation, the differences are not great.

Loans taken in this way are normally repayable, both principal and interest, in cash, and in the case of the Chettiar loan and also of loans by most classes of money-lenders, there is usually no attempt to restrict or control the borrower in the disposal of his crop. The lenders are indifferent to whom the crop is sold so long as they get their money and their interest. An exception to this is the landlord-creditor, who almost invariably insists on paddy to the value of the debt being sold to him or through him.

In cases where the security offered is unacceptable to the Chettiar or other regular money-lender, or, in the case of the tenant-borrower, where the landlord has come to the limit of what he is prepared to lend, recourse for a loan may have to be made to outside agencies such as traders and village-shopkeepers. Here in view of the greater risks of the lenders (and the greater needs of the borrowers) the rates of interest are likely to be higher and restrictive conditions as to repayment in produce may be introduced.

There are four main forms of these restrictive loans which a cultivator may find himself forced to take, *viz.* :—

- (1) *Saba-do*.—In this the loan is made in produce and both principal and interest are repayable in produce ;



- (2) *Saba-de*.—The loan is made in produce. The principal is repayable in produce, but the interest must be paid in money ;
- (3) *Saba-nyun*.—The loan is made in money. The principal is repayable in money but the interest must be paid in produce. The produce repayable is the number of baskets which, calculated at the previous season's price, represents from 7 to 10 per cent per month on the loan.
- (4) *Saba-pe*.—This is strictly not a loan but an advance sale. For sales made and money paid over in June, August and October respectively the price for delivery after harvest is roughly 50, 60 and 70 per cent of the price which paddy commanded in the previous season. At these rates the "interest" works out at from 8 to 15 per cent per month (96 to 120 per cent per annum).

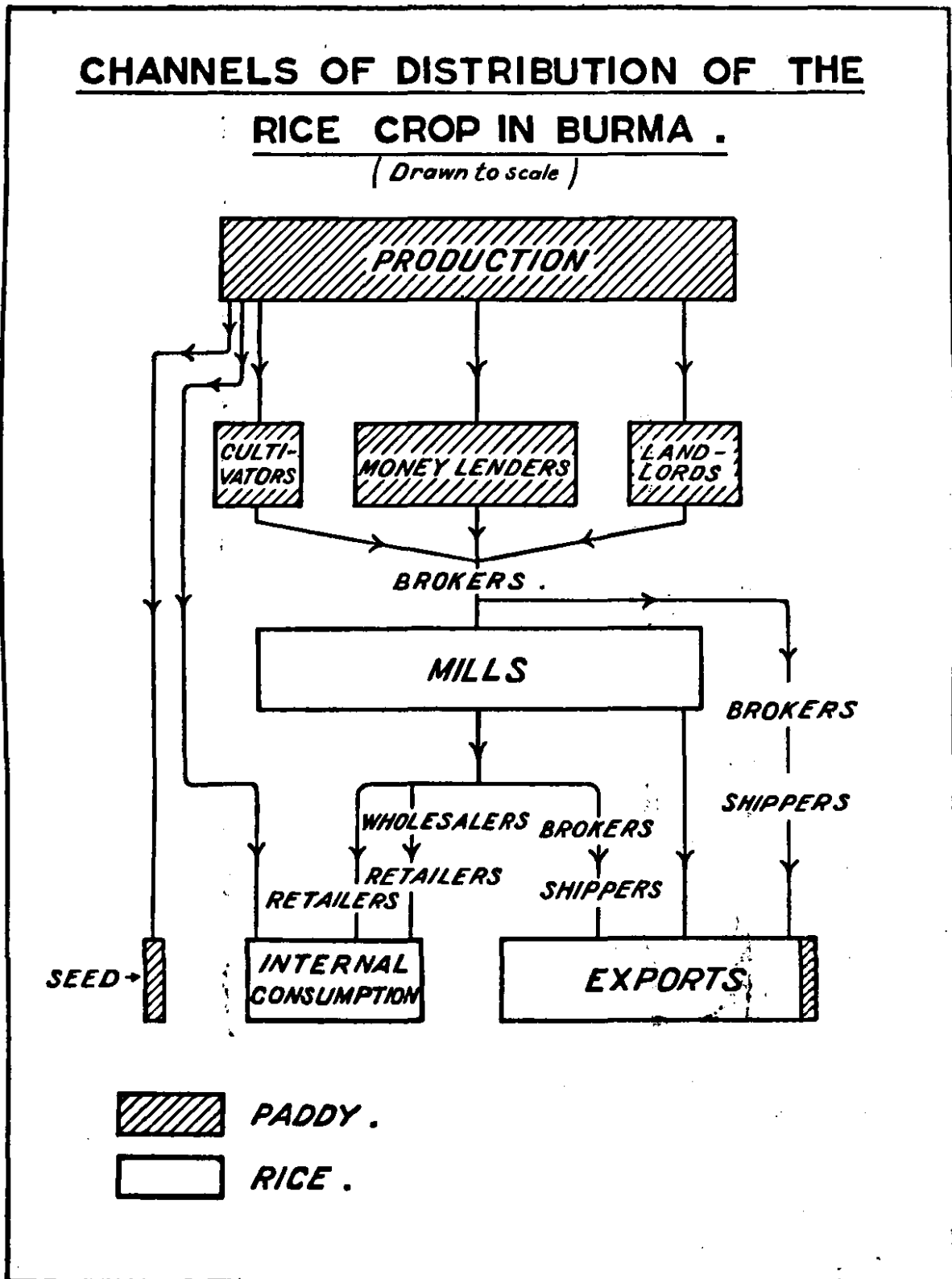
In the Delta *Saba-do*, *Saba-de* and *Saba-nyun* loans, though still found in certain areas, are becoming rarer. *Saba-pe* loans on the other hand are found to be still common. Where they are used, however, it is mainly for small requirements of food and seed and to provide money for paying labour. The hired labourer too, where employed other than on wage, uses them fairly freely to obtain, either from his employer or from the village-shopkeeper, advances on the produce wages due to him at harvest. *Saba-pe* transactions, because of the exorbitant interest rates which they carry, must nevertheless be regarded in all cases as the last resort of people whose credit is so poor that no other source of assistance is open to them. Unfortunately amongst Burma paddy cultivators there are many who are in this plight.

It will be recalled that when buying paddy all the mills and some of the bigger speculators employ brokers. They are usually men possessing an intimate knowledge of particular areas and having, either directly or through their sub-agents, some measure of control over or connection with cultivators and stock-holders in these tracts. Until comparatively recently it was customary for the large mills to make general advances of considerable magnitude to their brokers for the purchase of paddy. These advances were often for four or five months, from January to May and no interest was charged on them. The accounts between millers and brokers were balanced at the end of the season. This system has of late years been largely discontinued by the bigger mills, who now usually give advances only for specific purchases for delivery within a limited period of ten days or so. Many of the smaller mills, however, still persist with the system of general advances, though the tendency even with them is becoming less.

It is common for speculators and for the big brokers maintained by mills to make advances to brokers subordinate to them or to small traders. These advances may be made from capital owned by the speculator or broker himself, or from money borrowed by

# CHANNELS OF DISTRIBUTION OF THE RICE CROP IN BURMA .

( Drawn to scale )





GRADING RICE (PATNAI) IN AN EXPORTER'S GODOWN NEAR CALCUTTA.

him for the purpose from Chettiars on the security of property. These advances are frequently in turn supplemented and again handed on. They may reach the cultivator as cash payment for purchases or in the form of earnest money given during or just before harvest to secure a lien on the crop, or they may have been taken by him at the beginning of the cultivation season in the form of a *saba-pe* loan.

With the very considerable produce rents which are due to landlords and with the loans taken it is easy to see why the bulk of the paddy produced follows certain recognized channels of assembly into the hands of the land-owner and the village trader or the money-lender, or be urgently disposed of from the threshing floor to meet other debts.

The position may, therefore, be summarised as follows. Of the total marketable surplus in Burma which constitutes 83 per cent of the total production and amounts to 4.75 million tons of rice (on the basis of the annual average crops of the triennium 1934-35/1936-37) the grower handles about 19 per cent, the landlord 29 per cent and the money-lender 52 per cent—all in the form of paddy. Expressed in terms of quantity these proportions represent 0.90, 1.36 and 2.49 million tons of rice respectively. Practically the whole of this movement of paddy eventually passes through the hands of the broker on its way to the mill to be converted into rice and a relatively small quantity only is disposed of to shippers who export the produce as paddy. The channels of assembly and distribution will be found illustrated in the diagram facing page 282.

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*Assembling.]*

## INTER-CHAPTER FIVE.

The cultivator likes to market his produce himself rather than dispose of it in the village to the various assembling intermediaries. But unfortunately owing to fear of excessive deductions and malpractices in the market and his financial obligations to creditors who are as a rule interested in acquiring his produce at first hand, his share in the assembling process so far as the rice crop is concerned amounts to a little over one-eighth of the total marketable surplus. Merely as a result of not marketing his produce direct the rice grower is losing at least 9 rupees for every 100 rupees worth sold to the middleman in the village.

Before entering the market the first charge on the produce is the municipal octroi. In the market the seller has to pay market charges including those on account of handling and weighing, brokerage, commission, deductions on account of refraction, driage, etc., and charity allowances. Over and above these the sweeper, the waterman, the *arhatiya's* employees and wandering beggars claim a share of the produce offered for sale.

The total admitted market charges payable on paddy and rice are certainly very high in a number of markets in the different provinces and States of India. In the United Provinces, for instance, they amount to as much as 13·89 per cent on paddy and 9·56 per cent on rice exclusive of municipal tolls or taxes. Wherever comparable data were available it was also found that the incidence of market charges on paddy is generally heavier than that on rice. Another significant fact which emerges from an analysis of the charges in different markets is that in the majority of cases a greater proportion of these expenses is borne by the seller, the buyer's share being relatively small.

Deductions to compensate for loss in weight on account of impurities, driage, etc., in vogue in several markets are not only excessively high as, for example, in the United Provinces markets where they average Rs. 4-13-8 per Rs. 100 worth of paddy, but what is even more unjust is that these allowances have to be met by the seller whether or not the condition of the produce actually justifies them.

Charges on account of charity may or may not be justifiable on ethical grounds. It seems clear, however, that the poor village cultivator derives no practical benefit from the town charities he is compelled to support. In many cases, the money does not pass to any charity and sums lying to the credit of charity funds with various establishments are used for trading purposes. Local governments might well examine the possibility of acquiring such funds for improvement in public utilities of benefit to cultivators, *e.g.*, in improving existing market facilities and storage accommodation. It is also worth considering why sundry persons like the sweeper, the waterman, the *arhatiya's* cook and above all beggars without number should be allowed to tax the seller promiscuously.

The various market practices including weighment, method of sale, basis of delivery, etc., need regularisation. The method of bidding under the cloth implies secret dealing and on that ground is liable to abuse. The practice can, however, be tolerated if the final bid is openly declared. When the produce is being weighed for delivery the buyer sometimes claims further deductions or a discount from the price originally settled on frivolous pretexts. This is reprehensible as the seller at that stage has no redress and no responsible party to whom he can appeal for arbitration.

In the interest of the cultivator who has to bear the brunt of all these impositions necessary measures should be taken to regulate market charges and prac-

tices on fair principles. Matters could have been improved to a considerable extent by the trade itself through organised action. That this is possible is evidenced by the fact that in several markets, mainly, in Northern India, the standardisation of market charges and procedure has been attained by the local trade associations. Unfortunately, conditions elsewhere are not satisfactory and in some cases have deteriorated with the march of time. As a concrete instance it may be mentioned that a petition was filed in January 1940 by the cultivators of Tenali, Guntur district (Madras Presidency) to the Collector complaining that the market charges on paddy in the Tenali market had risen from 4 pies per bag in 1921 to Re. 0-1-7 in 1940 and that whereas formerly a bag of paddy used to be reckoned equivalent to 166 lb., the quantity taken per bag now was 178 lb. The petition also referred to fraudulent weighing. On enquiry not only were these charges found to be correct but it was also revealed that whereas a portion of the market charges amounting to about 25 per cent of the total was unspecified, another 20 per cent taken for God, police and school was pocketed by the merchants themselves.

In these circumstances, legislative measures are indicated to set matters right. So far as the rice crop is concerned, market legislation has not been applied except in the case of a few markets in the State of Hyderabad. It is interesting to observe that the market charges payable on paddy and rice in the regulated markets are appreciably lower than in the unregulated markets in this State. That the introduction of regulated markets in respect of other commodities in certain provinces and States has proved beneficial is as well established. No further arguments are, therefore, necessary to draw the attention of local administrations towards the need of an early action in the matter of regulating markets for paddy and rice. In those provinces and States, where a Market Act, such as the Commercial Crops Act in Madras, is in operation, it can be usefully

extended to those markets and commodities, such as paddy and rice, which are not yet included under the Act. In areas, where such a legislation does not exist steps should be taken to enact the necessary measure at the earliest opportunity.

The hampering effect of municipal tolls on marketing has been pointed out in previous reports of the marketing series. In many instances it has been found that the tax is "more than the traffic can bear" and drives produce into round about channels. It is desirable to examine this question with a view to reducing these burdens to a minimum.

In financing himself the cultivator, in addition to paying a rate of interest which is excessively high, even after allowing for the serious risk which the creditor is running, has to part with a considerable proportion of his produce soon after the harvest at very low values in comparison with what he could obtain, were he in a position to market it independently. Herein lies in a large measure the justification for growers' co-operative loan and sale societies—particularly for paddy. Having regard to the size of the Indian rice crop and the favourable scope for co-operative endeavour in practical marketing the part played by co-operative societies in financing the assembling (and distribution) of this important food grain is very disappointing.

Banks advance loans to merchants on the security of the produce only on certain conditions. In view of the comparative immunity of paddy from deterioration in storage and the customary normal seasonal rise in price, banks might well consider the provision of more extensive facilities for making advances on the crop at harvest time.

In Burma, the grower handles about 19 per cent, the landlord 29 per cent and the money-lender 52 per cent of the marketable surplus—all in the form of paddy. Practically, the whole of this movement of paddy even-



tually passes through the hands of the broker on its way to the mill to be converted into rice, a relatively small quantity being disposed of to shippers who export the produce as paddy. The paddy broker is usually in fact not a broker but a trader, and like every other trader he has a margin between his buying and selling prices. It has sometimes been suggested that the broker is a parasite battenning on the cultivator, but the question of finding an efficient substitute for him remains to be solved. Mills are bound to the broker by no sentimental attachment, as is evidenced by the fact that in various parts of the Delta, jungle agencies with fixed delivery points under direct supervision of the mills, have been set up during the past few years in an attempt towards establishing closer contact between the mills and the paddy growers. But even to these delivery points it is found that the paddy is seldom brought in by the growers direct and brokers are still found necessary. The experience in the Sittang Colony Area in the co-operative marketing of paddy is, however, encouraging and attempts should be made to extend this movement on similar lines to other parts of the country.

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## CHAPTER VI—CLASSIFICATION, GRADING AND STANDARDISATION.

### INDIA.

#### A—Classification.

Research workers of reputation such as Roxburgh, Watt and Hooker found great difficulty in fixing criteria for the classification of cultivated rices and were eventually obliged to base their classification on the mode of cultivation, season of sowing or the localities in which the produce was found to be growing. A classification of this kind may be regarded as somewhat artificial but it brings to light an important characteristic of rice, namely, its response to cultural practices, soil and climate. The trade takes these factors into consideration by deep-rooted prejudices in favour of localities. For instance, *Basmati* rice of Dehra Dun, *Hansraj* of Pilibhit, *Anji* and *Gaurya* of Naugarh, *Samhalu* of Fatehpur and *Anjana* of Haldwani are all marks of quality which are well recognised in the United Provinces and the neighbouring tracts by traders and consumers alike without question.

In addition to this factor it is important to bear in mind that the trade in rice is based on named types or commercial descriptions in which it may be recalled there exists a bewildering multiplicity of nomenclature\* owing to the enormous number of botanical varieties which are to be found growing in India and the wide range of physical variations in the grain due to local agronomic conditions. These give rise to distinct localised types for which in the course of years there has arisen a specialised demand from certain communities or from certain areas—in India or abroad. The Indian taste is so far educated that there is, in fact, no such thing as “rice” in a general sense. As a Frenchman does wine so the Indian consumer orders his rice by its special name, and age in rice is as much appreciated as vintage in wine.

Quality factors in rice and the more important trade descriptions with their physical characteristics have already been given in Chapter I under the three major categories of (a) conformation, viz., fine, medium and bold, (b) raw and parboiled and (c) machine-

\* Some examples of confusion in nomenclature may be quoted below. The instances given apply to the United Provinces.

- (i) Lakhimpur grows a medium rice verging on the coarse. It is slightly better than *Sathi* and is sown broadcast with it. It ripens late although much earlier than *Basmati* of Dehra Dun. This rice is called *Basmati* and is sold as such in the markets of Gola and Lakhimpur. By no stretch of imagination could the variety in question be regarded as resembling the *Basmati* in any physical respect either in the raw or cooked state.
- (ii) Near Madhoganj a bold or coarse late variety rice is grown and generally used for making *kheel* (parched paddy) and *chura* (beaten rice). This variety sells under the name of *Hansraj*, the well-known high grade fine rice of Pilibhit and Tanda.
- (iii) In the *Basmati* rice area around Saharanpur, near Rampur Manyaran, a coarse rice is grown, normally priced at about the same level as the cheap *Sathi*. It bears the name of *Dhania* which is also that of a medium quality marketed at and in the neighbourhood of Etawah some 200 miles south-east of the Saharanpur district.

milled and hand-pounded. The factors on which the commercial classification of rice is based need not, therefore, be repeated here. For greater convenience, however, it may be useful to present in tabular form a list of the main trade descriptions classified in accordance with the above factors, the fine category being subdivided into long and short, and giving the province or State and the district or districts of production. It should, however, be borne in mind that a certain amount of overlapping occurs in production and that in consequence the districts named are only those in which the variety in question is chiefly grown. Rices shown as scented have been selected as possessing this characteristic in a fairly marked degree. To facilitate reference to the more detailed descriptions contained in Chapter I the pages on which such particulars may be found are set opposite each variety. The table is not complete but covers all the varieties which are of any importance outside the areas where they are produced.

*Classification of some important commercial varieties of rice.*

	Trade name.	Area of production.		Description given on page.
		Province or State.	District.	
(1) <i>Fine.</i>				
A.—Long fine				
(i) Raw ..	Dehra Dun Basmati* ..	United Provinces	Dehra Dun ..	51
	Hansraj† ..	"	Naini Tal ..	} 51,52
	Raimunia ..	"	Bareilly ..	
			Saharanpur ..	52
	Punjab Basmati* ..	Punjab	Sialkot ..	} 51
	Hansraj ..		Sheikhupura ..	
	Mushkan* ..		Gujranwala ..	
	Parmal ..		Lahore ..	
	Sugdasi* ..	Sind	Larkana ..	55
	Seeta† (Patnai)	Bengal	24-Parganas ..	} 54
			Khulna ..	
			Midnapore ..	
			Hooghly ..	
(ii) Parboiled	Patnai ..	"	" ..	54
	Kalambank (Patnai)	Orissa	Balasore ..	53
	Ballam ..	Bengal	Noakhali ..	} 54
			Backergunge ..	
			Khulna ..	
			24-Parganas ..	
	Kalamkatti ..	"	Dinajpur ..	} 55
			Bankura ..	

\*Scented.

†Hand-pounded.

	Trade name.	Area of production.		Description given on page.
		Province or State.	District.	
(1) <i>Fine</i> —contd.				
A.— <i>Long fine</i> —contd.				
(ii) <i>Parboiled</i> —contd.	Kalamkatti ..	Bihar ..	Purnea .. Santhal Parganas .. Manbhum ..	} 53
	Saharanpur Sela	United Provinces.	Saharanpur ..	51, 52
	Raimunia ..	" ..	" ..	52
B.— <i>Short fine</i>				
(i) <i>Raw</i> ..	Kamod ..	Bombay ..	Gujrat districts	} 52,53
	Kolomba (Zinia)*	" ..	Thana ..	
	Jiresal*.	" ..	Poona ..	
	Kolpi .	" ..	Maval ..	
	Kalikamod* ..	Central Provinces	Bhandara ..	52
	Chhatri* ..		Seoni-Chhindwara	} "
	Chinoor* ..		Balaghat .. " .. Bhandara ..	
	Baspatri* ..		Raipur, Drug ..	"
	G. E. B. 24, Khichili or Khichidi Samba	Madras ..	West and East Godavari .. Kistna .. Guntur .. Kurnool .. Anantapur .. North and South Arcot .. Chingleput ..	} 53
	Krishnakatukulu.		West and East Godavari .. Vizagapatam ..	} "
(ii) <i>Parboiled</i>	Sitasal ..	Bengal ..	Midnapur .. Hooghly .. 24-Parganas .. Khulna ..	} 54
	" ..	Orissa ..	Mayurbhanj ..	} 53,54
	Begami ..	Punjab ..	Balasore .. Sialkot ..	
(2) <i>Medium</i> ..				
(i) <i>Raw</i>	Sone ..		Amritsar .. Sheikhupura ..	} 55
	Anjana ..	United Provinces	Gujranwala .. Amritsar .. Moradabad .. Bareilly ..	
				} 56

\*Scented.

	Trade name.	Area of production.		Description given on page.	
		Province or State.	District.		
(2) <i>Medium—</i> <i>contd.</i> (i) <i>Raw—contd.</i>	Sondhi ..	United Provinces	Etawah ..	56	
	Didai ..	"	Basti .. Gorakhpur .. Gonda ..	} "	
	Anji ..	"	" ..	"	
	Rambhog ..	"	" ..	"	
	Luchai ..	} Central Pro- vinces	Raipur ..	} 56,57	
	Budhiabako ..		Bilaspur ..		
	Samundrasok ..		Drug ..		
	Kersail ..	Assam ..	Sylhet .. Goalpara .. Sibsagar ..	} 59	
	Ambemohar* ..	Bombay ..	Karnatak districts.	57	
	Sutersal ..	} Madras ..	Gujarat districts	"	
	Red Sirumani ..		Tanjore .. South Arcot .. Chingleput ..	} "	
	White Sirumani Akkulu ..		" ..	West and East Godavari .. Kistna ..	} "
	Sadai Samba ..	" ..	Trichinopoly .. South Arcot .. Coimbatore .. Salem ..	} "	
	Attragada ..	" ..	West Godavari .. Kistna .. Guntur ..	} "	
	Molagolukulu ..	" ..	Nellore ..	"	
	(ii) <i>Parboiled</i>	Daudzai*, ..	} North-West Frontier Province	Peshawar ..	59
		Swati ..			
Dudhraj ..		} Bihar ..	Champaran .. Saran .. Muzaffarpur ..	} 57,58	
Dudkhani ..			Darbhanga .. Purnea ..		
Saldhenti ..			} Orissa ..		Sambalpore district.
Kankerbija ..		States of Bamra. .. Raigarh .. Sonpur .. Patna ..		} 58	

\*Border line cases.

	Trade name.	Area of production.		Description given on page.			
		Province or State.	District.				
(2) <i>Medium—</i> contd. (ii) <i>Parboiled—</i> contd.	Dudhkalma ..	} Bengal ..	Burdwan ..	} 58			
	Jatakalma ..		Bankura ..				
	Nagra ..	" ..	Burdwan .. Bankura .. Midnapore .. Hooghly ..	} "			
	Indrasail ..	" ..	Dinajpur .. Rajshahi .. Patna .. Dacca .. Mymensingh .. Murshidabad ..	} 59			
	Banktulasi* ..	" ..	24-Parganas .. Burdwan ..	} 59			
	Red Sirumani White Sirumani	Madras ..	Tanjore .. South Arcot .. Chingleput ..	} 57			
	Nekiradhan .. Malsira .. Latisal ..	} Assam ..	Sylhet .. Goalpara .. Sibsagar ..	} 59			
	(3) <i>Bold.</i> (i) <i>Raw</i> ..		Kangni ..		Sind ..	Larkana ..	62
	Jhona ..		Punjab ..		Lahore .. Sialkot .. Amritsar ..	} 60	
	Banki Sathi ..	} United Provin- ces	Hardoi .. Unao .. Sitapur .. Barabanki ..	} "			
Pahari ..	" ..		Etawah ..		"		
Dhani ..	" ..	Saharanpur ..	"				
Bhadian ..	" ..	Gorakhpur .. Basti .. Gonda .. Azamgarh ..	} "				
Gurmatia ..	} Central Provin- ces	Raipur .. Drug ..		} "			
Pattani ..		Bombay ..	Ratnagiri ..		61		
Kusuma ..	Madras ..	Kistna .. Guntur ..	" "				

\*Border line cases.

	Trade name.	Area of production.		Description given on page.
		Province or State.	District.	
(3) <i>Bold</i> —contd. (i) <i>Raw</i> —contd.	Konamani ..	Madras ..	West and East Godavari Kistna .. Vizagapatam ..	} 61
	Kodai ..	" ..	Madura .. Ramnad .. Tinnevelly ..	
(ii) <i>Parboiled</i>	Kazla ..	Bengal ..	Jessore .. Khulna .. Nadia .. Midnapore ..	} 61,62
	Satraj* .. Mota Chaudhana. }	Bihar ..	Saran .. Champaran .. Shahabad .. Muzaffarpur ..	
	Kurvai ..		Madras ..	Madura .. Ramnad .. Tinnevelly ..
	Kangni ..	Sind ..	Larkana ..	62

### B.—Grading and marking.

It is essential that any rice put on the market should be described and marked with its correct name. To ensure the correctness of the description, the marking should be done in the producing area. Within each class of rice there are various grades of quality and it is desirable that these should be standardised and observed throughout the trade generally. Standardised grading not only facilitates the dissemination of prices and market information generally but also assists the machinery of distribution at all stages. Goods can be readily and safely bought by letter, telegram and telephone without examination of samples and detailed reference to their physical characteristics. They can also be as easily sold for forward delivery as on the cash or spot market. The introduction of standard grades eventually leads to greater uniformity of production types and tends to eliminate or at least reduce the heterogeneous number of varieties and trade descriptions.

While a certain amount of grading is done by individual millers and merchants, almost wholly in respect of the more expensive rice<sup>†</sup>, there are no fixed standards of quality and grading in bulk with the specific object of conforming to well recognised standards.

\*Hand-pounded.

†Judging by the condition in which the great bulk of cheap coarse rice was found to be marketed, the extra labour and cost of sieving involved in grading is apparently considered uneconomic.

Isolated attempts on the part of a few large growers and other sections of the industry are made in different ways. For example, cultivators who grow improved varieties generally keep these separate and market them as such. The deliberate mixing of different varieties of paddy is not normally resorted to by the growers and where the produce is found to contain an appreciable proportion of admixture the reason is generally to be found in the field where plants bearing different varieties of grain are allowed to grow side by side and are harvested together. Roguing appears to be very rarely undertaken. Some growers also sort out the superior from the inferior qualities, market the former and consume the latter, while the retailer has also been known to make some attempt at grading in order to sell at competitive rates. This usually consists of cleaning and blending or mixing together two or more different varieties of rice of similar physical characteristics, the whole being named after the superior rice in the mixture in order to obtain the best possible price from the consuming public. The methods employed in all cases are crude and are based on the individual's experience and knowledge of the local demand.

#### (1) EXISTING PRACTICES.

The methods adopted in grading rice may either be mechanical or manual. The former system is invariably employed in the "self-contained" or automatic huller type of rice milling plant as it is an integral part of the machinery. Manual grading is accomplished by different kinds of sieves in different areas and by the winnowing tray method, according to local usage. The plate facing page 283 shows grading being done by manual labour in the Calcutta godown of a large shipper of *Patnai* rice from Bengal.

The types of sieve used lack uniformity in construction and the size of mesh. In Bengal, for example, circular sieves made of bamboo and about 18 inches in diameter are used to grade *Patnai* rice. The meshes are formed by inter-crossing thin strips or slats of bamboo. In the Punjab, on the other hand, wire-mesh sieves are used having varying numbers of meshes to the linear inch, the usual range employing 8, 9, 10, 11 and 12 square meshes per inch. This type of mesh is also adopted in the separating equipment of self-contained or automatic huller plant. Broadly speaking, the highest grade of rice is regarded as being one which is retained by (or fails to pass through) a sieve with 7 to 8 meshes to a linear inch. A rice which passes through an 8 mesh sieve but is retained by a 9 mesh one is considered to be of the second grade and so on. The following description of the grading of high grade rices in the Punjab may be of interest. The entire operation is manual and calls for a considerable degree of skill on the part of the operator as the grading is affected by the method of shaking the sieve and the time the sieve is oscillated.

The detailed observations quoted below relate to the *Basmati* variety graded at Sialkot under actual commercial conditions. One maund of *Basmati* paddy was husked by power-driven huller and yielded a total of about 25 seers of rice—an outturn of 62·5 per cent— inclusive of edible brokens. The output of 25 seers of rice was then placed on a sieve with 7 meshes to an inch and shaken for about a



minute. This resulted in the rice passing through leaving a certain quantity of the largest whole grains on top of the sieve which for convenience may be called grade B and A respectively. The latter was carefully set apart and the former passed through an 8 mesh to the inch sieve yielding two further grades, say, C and D. The material retained by this sieve (grade C) was set apart and mixed with the separations of the first sieving (grade A) the mixture amounting to 12 seers gross or 48 per cent of the total rice. This quantity was again passed through the 7 mesh sieve and resulted in about 1 seer or roughly  $8\frac{1}{2}$  per cent being left on top of the sieve. The quality is known locally as *Wand* and is sold much dearer than any of the other grades on account of the large and uniform size of the grain and its freedom from brokens. The practice of double sifting through the 7 mesh sieve is, however, adopted only by a relatively few important dealers whose turnover is on a very large scale.

Grade D, or the residue of the second sifting was then shaken up in a 9 mesh to the inch sieve. Such grains as were too large to drop through and which may be called grade E amounted to  $1\frac{1}{2}$  seers or 6 per cent of the total quantity of rice. That which had passed through (grade F) was in turn subsequently sifted through a 10 mesh to an inch sieve the rice retained (grade G) weighing  $5\frac{1}{2}$  seers or 22 per cent of the total quantity of rice. This grade was again re-sifted and separated into two sub-grades consisting of some 4 seers of rice approximately three-fourths of a whole kernel and  $1\frac{1}{2}$  seers of *Moongra*. Grade H which may be regarded as representing the balance left over after the third sifting was then put through an 11 mesh to the inch sieve and gave 3 seers of *kani* or fragments.

The following table summarises the results of the whole procedure.

First and second sifting combined	Extra-special	..	..	1.0 seer.
	First grade	..	..	11.0 seers.
Third sifting .. ..	Second grade	..	..	1.5 seers.
Fourth sifting .. ..	Three-fourths grains and <i>Moongra</i>	..	..	5.5 seers.
Fifth sifting .. ..	Small brokens and fragments	..	..	6.0 seers.
	Total rice graded	..	..	25 seers.

The subdivision into grades is naturally a matter of choice and depends also on market considerations. For example, at Narang in the Sheikhpura district of the Punjab, it is customary to prepare only one, or occasionally two grades. Generally, however, the locally grown *Basmati* is put on the market in one grade only, the actual separations from 25 seers of rice obtained from the hulling of 1 maund of paddy being 15 seers of rice,  $7\frac{1}{2}$  seers of brokens and  $2\frac{1}{2}$  seers of fragments. In respect of the popular but less costly *Jhona* variety two different series of separations may be made in ordinary commercial conditions. In the actual case under observation, this variety was found to yield 26 seers of rice (65 per cent) from 1 maund of paddy. This could be separated into and marketed either as *Dara* or fair average quality in the proportions of  $22\frac{1}{2}$  seers of rice

and  $3\frac{1}{2}$  seers of fragments or alternatively as *Begami* and *Chhanahua* (literally—sifted) the former aggregating  $6\frac{1}{2}$  seers and the latter  $16\frac{1}{2}$  seers with a residue of  $3\frac{1}{2}$  seers of fragments.

The following table giving a few examples of the prices of the various products prevailing at the time the above observations were made will enable some idea to be formed as to the relative qualities obtained by sifting.

		Rate per maund.	
		Rs. A. P.	
<i>Basmali (outturn 62.5 per cent).</i>			
Rice	.. .. .	.. 15 seers	6 8 0
Moongra or large brokens	.. .. .	.. 4 seers	3 12 0 to 4 0 0
Fragments	.. .. .	.. 6 seers	2 8 0
<i>Hansraj (outturn 65 per cent).</i>			
Rice	.. .. .	.. 16 seers	5 8 0
Moongra or large brokens	.. .. .	.. 5 seers	3 8 0
Brokens	.. .. .	.. 4 seers	2 8 0
<i>Jhona (outturn 65 per cent).</i>			
Rice	.. .. .	.. .. .	3 12 0
Moongra or large brokens	.. .. .	.. .. .	2 8 0
Brokens	.. .. .	.. .. .	2 5 0

## (2) SALES ON SAMPLE.

On account of the almost innumerable varieties of rice grown in India and in the absence of any uniform grades or standards of quality, the great bulk of the internal rice trade is conducted on the basis of samples, values being assessed by visual examination only. This also holds good in respect of paddy with the difference that milling quality is first given a rough and ready test by dehusking the grains by vigorously rubbing a small quantity between the palm of the hands or between two hard surfaces\*. The friction thus applied to the grain removes the husk and exposes the kernels which are closely scrutinised for breakage and sun-cracks. The presence of the latter indicates that the grain would not stand up well to milling and would disintegrate badly. The paddy is also examined for unfilled or immature grains and red kernels. When these are found, due reckoning is made in calculating the price to be offered. As regards rice, the various quality factors which are looked for have already been described in detail and need not be repeated here. Suffice it to say that characteristics such as translucency or opacity, colour, polish, proportion of broken grains present in the sample, etc., are all assessed before a bid is made.

It is important to notice that no standard scales of allowances or deductions for the various impurities or defects found either in paddy

\* In Bombay, parts of Madras and a few other districts, friction is applied to the paddy by means of a small block of wood, some 3 inches wide and 7 or 8 inches long, the grain having first been placed on a hard surface such as a table or concrete floor.

or rice are recognised in any part of India. More frequently than not, prices are fixed after prolonged bargaining as local usage has no criterion for assessing quality other than mere visual examination.

Where sales of rice are made to comparatively distant consuming markets within the country or possibly to Ceylon or Mauritius samples are not always sent in connection with each transaction, particularly in the case of reputed varieties handled by well-known firms, many of whom may have their own selling agents in different selling centres. In such instances, a few samples may be exchanged early in the season to give prospective clients some idea of the quality of the current year's crop. Subsequently, business may be done on the basis of trade descriptions only provided the relations between the parties concerned have been mutually satisfactory in the past. Occasionally large buyers maintain their own agents in important producing centres or their representatives may pay periodical visits to the supplying markets to inspect the quality of the produce and make direct purchases. It was reported that sellers generally take some pains to despatch goods well up to sample since buyers would have no compunction in rejecting inferior tenders thus putting the defaulting sellers to considerable inconvenience and possibly serious loss, as the rejected goods could only be sold in the open market at the best available price. It is found, however, in practice that buyers generally make small claims for alleged inferiority of quality. In the absence of any regular provision for the settlement of dispute by arbitration or other means (no standard contracts are used in the internal trade) many disputes, some doubtless of a frivolous nature, occur and are eventually compromised after much bargaining.

In view of the enormous number of varieties involved buying on sample must continue until the different varieties are put on the market in standard grades. Measures which have recently been instituted with the ultimate object of achieving this purpose are described in the next section.

In regard to the export trade from Bengal to Europe, all of which consists of the hand-pounded variety, *Seeta (Patnai)*, a quality known in the overseas markets as a "rough" rice or a rice which has not been "finished" or milled, a large proportion of sales of this description are made on the basis of a sample made up annually by the London Rice Brokers' Association and based on the average quality of the preceding season's shipments. The contract employed for such transactions is referred to under "Sales on standard contracts".

### (3) SALES ON FAIR AVERAGE QUALITY.

As far as the internal trade in domestic rice is concerned, transactions on this basis are so rarely made as to warrant no special reference. Well-known trade descriptions imported from Burma may, however, be sold on a fair average quality basis on the condition "fair average quality of the season procurable at the time of milling" (Clause I of the specimen contract in Appendix LXX). This appears to be possible because of a fair measure of standardisation of certain qualities which has already been achieved by some sections of the Burma milling industry.

## (4) SALES ON STANDARD CONTRACTS.

As far as could be ascertained, the only standard contracts used in India apply to imported rice and are those of three trade associations\* whose members handle the imported product. Rice sold abroad to destinations other than Europe and North America is not covered by standard contracts. Most shippers from Bengal or Madras to Ceylon, East Africa, Mauritius and Arabian ports have their own branches at the foreign ports and operate on the basis of samples or their own trade brands or marks.

The contract form of the Calcutta Rice Merchants' Association of which a reproduction will be seen at Appendix LIII may be regarded as fairly typical in all the main essentials of the contracts in vogue in the other associations. It specifies the description of the deliverable rice, the quantity, the price, the port and month of shipment, terms of payment and delivery and provision for the settlement of disputes by arbitration, in accordance with the rules of the Calcutta Rice Merchants' Association applicable at the time of the dispute. It is interesting to observe that the quality of the bags used for packing of the consignment covered by the contract is not specifically mentioned. As regards part payment, 95 per cent of the bill (or invoice) value of the goods is advanced and earnest money may be demanded from the buyer if his status is in doubt. Usually this condition is waived as the parties are well-known to each other.

The Bombay Rice Merchants' Association's Contract printed in Gujarati is for Burma rice and is based on c. i. f. terms or godown delivery (at Bombay), at sellers' option. Strictly speaking, this is not a futures contract but rather for shipment and delivery. Transactions are negotiated privately and not on the floor of a trading ring, while the association is only concerned with the satisfactory fulfilment of the members contractual obligations, provisions having been made for arbitration by the Association. There are no clearing house arrangements and the adjustment of accounts is left entirely to the parties concerned in the transaction. The tenderable quality is known locally as *Nani Mills* and the brands or marks accepted are only those of certain well-known mills in Bassein. Actually, the quality of the deliverable product approximates a good class of *Small Mills Specials*. The tenderable marks are liable to be changed from season to season depending upon the quality of output of the mills in question but several well established marks appear year after year owing to their consistent quality. Such marks are "Double Elephant", "Butterfly", "Scissors", "Peacock" and "Lion". The remaining marks current in 1940 were "Three Stars", "Lighthouse", "Rabbit", "Three Golden Cocks" and "Palm Tree".

The unit of transaction is 25 tons and contracts may be made for any month of the year. The contract allows original mill packing only to be tendered. Re-bagged consignments are barred and may be rejected outright by buyers. No days of grace are allowed for the shipment month and bills of lading must be dated within the month

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\*The Calcutta Rice Merchants' Association, the Calcutta Grain, Oilseed and Rice Association and The Bombay Rice Merchants' Association.

of shipment. The seller is required to inform the buyer within 5 days of the date of sailing from Burma that the goods have been shipped, at the same time giving the marks of the consignment. Although the contracts are c.i.f., the seller has the option of delivering *ex-godown* in Bombay providing marks and quality are in accordance with the contract. It is at all events not customary for the buyer to demand a full set of documents such as the bill of lading, insurance policy (or certificate of insurance) and certificate of quality. Delivery orders only are issued by the seller and constitute a fair tender.

**NOTE.**—It is important to observe that ready transactions for both India and Burma rices are largely effected by oral agreement, through brokers, on the basis of samples. This is particularly a feature of the Calcutta trade. Such transactions are recorded by the two parties to the transaction by making appropriate entries in their purchase and sales books respectively and may or may not be confirmed by letter. These entries which are not signed show such particulars as the date of transaction, quality, quantity, price and name of broker. If the goods are to be consigned to any destination outside the centre in which the transaction has taken place, the date of despatch and place of delivery are also recorded.

Exporters' selling contracts for Bengal rice (*Seeta*) shipped to Europe are almost invariably made on the contract of the London Rice Brokers' Association, a specimen copy of which is contained in Appendix LIV. Such sales are made with full guarantee and on *ex-ship* terms. These contracts are signed in London by the representatives of sellers in Calcutta and the buyers concerned.

The opinion has been expressed by the local trade that penalties imposed by the arbitrators in London for inferiority in quality tend to be unduly severe and inconsistent. The feeling seems to be that since the volume of the European trade in Indian rice was insignificant as compared with that of Burma or Siam rice, London brokers did not look after the interests of their Indian constituents as they did not wish to antagonise the large buyers of the latter descriptions. For this reason certain shippers have endeavoured to establish direct relations with buyers outside the United Kingdom and since about 1936 or 1937 to the outbreak of War a certain proportion of sales to the Continental Europe have been made with Hamburg arbitration. Similarly, some direct sales have taken place to North America and the West Indies, the former with New York arbitration.

Some dissatisfaction has also been expressed in regard to the existing system of making up the fair average quality sample in London from shipments of the previous season's crop. The argument was advanced that the succeeding crop might be a very good one in which case shippers would be consigning goods superior to the standard but would receive no premium. On the other hand, the crop might turn out inferior and shippers would be penalised.

In view of these difficulties it would appear to be desirable to examine how far the trade could be developed on the basis of standards prescribed under the provisions of the Agricultural Produce (Grading and Marking) Act, 1937.

#### (5) METHODS OF SAMPLING.

In regard to the drawing of representative samples, no special methods are employed. Bulked paddy or rice is sampled by hand,

the arm being inserted into the bulk as far as it can be thrust and a handful or two of grain withdrawn for examination. When the produce is bagged a hollow spear tapered to a sharp point is used to draw off the required sampling material. This implement is made of metal and is known variously as *parkhi*, *boma* or bamboo. No uniformity is observed as to the number of bags selected for sampling, matters being settled by mutual arrangement.

As rice or paddy are not subjected to analysis as is done in the case of other cereals and oilseeds, the question of technique in making such analysis does not arise.

### C.—Standardisation—the AGMARK\* scheme.

With the ultimate object of bringing about some measure of uniformity in the innumerable and undefined grades or qualities in which rice is normally put on the market measures have been taken under the Agricultural Produce (Grading and Marking) Act, 1937\* to draw up standard grade specifications in respect of a number of well-known commercial descriptions. Each variety is covered by a separate schedule and the various quality factors enumerated in each schedule (specimens are given in Appendices XLIII and LXXII to LXXIV) are (a) Foreign matter other than rice, (b) Broken grains, (c) Fragments, (d) Other rices including red grains, (e) Damaged or discoloured grains, (f) Weevilled grains, (g) Chalky grains, (h) 1,000 kernel weight and (i) Size of grain as reflected in its length and breadth.

Briefly stated, the AGMARK† scheme for rice operates as follows. In order to fix the type and the permissible tolerances in respect of each factor a large number of samples of each variety intended to be graded is obtained from the trade and their physical characteristics examined. Care is taken to select samples representative of the two, three or four better grades normally marketed as it is considered undesirable to apply the AGMARK to inferior produce. The samples having been analysed and the various determinations made under the quality factors mentioned above, the appropriate tolerances are laid down, expressed as percentages by weight. Reference is next made to the trade interests concerned before initiating any grading work so that the tolerances fixed may be assured of their practicability by having secured the full approval of millers and merchants including producers' co-operative sales organisations where such exist.

In order to try out the draft specifications before finally notifying them in the Government of India Gazette as required by the Act, provisional Certificates of Authorisation only are issued to packers for an experimental period which may extend over a full season. During this period, the Office of the Agricultural Marketing Adviser not only issues, on request, all grading and marking equipment such as

\*The word AGMARK is made up of the first syllables of "Agricultural" and "Marketing" and is the grade designation mark applied to Indian produce graded in accordance with the Agricultural Produce (Grading and Marking) Act, 1937. Only properly authorised persons may use the mark and then only on condition that they grade and pack their produce carefully, in accordance with the prescribed rules and are willing to submit to inspection of their premises, etc.

†For the Act and the Rules (General) made under it see Appendix LV.

labels, lead seals, recording forms, etc., free of cost, but where grading is being initiated for the first time in a province or State, financial assistance, where necessary, may be provided by the Agricultural Marketing Adviser to enable a recorder or grader to be employed for three or four months.

After the experimental period is over, the results of grading and marking under the AGMARK scheme are reviewed, and changes, if any introduced into the original draft specifications, which are then duly notified in their revised final form. Certificates of Authorisation are subsequently issued, on application, in replacement of the provisional documents.

As soon as the grading of any scheduled commodity or variety of a particular commodity has passed the experimental stage and with the ultimate purpose of making the AGMARK scheme self-supporting, a small charge is levied on authorised packers, after consultation with the interests involved, in order to defray the cost of grading equipment such as labels, seals, etc. In regard to rice this charge was not levied in 1940 but it is proposed to do so in respect of the four varieties the grade specifications for which have been finally notified\*. The proposed scale of charges which is given below will also apply to other varieties as soon as they are notified.

Capacity of each bag.	Charge per 100 labels.		
	Rs.	A.	P.
Below 10 seers nett. . . . .	0	4	0
10 seers nett and above but below 20 seers nett ..	0	6	0
20 seers nett and above but below 1 maund nett ..	0	12	0
1 maund nett and above .. . . .	1	0	0

The kind of label used for graded rice is illustrated in the diagram facing this page. Every label is serially numbered in addition to carrying the name of the packer and the packing centre. Thus it is a comparatively simple matter to trace any consignment or individual bag as detailed records are maintained of the serial number of labels issued to authorised packers and the number actually used on different dates or periods for affixing to the containers.


The AGMARK scheme is entirely voluntary and it is not obligatory for holders of Certificates of Authorisation to grade and mark all their output or turnover. Only such quantities need be put out under the AGMARK as fall within the limits of tolerance specified against one or other of the grade designations.

The first experiment was initiated in January 1939, at Sheola, a village near Dehra Dun (United Provinces) in an area noted for its production of *Basmati* scented rice. The Dehra Basmati Rice Producers' Co-operative Marketing Society, which has its headquarters in this village, was the first institution to be permitted the use of the AGMARK.

A grading centre for *Basmati Sela* (parboiled) was later established at Saharanpur, also in the United Provinces.

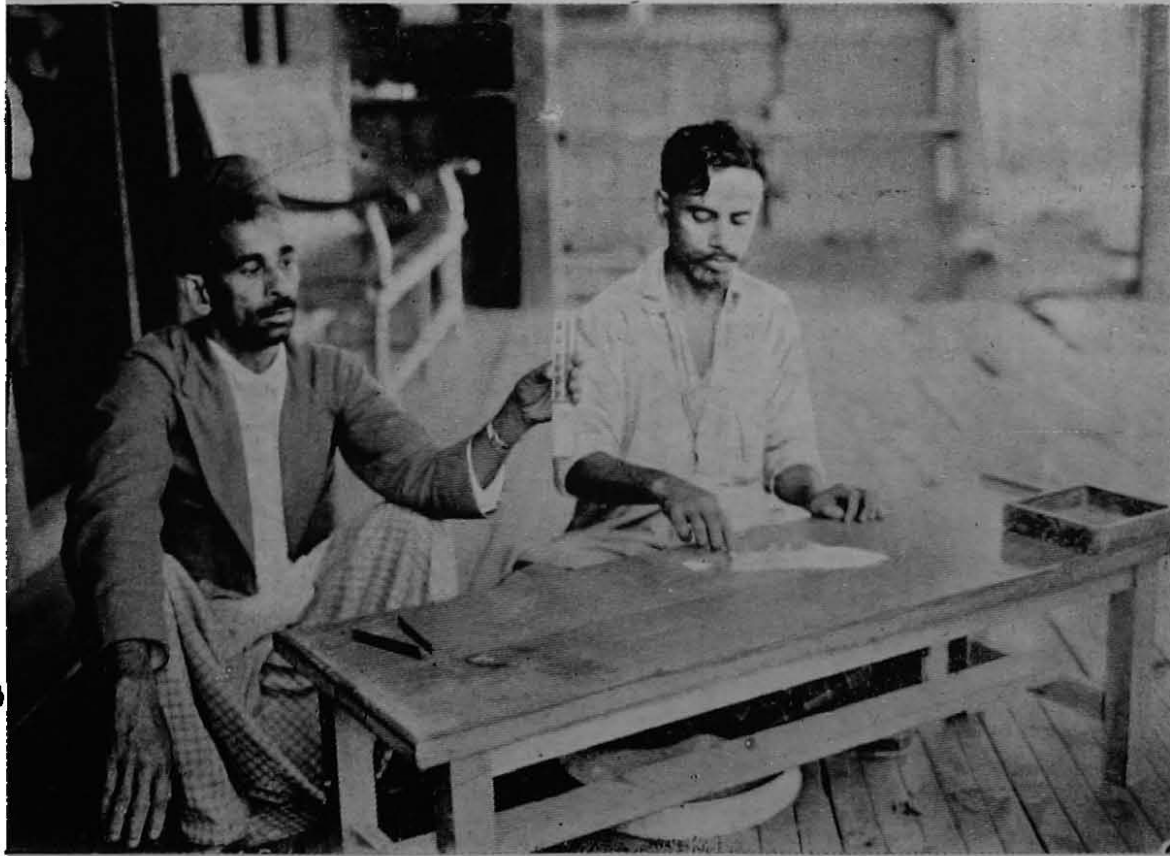
\* *Dehra Dun Basmati, Red Sirumani, White Sirumani and Molagolukulu.*

**SPECIMEN OF AN AGMARK LABEL  
USED FOR GRADED RICE.**

	[ <i>Name of variety to be stamped in this space.</i> ]	S.I. No.
	<b>RICE</b> SPECIAL QUALITY	
Nett weight _____ of the _____ crop		

Graded and packed by _____
Place of grading _____
Date of packing _____
_____
_____
This label is the property of the Agricultural Marketing Adviser to the Government of India.





ANALYSING A SAMPLE OF RICE IN RANGOON BY THE VOLUMETRIC METHOD.

(Note the graduated glass measure and the separation of broken grains being made by hand. A small box sieve is lying at the corner of the table).

Similar experimental rice grading stations were established in the Madras Presidency, the first coming into operation on the 15th February, 1939, at Kotallam, an important centre for the well-known export variety *Sirumani*, and the second, later in the same month, at Nellore noted for its production of *Molagolukulu*. The scheme met with almost immediate success as the *Sirumani* rice shipped to Ceylon under the AGMARK labels and seals was found to be fetching premiums of 1 to 4 per cent over the ordinary ungraded produce. These early and encouraging experiences have resulted in a marked expansion in the number of authorised packers in the Madras area. By October 1940, a total of forty-five packers has been authorised at eight different centres\*. All are millers, in some instances with a considerable turnover. Nine commercial descriptions are at present embraced in the AGMARK scheme in Madras. These are as follows.

- (1) *Red Sirumani* (parboiled milled).
- (2) *White Sirumani* (parboiled milled).
- (3) *Molagolukulu* (raw milled and hand-pounded).
- (4) *Nellore Samba* (parboiled milled).
- (5) *Arai Samba* or *Korangu Samba* (parboiled milled).
- (6) *Kusuma* (raw milled).
- (7) *Attragada* or *Ramusagara* (raw milled).
- (8) *Khichili Samba* or *G. E. B. 24* (raw milled).
- (9) *Delhibhogam* (raw milled).

A special feature of the development of rice grading activities in Madras has been the formation by authorised packers of local grading unions. The first to be constituted was at Nellore with the main object of popularising AGMARK graded rice and this was followed at short intervals by the formation of six other grading unions, one at each of the places mentioned in the footnote to this page, with the exception of Gudivada.

Membership of the unions is generally open to all rice millers and merchants operating in the centre at which the union is formed (or within a specified area) and interested in the grading of rice under the AGMARK scheme. Provision may be made, as at Nellore, for the employment of a recorder or grader to draw and analyse samples and to exercise a general check on the grading and marking of the authorised packer members' produce. At Nellore, a fee of 3 pies per bag of graded rice is levied on members in order to defray the cost of this control, the recorder or grader maintained by the local union working directly under the instructions of the Provincial Marketing Officer.

Work done in other areas may be briefly summarised as follows. An attempt was made in 1939 to grade *Budhiabako* rice in the Central Provinces. An experimental grading station was established for the purpose at Raipur, but it worked for a short period only as sufficient supplies of suitable quality were not forthcoming.

\*Nellore, Kotallam, Gudivada, Nachiarkoil, Korachari, Trichinopoly, Chidambaram and Tenali.

Subsequently, however, several firms applied for permission to grade *Budhiabako* (*Hansa*) and *Chinoor* rices. Draft specifications were drawn up in the 1940-41 season. The possibilities of grading fine *Zinia* (*Kolamba*) rice grown in Bombay received attention throughout 1939 and 1940 and tentative specifications were drawn up in consultation with the local marketing staff and the trade. Seven parties were authorised to take up grading from 1940-41 season. A grading station for grading *Kalamdan* rice of Bihar was opened at Bakerganj, Patna in 1939, but activities were handicapped owing to the unfavourable weather conditions. Grading was also started in the Punjab of the fine scented *Basmati* rice grown in the province. The possibilities of grading the *Daudzai* rice grown in the Peshawar area of the North-West Frontier Province were examined in the 1939-40 season and tentative specifications drafted. Local conditions, however, did not appear to favour taking up this work. From November 1940, the AGMARK scheme is being experimentally applied to the *Sugdasi* and *Kangni* varieties grown in Sind. The question of grading *Patnai* and *Kalambank* rices grown in Bengal and in Orissa respectively received active consideration and draft grade specifications for the former variety were circulated to the local trade for opinion.

In view of the importance of *Patnai* rice in the export trade, it may be of interest to describe the position in Calcutta whence the great bulk of this variety is shipped to East Africa, Mauritius, etc.

Strong opposition to the AGMARK scheme has characterised the attitude of practically all the members of the export trade in *Patnai* rice from Calcutta. At numerous discussions which took place from 1938 onwards between members of the Central and Provincial Marketing Staffs and representatives of the local shippers, the main reason advanced against the adoption of the AGMARK scheme was that since the various brands or trade marks of the shippers were long established and sufficiently well-known to buyers overseas any additional marks, would be unnecessary. It was held that the existing method of assessing quality and value by visual examination only was quite adequate and rendered unnecessary the laying down of tolerances for the varying physical characteristics such as broken, damaged grains, etc., which would imply having to examine and analyse every consignment of rice—a procedure which was not customary in India. Many exporters feared too that by adopting the AGMARK they would render their trade operations liable to examination and interference by government agencies. The conclusion seems to be that local opposition to standardisation springs largely from the fact that the export trade is run on purely individualistic lines and the fierce competition which has grown up since the War of 1914-18 has resulted in drastic price cutting and a consequent lowering of the general standards of *Patnai* rice. This has been brought about in a number of ways, such as by blending or mixing, in various proportions, cheaper varieties of rice possessing somewhat similar characteristics to the genuine *Patnai*, or by increasing the broken grain content and including kernels of irregular size or colour, thus marring the general appearance of the rice by lack of uniformity. The draft specifications to which reference has been

made in the preceding paragraph have, therefore, been mainly designed for use by the local milling industry which constitutes the primary source of supply for exporters. Several millers signified their willingness to adopt the AGMARK grades and with a small beginning in the season 1940-41 shippers may in time to come realise the advantages of the AGMARK scheme, particularly as the food control authority\* in Mauritius, a destination to which a very large proportion of Calcutta's rice exports are consigned, has given an assurance that graded rice carrying the AGMARK labels and seals would be accepted at the port of discharge without examination. Arrangements would also be made to publish the grade specification in the Mauritius Government Gazette for the information of importers.

Tentative grade specifications have been drawn up for *Khichidi* rice grown in Hyderabad State with a view to the establishment of grading centres.

In October 1940, in addition to the forty-five Madras packers, there were five authorised packers at five different centres in the United Provinces, seven packers at five centres in the Central Provinces, three at two centres in the Punjab and seven at two centres in Bombay. Experimental grading stations in Sind were being established.

The location of the various grading centres and the varieties which were being put under the AGMARK at each will be seen at a glance from the following table.

Province.	Name of centre.	No. of authorised packers.	Trade descriptions.
Madras ..	(1) Nellore .. ..	11	Molagolukulu.
	(2) Kotallam .. ..	7	Red and White Sirumani. Kattai Sambalai. Nellore Samba.
	(3) Gudivada / .. ..	1	G. E. B. 24 or Khichili Samba. Delhibhogam. Kusuma. Ramasagara.
	(4) Nachiarkoil .. ..	3	White and Red Sirumani. Nellore Samba. Kattai Sambalai.
	(5) Koradachari .. ..	3	White and Red Sirumani.

\*At an informal discussion which took place at Calcutta in April, 1940, between the Food Controller, Mauritius, and members of the Calcutta rice export trade, at which a member of the Central Marketing Staff was present, the Controller strongly supported the principle of standardisation and recommended that the grading of *Patnai* rice under the AGMARK scheme should be adopted by the shippers.

Province.	Name of centre.	No. of authorised packers.	Trade descriptions.
Madras—contd.	(6) Trichinopoly ..	5	Nellore Samba. Arai Samba. Khichili Samba.
	(7) Chidambaram ..	6	Red and White Sirumani.
	(8) Tenali .. ..	9	Ramasagara. Kusuma. Delhibhogam.
Punjab ..	(1) Lahore .. ..	2	Punjab Basmati.
	(2) Kamoke (District Gujranwala).	1	Do.
United Provinces.	(1) Saharanpur ..	2	Saharanpur Sela Basmati.
	(2) Sheola Kalan (Dehra Dun).	1	Dehra Dun Basmati.
	(3) Kashipur (District Nainital).	1	Hansraj.
	(4) Nougah (District Basti).	1	Anji.
Central Provinces.	(1) Tumsar .. ..	2	Chinoor.
	(2) Bilaspur .. ..	1	Hansa.
	(3) Raipur .. ..	1	Do.
	(4) Drug .. ..	1	Do.
	(5) Bhatapara ..	2	Do.
Bombay ..	(1) Thana .. ..	5	Zinia (Kolamba).
	(2) Bazarpath, Kalyan.	2	Do.
Sind ..	Gajikhahwar (Larkana)	1 (Experimental station).	(1) Sugdasi. (2) Kangni.

The total quantity of rice graded since the inception was 1.75 lakh maunds or nearly 6,500 tons valued at roughly Rs. 8 lakhs.

## BURMA.

### A.—Classification.

#### (1) PADDY.

The types of paddy grown have been described in Chapter I. These types are well-known and they form the first basis for grading. Within each type group there is further subdivision according to varieties. It must be remembered, however, that the Burma rice trade has been built up on the indigenous varieties of the

country and under conditions which, until recently, have not called for any great degree of purity amongst these. Moreover, until recent years, there has been no Agriculture Department to whom the cultivator could turn for new supplies of pure seed or for help in re-establishing the purity of the old. It will be understood, therefore, that although the types of paddy are usually well-known, the varieties composing them are not always as pure as they might be. Subject to this limitation, the cultivator grows his paddies by varieties, diversity in these being due to differences in soil, in situation and in season. His need for an early paddy for subsistence purposes whilst the main crop is ripening is also a factor in some areas.

The varieties grown are invariably harvested and threshed individually and they are kept separate on the threshing floor. The mills' need for a uniform grain, if undue breakage in milling is to be avoided, has already been mentioned, but between the cultivator who has his varieties heaped separately for sale and the mills who would welcome delivery by varieties as a first step towards a uniform consignment, there intervene the various assembling agencies. For these, purchasing as they do threshing floor by threshing floor and bulking their buyings in huge heaps at assembling points, it is, except in the rare areas more or less devoted to paddy of a particular kind, almost impossible to keep the varieties separate and difficult enough at times to bulk them even according to types. The competitive activity with which paddy buying opens in January and continues throughout February and March, does nothing to help them in this grading by varieties, and it must be admitted that in the case of many of the primary assemblers little or no attempt is made.

In the movement from the primary assembler up to the mills, the keeping separate of such groupings as have been made is less difficult because of the greater bulks in which they are handled and very little further mixing takes place. The mischief has, however, been done, and mills, except for any special consignments which they must have been able to obtain, are forced to accept supplies on the rougher basis of their suitability for producing rice of various qualities such as *Big Mills Specials*, *Small Mills Specials*, *Straits Quality*, etc. It is in terms of suitability for these qualities that paddy prices are mainly quoted, with further sub-division in the quotation according to the areas from which supplies are received.

In Rangoon, the main paddy grades and the areas from which they derive are as follows.

*Pasundaung Boat*.—Comprising supplies drawn from the Kayan-Thongwa creek area and from the Delta east of the Rangoon river.

*Pasundaung Rail*.—Comprising supplies received from points on the Rangoon-Mandalay line as far as Pegu and from the Thongwa line as far south as Yitkan.

*Kemendine Boat*.—Comprising supplies from the Hlaing river area.

*Kemendine Rail*.—Comprising supplies received from points on the Promé line south of Okkan.

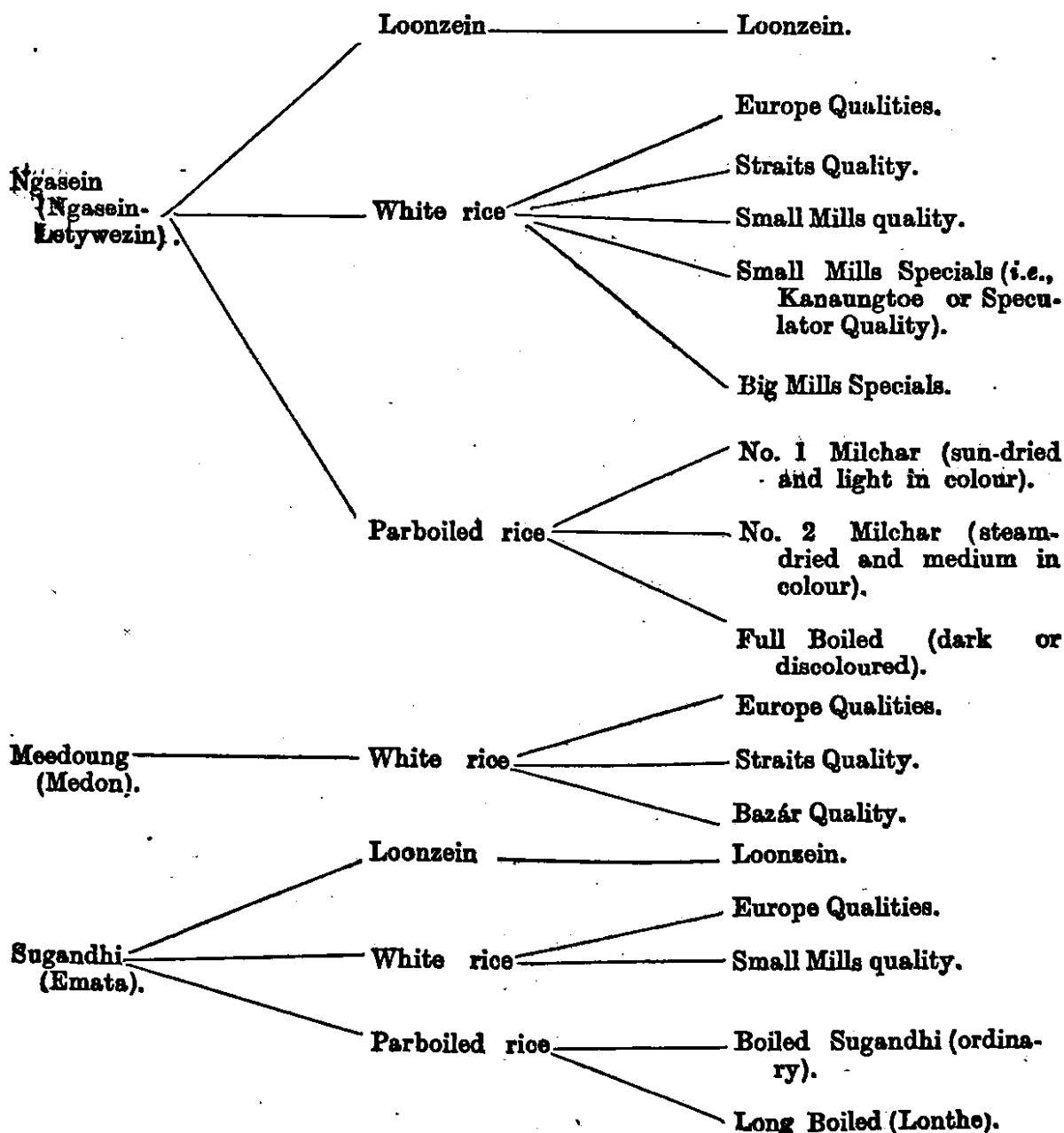
*Kanaungtoe (Boat only)*.—Comprising supplies from the Delta areas west of the Rangoon river and east of the Einme-Wakema-Pyala-law river line (Dedaye, Pyapon, Kyaiklat, Moulmeingyun).

The above are mainly composed of paddies of the *Ngasein-Letywezin* groups, of which the *Kanaungtoe* quality, coming from the secure lands to the south, is the best quality and usually commands a premium of Re. 1 or Rs. 2 per 100 baskets over "boat paddy" from either of the other areas. Between the boat and tail paddies of a particular area there is also usually a price difference of one or two rupees per 100 baskets in favour of the more secure and plump boat grain.

Additional to the above groups, paddies of the *Emata* and *Medon* groups brought into Rangoon may also be separately quoted. A further difference in quotations for any of the above is between the *Big Mills* and *Small Mills* rates, the difference being apparently based on the fact that *Small Mills*, with their smaller lot buying can and do select lots for which they are prepared to pay a small premium.

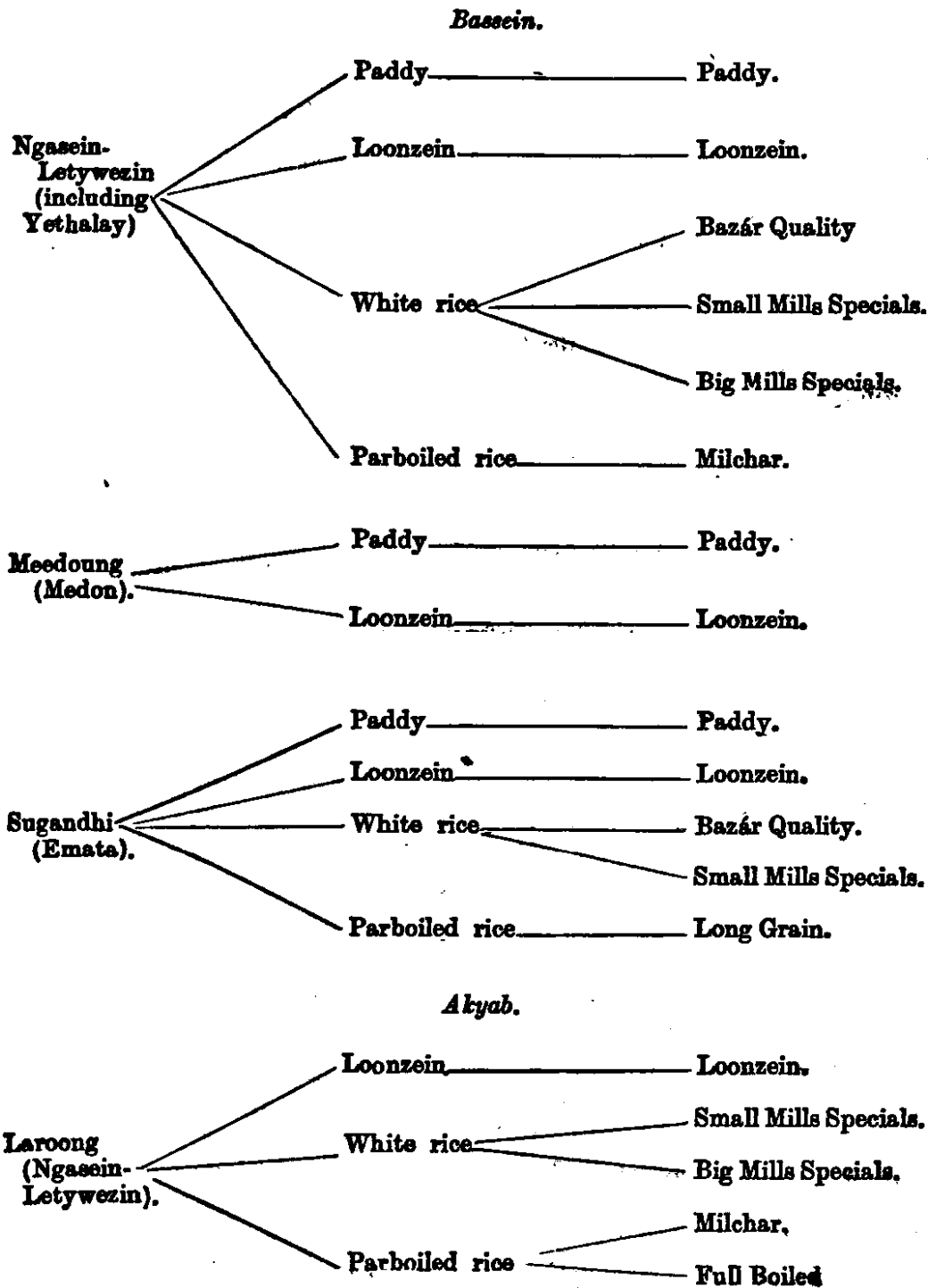
(2) RICE.

From the paddies coming into Rangoon, various kinds of rice are produced. The chief of these are shown diagrammatically below :—

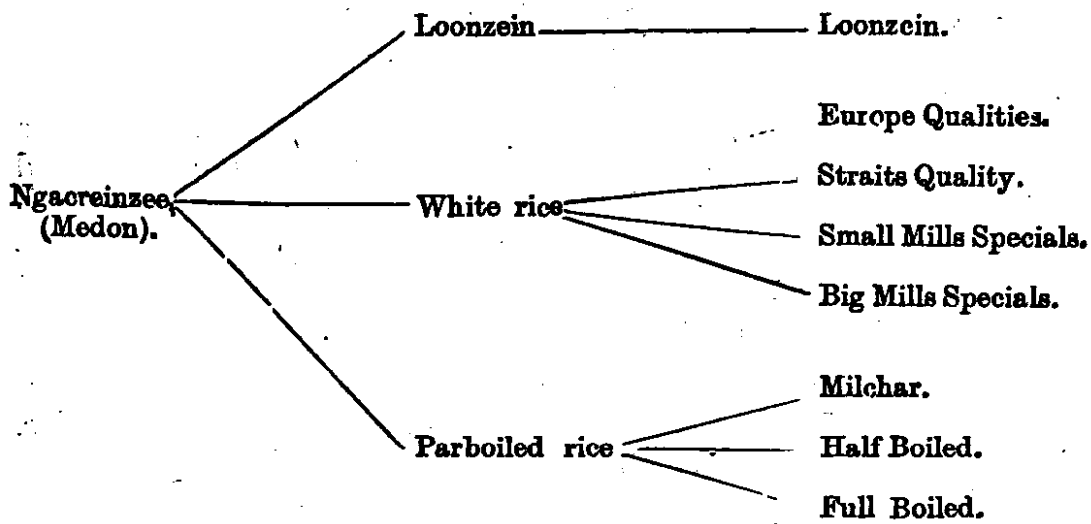


To the above rices produced in Rangoon must be added for export those produced from paddies processed in the district. The chief of these are the white rices of good quality produced from Mu Valley *Medon (Kalagi)*, Shwebo *Letywezin (Lonthe)* and Prome *Emata (Pindosein)*. The boiled rices milled from Henzada and Prome line *Emata-Letywezins* and from Pegu line *Ngasein-Letywezins* are also important. These boiled rices (mainly sun-dried) are usually of a better quality than those from similar named grain processed (and usually steam-dried) in Rangoon.

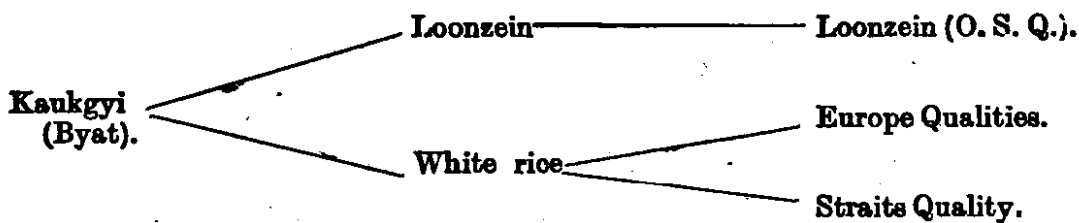
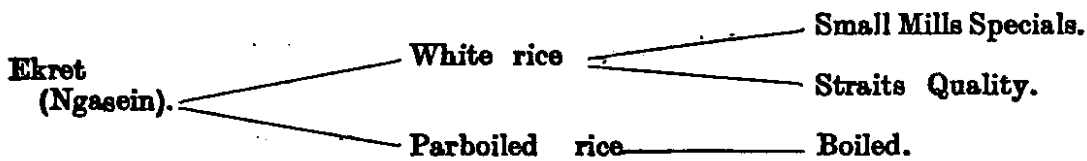
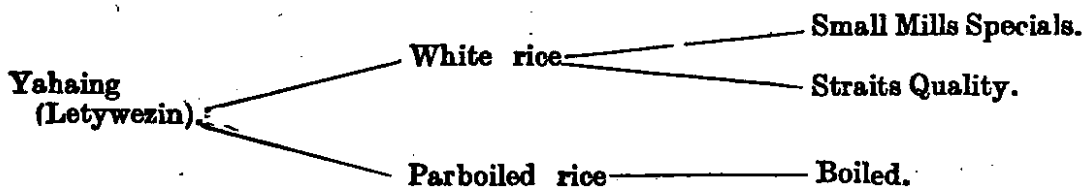
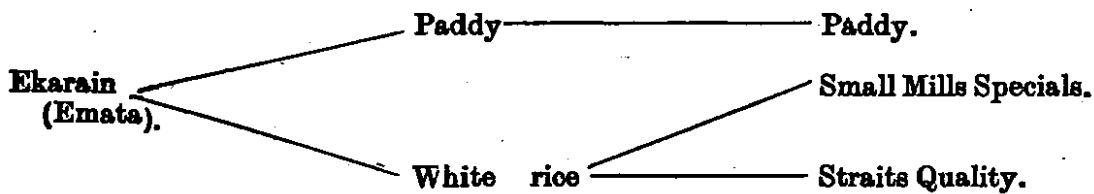
Bassein, Moulmein and Akyab similarly have their own paddies from which they produce their own particular qualities of rice. The chief of these are shown below :—







*Moulmein.*



**B.—Grading.**

(1) PADDY.

In all paddy buying the quality grades and sub-grades used, though roughly defined, are well-known in the trade and they form a basis for all acceptances. Each has its known basket weight and in the bigger mills variations from this are allowed for by the volume-cum-weight system of buying. Under this system the basic weight of a 9 gallon basket is fixed at 46 pounds and variations from this are met by additions to or deductions from the actual number of baskets at the rate of 2½ per cent for every pound of variation from the standard. This acts as a rough grading. In practice,

the paddy is usually purchased by volume, variations from standard weight being assessed by weighing an odd basket or two in each hundred on the instructions of the buyer or seller at will.

The system has the advantage of securing a higher price for the plump paddies liked by the mills, whilst it penalises adulterations with empty grain, husk, etc. A drawback to what seems to be a very fair system to both buyer and seller is the custom of some mills of regularly taking off a fixed quantity from the weight of each basket to allow for unspecified adulterations which may have found their way into the consignment.

Among the smaller mills the volume-*cum*-weight system of buying has not yet obtained a general hold, and in the case of the less reputable buyers the use of baskets of varying size to compensate for departures from grade standards is the common practice. It is seldom that the simpler expedient of a reduction in price is adopted, and this juggling with standards of measurement constitutes, by reason of its elusiveness, a factor of grave importance which will have to be taken into full consideration in any proposals made towards improving conditions under which the crop is marketed.

## (2) RICE.

In regard to rice standards these are more clearly defined than in the case of paddy. The main grades recognized by the trade have already been described in Chapter I and in general the rice conforms fairly closely to the descriptions. With paddy, sales on samples, except the small sample which may be taken by an agent for the information of his principal, are practically unknown, the buyers complaining that experience has shown them that a sample submitted by a seller is never representative of the bulk from which it purports to have been drawn. In view of the manner in which assembling takes place this is understandable. The custom has, therefore, grown up in the case of paddy for sales on sight with deductions from the agreed price if the basket weight is below that of fair average quality.

In the process of milling the paddy into rice, a more complete mixing of the bulk takes place. The resulting grades or qualities of milled rice of which an infinite number is possible may, however, be whittled down for actual trade purposes of the following.

*Big Mills Specials.*—This is the lowest grade of rice milled. It is milled mainly from poor *Ngasein-Letywezin* paddy and may contain up to 42 per cent brokens\* of various size, with a fair proportion of red grain. Milling is chiefly, though by no means exclusively, carried out at ports by the big European owned mills.

*Small Mills Specials.*—This is the quality mainly traded in the futures market and in speculator trading. It is milled from poor to medium grades of paddy (*Ngasein* and *Letywezin*). Up to 42

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\*Though the word "brokens" will be used throughout this note the term "separations" would be more correct as indicating the smaller broken grain, Chipped grain and the larger brokens are for most grades usually reckoned as whole rice.

per cent brokens is allowed but none may be smaller than quarter-grain. Red grain in small amount may be included.

*Small Mills quality*.—Similar but rather better than *Small Mills Specials*. This is the grade most commonly produced throughout Burma and is the standard quality to which most of the white rice mills outside the ports work. It may be milled from *Ngaseins*, *Letywezins*, *Medons* or *Emata*.

*Bazar Quality*.—This is much the same as the *Small Mills quality* but millings are mostly done from *Medon* paddy.

*Straits Quality*, usually designated "S. Q." and now-a-days not necessarily synonymous with the grade exported to the Straits Settlements. This is milled from *Letywezins*, *Ngaseins* and *Medons*. It may contain up to 35—40 per cent brokens. Red grain is not usually included.

*Europe Qualities*.—The milling of these is almost exclusively in the hands of European firms and is done from selected parcels of paddy. *Ngasein*, *Medon* and *Emata* paddies are all used. In the *Super Quality*, brokens must not exceed 5 per cent and these must all be of large size. In the *No. 0 Quality* up to 10 per cent brokens may be included. For the *Special* or *No. 1 Grade* the brokens are limited to 10—15 per cent. For the *Nos. 2 and 3 Grades*, brokens up to 30 per cent may be allowed but none of less than quarter-grain size may be included. Red grain is barred from all the European qualities.

In the parboiled rice trade, as distinct from white or raw rice, only the *Emata* and *Letywezin* paddies are concerned to any extent, though certain of the *Ngaseins* may be mixed in with the *Letywezins*. From the *Letywezin-Ngasein* group the grades produced are—

*Milchar No. 1*.—Usually sun-dried and light in colour.

*Milchar No. 2*.—Usually steam-dried darker in colour.

*Full Boiled*.—The lowest grade, frequently discoloured and usually containing a high percentage of brokens.

From the *Emata* paddy group there are two main qualities produced, *viz.*, :—

*Long Boiled*.—This is produced from the long-grained *Ematas* of the Henzada district and is highly esteemed.

*Boiled Sugandhi*.—For this the ordinary *Ematas* are used.

In either of the above grades there may be further subdivisions according to quality.

It is interesting to observe that an examination of a number of samples of *Small Mills Specials* shipped to Bombay and drawn in various markets of that province showed marked variations in their broken grain contents, the lowest figure being 22·8 per cent and the highest 47·7 per cent, the average working out at 32·2 per cent. The results of analysis of commercial samples of *Small Mills Specials* made at the Rice Research Station. Hmawabi (Rangoon), also revealed a range of variation which was appreciable although not so marked as that found in Bombay. Of four samples taken from random lots, one gave 36·7 per cent brokens, another 33·9

per cent, the third 42.9 per cent and the last 23.6 per cent. One sample of *Big Mills Specials* showed a broken grain content of 25.8 per cent. It would seem, therefore, that while the standardisation of general types has been achieved by the Burma milling industry in a fair measure, the commercially acceptable proportions of broken grains is a factor subject to wide latitude within the permissible maximum tolerances recognised by the trade.

(3) SALES ON STANDARD CONTRACTS (INCLUDING "FUTURES" CONTRACTS).

The contracts used by the large mills at the port terminals are practically identical, while members of the Burma Rice Merchants' Association at Rangoon operate on a somewhat similar kind of contract approved by the Association both for "delivery" contracts and for "futures" transactions. The unit for the latter is 100 tons (1,000 bags) and the quality tenderable is *Kanaungtoe Small Mills Specials*. The basis of quotation is per 100 baskets, as customary and may be for six months delivery or even more, but as a rule "futures" trading is done for "delivery" one, two or three months ahead only. Specimen copies of both types of contracts are shown in Appendices LVI and LVII.

It will be seen that "delivery" *ex-hopper* is stipulated in these contract forms and that the actual date of delivery within the named period is at sellers' option. Sellers also reserve to themselves, either specifically under the terms of their contract forms, or in general terms under Burma Rice Merchants' Association contract form, the right to arrange to give delivery from mills other than their own. Sellers are, however, bound to give due warning to the buyer as to the place, date and time selected by them for delivery. By customary usage this notice has taken the form of a milling notice, *vide* Appendix LVIII, which must be delivered at the Office of the Burma Rice Merchants' Association not later than between 1-30 and 2 P.M. (11-30 A.M. to 12 noon on Saturdays) of the day prior to milling. These milling notices represent the nearest approach to rice which is available outside the spot market. They, therefore, find a ready sale amongst those whose forward commitments for delivery are about to fall due. For this reason it has become customary for merchants and brokers concerned to meet at the office of the Association each day between 1-30 and 2 P.M. Here a milling notice may change hands a score or more times, each new buyer endorsing the back of the notice. With a keen demand for these milling notices their price rises, whilst on days when the supply exceeds the demand they may be procurable at a discount.

Whatever price fluctuations the milling note may have undergone during the day its final acceptor is required to be at the mill at the stated time, complete with gunnies and string to take delivery of the rice as it comes out of the hopper.

Payment for the rice may be demanded immediately milling is completed. This right, however, is rarely exercised. The bagged rice accepted from the hoppers may under the terms of most contracts be kept at the mill without any charge for godown rent for a period of 15 days, all risks of fire and damage being borne by the

buyer. During this time the seller and buyer nominate a collector whose duty it is to call upon all intermediate parties interested in the particular parcel of rice and collect from them their transfer documents together with any moneys which may be due from them on account of the transfer. These moneys the collector must pay out within five days of the commencement of the collection to those who have gained by the transfer. If any intermediate party fails to pay his losses his immediate seller or buyer is held liable. Disputes arising in the course of collection are referred to a committee appointed by the Rice Merchants' Association.

Where disputes arise as to the quality of the rice offered for acceptance, if they cannot be settled on the spot, they are referred to arbitrators nominated, one by the buyer and one by the seller, from the 15 members of the Rice Brokers' Association. In the case of disagreement between these, the matter is settled by an umpire nominated by the President of the Association. Fees for arbitration amounting to Rs. 32 per unit of 100 tons are paid by the loser.

Although trading in "futures" is primarily intended and used by millers and shippers to afford them cover against commitments in the way of paddy purchased or of rice deliveries for which forward contracts have been made, it also affords an opportunity for "margin trading" by persons who have no intention of handling the produce with which they are dealing. It is, however, very difficult to say where the line between the trader, "hedging" for the protection of his business, and the speculator, intent only on profit margins, can be drawn.

The "futures" market in Rangoon has no counterpart in India. There are no exchange premises and the amenities for trading are elementary in the extreme. The Association under whose auspices "futures" business is transacted provides no clearing house facilities nor are there periodical adjustments of differences arising out of the changing relationship between contract values and current market prices. Financial risks are, therefore, proportionately greater than if "futures" trading was conducted under the system adopted by East India Cotton Association or the Karachi Indian Merchants' Association, for example. The possibilities should be examined of adopting the methods of organised "futures" trading in agricultural products current in India to the rice industry in Burma. Failing that it would be desirable to abolish the present "futures" market as its operations only tend to accentuate the harvest-time depression in prices instead of being a stabilising factor.

#### (4) METHOD OF ANALYSIS.

Contrary to the prevailing custom in India where rice is not subjected to analysis other than a mere visual examination, the proportion of broken grains present in a sample is assessed in Burma by a volumetric method which operates as follows. The buyers' representative selects a number of bags at random and runs off a small quantity of rice through a hollow spear which he thrusts into the bag. If a spear is not handy, the sample may be

drawn in any manner to the mutual satisfaction of the parties concerned. The sample is then carefully mixed up and a graduated glass measure filled to a certain point. What remains of the sample is either set aside or discarded. The contents of the measure are then passed through a sieve. The separations or broken grains are carefully examined and measured off in the graduated measure. If, for example, the volume of the original sample was 100 cubic centimetres and the level of the separations read off to 10 cubic centimetres, the proportion of broken grains would be taken as 10 per cent. The plate facing page 303 shows how these determinations are made.

It may be of interest to remark that experiments have shown the results obtained by the volumetric method to conform very closely to those given by the weight system on which the tolerances, laid down in the grade specifications for Indian rice graded and marked under the provisions of the Agricultural Produce (Grading and Marking) Act have been based. The former system has the advantage of cheapness as a glass measure is less costly than a set of scales. It is also a little quicker and on occasions most accurate, as readings can be easily obtained in conditions which would affect a sensitive balance, such as, for example, when the air is agitated. This is a difficulty which, however, need not arise in normal circumstances as the analysis of samples is usually done under cover in a room or other sheltered surroundings. The limitations of the volumetric method become obvious when it comes to making determinations involving small proportions such as, for example, fragments, damaged or defective grains, chalky grains and the like. For completeness and accuracy, therefore, determinations based on weight are essential. In Burma, the volumetric system answers the purpose adequately as trade usage in that country recognises broken grains as the most important quality factor in the great bulk of the local rices. The fairly large broken grain content generally present in qualities such as *Big and Small Mills Specials* which form so large a proportion of Burma's production lends itself conveniently to assessment by measuring, the other quality factors such as colour, uniformity of grains, etc., being adjusted by visual examination only, as in India.

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*Classification, grading and standardisation.]*

## INTER-CHAPTER SIX.

On account of the almost innumerable varieties of rice grown in India and in the absence of any uniform grades or standards of quality, the great bulk of the internal rice trade is conducted on the basis of samples, values being assessed by visual examination only. This also holds good in respect of paddy with the difference that milling quality is first given a rough and ready test by dehusking the grains by vigorously rubbing a small quantity between the palm of the hands or between two hard surfaces.

Transactions on the basis of trade description or fair average quality are rare in the internal trade in domestic rices. Well-known trade descriptions imported from Burma may, however, be sold on this basis. This is because of a certain measure of standardisation of certain qualities which has been achieved by some sections of the Burma milling industry.

No standard scales of allowances or deductions for the various impurities or defects in paddy or rice are recognised in any part of India. In the absence of standard contracts in the internal rice trade—the only generally recognised contracts used in India apply to imported rice—many disputes in respect of sales to distant consuming centres about alleged inferiority of quality, some of a frivolous nature, occur and are eventually compromised after much bargaining.

Rice sold abroad to destinations other than Europe and North America is also not covered by standard contracts. Most shippers from Bengal or Madras to Ceylon, East Africa, Mauritius and Arabian ports operate on the basis of samples or their own trade

brands or marks. Exporters' selling contracts for Bengal rice (*Seeta*) shipped to Europe are, however, almost invariably made on the contract of the London Rice Brokers' Association which retains representative samples of all the recognised brands for the sake of comparison in the event of dispute. The view is expressed by many persons in the local trade that penalties imposed by the arbitrators in London for inferiority in quality tend to be unduly severe and inconsistent. Largely for this reason certain shippers have endeavoured to establish direct relations with buyers both inside and outside the United Kingdom. The existing system of judging the quality in London from samples drawn from shipments of the previous season's crop has been objected to on the ground that the succeeding crop might be a very good one in which case shippers would be consigning fair average quality goods which were superior to the sample but would receive no premium, while if the crop turned out inferior, they would be penalised.

Grading by millers and merchants in India—almost wholly in respect of the more expensive rices—is being done on individualistic lines, and there are no fixed standards of quality and grading with the specific object of conforming to well recognised standards has not hitherto been done.

Adulteration with cheaper and inferior types and with brokens is known to occur to a considerable extent at the various stages of marketing, and the sale of one type under the name of another similar but more expensive rice is not uncommon. Defects due to impurity may, however, frequently originate in the field itself on account of the use of seed containing admixture of other varieties.

The position in regard to quality in the rice trade may be aptly described as chaotic and the gravity of



the question should be recognised particularly as there is a close connection between quality and price. In the interest of the producer the trade and the consumer, the standardisation of qualities, therefore, should be regarded as one of the most urgent problems of rice marketing.

There are different classes of rice depending on whether a rice is (a) fine, medium or bold, (b) raw or parboiled and (c) machine-milled or hand-pounded. In each class there are different types deriving from a particular area or areas and designated with a particular name. Each type is recognised by the physical characteristics of its grain especially conformation, colour, structure, translucency and fragrance (if any), the grade of quality of a sample of a particular type depending on the proportion of broken grains, fragments, grains of other varieties, etc., present. Age, especially in fine raw rices, is another important quality characteristic. All these factors must be taken into consideration in the standardisation of qualities in rice.

Standardised classification and grading not only facilitate the dissemination of prices and market information generally but also assist the machinery of distribution at all stages. Goods can be readily and safely bought by letter, telegram and telephone without examination of samples and detailed reference to their physical characteristics. They can also be as easily sold for forward delivery as on the cash or spot market. The introduction of standard qualities eventually leads to greater uniformity of production types and tends to eliminate or at least reduce the heterogeneous number of varieties and trade descriptions.

With the ultimate object of bringing about some measure of uniformity in the innumerable undefined qualities of rice normally put on the market, measures

have been taken under the Agricultural Produce (Grading and Marking) Act, 1937, to draw up standard grade specifications in respect of a number of well-known commercial descriptions. Each variety is covered by a separate schedule and the various quality factors enumerated in each schedule are (a) foreign matter other than rice, (b) broken grains, (c) fragments, (d) other rices including red grains, (e) damaged or discoloured grains, (f) weevilled grains, (g) chalky grains, (h) 1,000 kernel weight and (i) conformation of grain as measured by its length to breadth ratio.

Grading under this scheme which is entirely voluntary, has been taken up by sections of the trade in the different provinces. The progress in the Madras Presidency has been especially encouraging and by October 1940, a number of packers have been authorised at eight different centres. A special feature of the development of rice grading activities in this province has been the formation by authorised packers of local grading unions having as one of their objects the popularisation of the graded AGMARK rice.

The only co-operative organisation grading under the AGMARK is the Dehra Dun Basmati Rice Producers' Co-operative Society. By the use of the AGMARK, the Society has greatly expanded its business and become a profitable concern. Further possibilities of expanding this work on co-operative lines are worth examining in the different provinces and States.

So far as the export trade is concerned, *Sirumani* rice (Madras Presidency) is the only type so far exported under the AGMARK. In the case of *Patnai* rice of Bengal, which is an important export quality, a small beginning has been made with the local milling industry which constitutes the primary source of supply for exporters. The latter, who have shown strong opposition to any scheme for the standardisation of export

grades will, it is hoped, eventually realise its advantages to the trade as a whole. It is also desirable to examine how far the trade in *Seeta* rice exported to the United Kingdom can be developed on the basis of AGMARK standards. As the rice milling industry in the United Kingdom is largely under the control of Burma rice milling interest, it is probable that this trade may continue to decrease rather than increase unless steps are taken to finish the rice before export.

The quality grades in Burma paddy, though roughly defined, are sufficiently well-known in the trade to form a basis for acceptances. Each has its known basket weight and in the bigger mills variations from this are allowed for by the volume-*cum*-weight system of buying. The system has the advantage of securing a higher price for the plump paddies desired by the mills, whilst it penalises adulteration with empty grain, husk, etc.

Among the smaller mills, however, the volume-*cum*-weight system of buying has not yet obtained a general hold, and in the case of the less reputable buyers the use of baskets of varying size to compensate for departures from the recognised standards is a common practice. This juggling with the standards of measurement constitutes, by reason of its elusiveness, a factor of grave importance which will have to be taken into full consideration in any proposals for improving conditions under which the crop is marketed.

The quality of the trade descriptions in Burma are more clearly defined for rice than paddy, and the trade descriptions put on the market are limited in number. It may, however, be noted that while some degree of standardisation of general types has been achieved by the Burma milling industry, the commercially acceptable proportion of broken grains is a factor subject to

a wide range within the maximum tolerances recognised by the trade.

Contrary to the prevailing custom in India where rice is not subjected to analysis other than a mere visual examination, the proportion of broken grains present in a sample is assessed in Burma by a volumetric method in which the necessary measurements are made by means of a graduated measuring jar. It may be observed that the results obtained by the volumetric method conform very closely to those formed by the weight system on which the tolerances given in the grade specifications for Indian rice graded under the AGMARK have been based. The volumetric method is no doubt quicker and reasonably accurate, but its limitations are obvious when it comes to making determinations involving small proportions of fragments, damaged grains, chalky grains, etc. In Burma, the volumetric system answers the purpose, as the determinations made by this method are in respect of broken grains only in the bulk of the rice trade. For completeness and accuracy, however, determinations based on weight would appear essential.

The "futures" market in Burma (Rangoon) has no counterpart in India. There are no exchange premises and the amenities for trading are elementary in the extreme. The association under whose auspices "futures" business is transacted provides no clearing house facilities nor are there any periodical adjustments of differences arising out of the changing relationship between contract values and current market prices. Financial risks are, therefore, proportionately greater than if "futures" trading was conducted under the system adopted, say, by the East India Cotton Association or the Karachi Indian Merchants' Association. The possibilities should be examined of adapting the methods

of organised "futures" trading in agricultural products current in India to the rice industry in Burma. Failing that it would be desirable to abolish the present "futures" market as its operations only tend to accentuate the harvest-time depression in prices instead of being a stabilising factor.

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## CHAPTER VII—CONSERVATION. INDIA.

In common with most agricultural staples and, in particular, food grains, rice is subject to certain losses during storage. These losses combined with the cost of conservation are responsible, to some degree, for the difference between the harvest and off-season prices. Apart from the seasonal fluctuation in the price level, the cumulative effect of storage on quality and the premiums obtainable for the matured product, particularly in respect of the more costly, fine and medium rices, form an important aspect of the marketing of rice. This chapter aims at showing mainly the extent of losses incurred during the storage period, the comparative efficiency of various methods of conservation and the relation between the cost of storage and seasonal price differences.

### A.—Methods.

#### (1) IN VILLAGES.

The great bulk of the rice crop held in the villages is stored in the form of paddy, as the grain keeps far better for a much longer period in that condition. Deterioration is particularly marked in the case of hand-pounded rices—these qualities are mainly eaten by the rural population—owing to the development of rancidity in the oil bearing bran layer surrounding the endosperm, which the hand-husking process only partially removes from the kernel. Cultivators, therefore, prefer to keep their produce in the form in which it is harvested and husk it as and when required. Where rice as such is kept for domestic consumption, it is generally stored in earthen pots or small home-made mud bins and the quantities involved are rarely more than a few days' supply. The following description of methods of storage, therefore, mainly relates to paddy.

(a) *Receptacles made of plaited straw, split bamboo, etc.*—Home-made containers of straw, bamboo splits, cotton and *tuwar* stalks, mid-ribs of toddy palm leaves, etc., are widely used for storing paddy wherever this crop is grown. The capacities of such containers are almost infinitely variable according to the amount of produce retained on the holding. Their shapes may be conical, cylindrical or spherical according to the dictates of custom and convenience.

Typical examples of straw containers of 50 to 100 maunds capacity are the *morais* of Bengal and the *pattarais* of Madras, the latter being illustrated in the plate facing page 324. These structures are generally placed in the courtyard of the cultivator's dwelling under the verandah or a thatched roof to shelter from rain. They are usually erected on a raised platform or plinth constructed of plastered mud brick-work, stone slabs or wooden planks. The method of building up these granaries is interesting as the construction of the walls by closely plaiting together the straw and the filling in the produce proceed simultaneously, a lining of *bhusa* (short pieces of straw) having been laid on the bottom before the filling is actually begun. On completion another layer of *bhusa* is placed over the grain and the upper ends of the interwoven containing material joined together and finished off in cone-shaped

fashion. Smaller straw containers such as the *morais* of Madras, the *kacheris* of Bihar, the *lotnas* of the Central Provinces and the *moodes* of Mysore which are used for storing anything from 1 to about 4 or 5 maunds of produce are usually spherical in pattern and are kept inside a room standing on the floor, on a wooden plank, or on a *machan* consisting generally of two parallel wooden beams fixed to the walls of the room at a reasonable height above ground level.

Receptacles made of interwoven bamboo splits are common almost everywhere in India. Representative examples are the cylindrical *kalanjiam* and *gadi* of Madras, the round *bheri* of Bihar, the *dholi* or *dhola* of the Central Provinces, the cylindrical *kanaj* of Bombay and the *palli* of Sind. These structures are fairly durable and unlike the straw containers described above, last for several years with a little care. They are almost always plastered over with a mixture of cowdung and mud for the better protection of their contents. The larger granaries of this type with capacities of 50 to 100 maunds are generally provided with a plinth or base of mud or brick-work and may be placed in an open courtyard duly protected against rain while the smaller ones are kept inside the house.

The *kangni* or *gummi* of Hyderabad State is a cylindrical receptacle of 4 to 40 maund capacity made of plaited *tuwar* or cotton stalks also plastered over with mud and cowdung and stood on wooden planks or stone slabs. Protection is afforded by a roof of thatch or corrugated iron.

(b) *Receptacles made of mud or brick-work.*—These are of a permanent or semi-permanent character and are commonly known as *kothis* or *gundis*, the former term being used mainly in the United Provinces, Bihar and the Central Provinces and the latter in Sind. In addition to being used for paddy other kinds of produce may be stored in them. The *kothi* or *gundi* is usually rectangular or conical in shape and supported on mud props. There is an opening at the top for filling the grain and a small outlet hole in the side near the base. Some of the larger *kothis*, however, may have an opening large enough to permit a person to enter for the purpose of cleaning or renovating the interior.

In the Karnatak area of the Bombay Presidency, large producers store their harvests in structures known as *panats*. These have earth walls and are roofed with tiles. An opening is provided in one wall to facilitate the storage and removal of the grain, there being usually 3 or 4 compartments in order to keep separate different varieties including paddies of varying degrees of maturity or age. A similar type of granary with corrugated iron roofing is used in Assam by well-to-do cultivators.

Larger masonry structures known as *kothas* are also used for storing paddy by some big landlords in Northern India. In the State of Mysore many landlords were found to possess masonry cubicles called *kanajas* in which they kept their paddy and other produce stocks. Some of these *kanajas* were constructed above ground level, while others were built below.

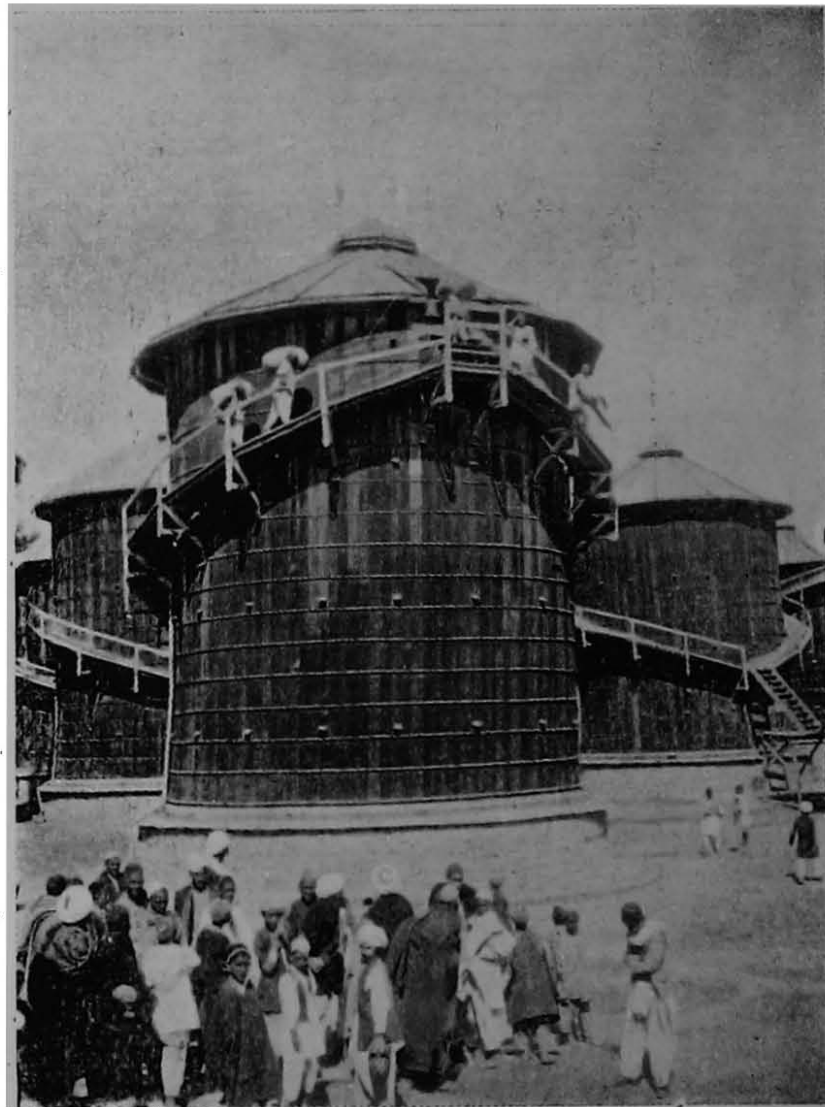
★ [Facing page 324.



THE PATTARAI—USED FOR STORING PADDY  
IN THE TANJORE AREA.



Facing page 325.]



STORING PADDY IN THE STATE-OWNED GRANARIES AT  
SRINAGAR (KASHMIR).

(c) *Wooden receptacles.*—Wooden bins of various dimensions are used by cultivators for storing paddy, especially in Assam, Bombay, the States of Kashmir, Mysore and Travancore. In most instances the bins are merely boxes, chiefly made of local wood. The type of receptacle found in Travancore, however, is unique and calls for special comment. In this State the average cultivators' home contains, as an integral part thereof, a specially constructed small safe-room known as an *arah*. The *arah* is generally made of well seasoned wood and great pride is taken in adorning it with carved designs. Owing to the heavy rainfall in these parts it is generally supported on raised platform 2 to 3 feet above the general floor level to safeguard the contents against dampness. It is interesting to note that each *arah* contains a small bin, also made of wood, used exclusively for the storage of seed paddy and known as a *pathazam*. While the capacity of an *arah* may range from 1 to 20 tons (27 to 540 maunds) that of the *pathazam* is usually anything from about 10 to 25 maunds. Well-to-do cultivators and landlords, on the other hand, possess much larger wooden granaries known as *nelpuras*. A *nelpura* is a composite structure of 50 to 200 tons capacity (1,350 to 5,400 maunds) containing several *arahs* and *pathazams* for the storage of different varieties of paddy separately and for other kinds of produce.

(d) *Pits.*—This is the most popular method of storing paddy in Orissa, but the pit system is also in vogue in Madras, some parts of Bihar and Kashmir. In Orissa the pits used for paddy storage are generally lined with a plastering of cowdung. A layer of straw is placed at the bottom before filling and another on top of the grain over which a final coating of mud plaster is laid. The method adopted in Madras is a little more elaborate as the sides of the pit are generally lined with a fabrication of straw. The whole operation will be clearly seen from the illustration facing page 326.

(e) *Miscellaneous.*—In the Punjab principally, and to a small extent, in Sind and the United Provinces, paddy may be stored in bulked heaps on the floors of rooms in the grower's home or in his godown. In Sind, where the rainfall is small and the danger of damage by water negligible, these heaps are also placed in the open, in a courtyard or on a levelled piece of land near the homestead and a plastering of mud is over-laid for protection. In many parts of India, especially in the Konkan area of Bombay big landlords store their paddy in rooms in rectangular compartments formed by nailing together wooden planks.

(f) *Storage of paddy for seed.*—The cultivator exercises as much care in the storage of seed paddy as he does in the case of wheat and other cereals. In Bengal, paddy for seed is stored either in straw packages or in earthen vessels securely sealed with mud. Straw packages are also employed for the purpose in Assam, Bihar, Orissa, the Central Provinces, Bombay and Madras. In the Punjab and the

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*Note.*—It should be borne in mind that the type of pits used for paddy storage is quite different from the wheat *khattis* of the western United Provinces markets. The latter are deep and shaped rather like a truncated cone wide at the bottom and tapering upwards to a fairly narrow mouth of entrance at the ground level.

United Provinces, paddy reserved for seed is almost invariably conserved in earthen pots or jars. Sind, however, appears to be the only province in which gunny bags are used for storing seed paddy. The cultivator usually takes particular care thoroughly to dry his seed paddy in the sun before it is stored. Where the source of seed supply is the village merchant, the quality, purity and germinating capacity of the seed thus obtained often leaves much to be desired as the village merchant takes no special steps to keep the grain in the best possible conditions.

#### (2) IN THE MARKETS.

Since about half of the marketable surplus of the rice crop is moved to the market during the first four months of the crop year, the question of storage at this place is important. In practically all the markets, both in producing and consuming centres, merchants possess permanent storage accommodation in the form of godowns or warehouses which are usually built of masonry and in a number of instances have cement floors or are paved with flagstones. Before storing the produce in these godowns some kind of covering such as bamboo mats is usually spread on the floor especially if the latter is of beaten earth (*kachcha*). This precaution is generally considered necessary to minimise damage or loss caused by dampness. In certain wholesale markets of the Central Provinces, merchants who are unable to find sufficient accommodation in their places of business in the market place, often use rooms or other parts of their residences for storing goods.

As regards the actual methods of storage adopted in the up-country markets it may be said that while paddy is stored both in bulk and in bags in nearly every province or State, the husked product or rice is generally kept in bags. The main exceptions, to this rule occur in three provinces. In the Punjab, for example, where the production is comparatively small, bulk storage is rare, bags being used both for paddy as well as rice. In Bengal rice is conserved not only in bags, but in bulk also while in the Central Provinces merchants prefer bulk storage for rice.

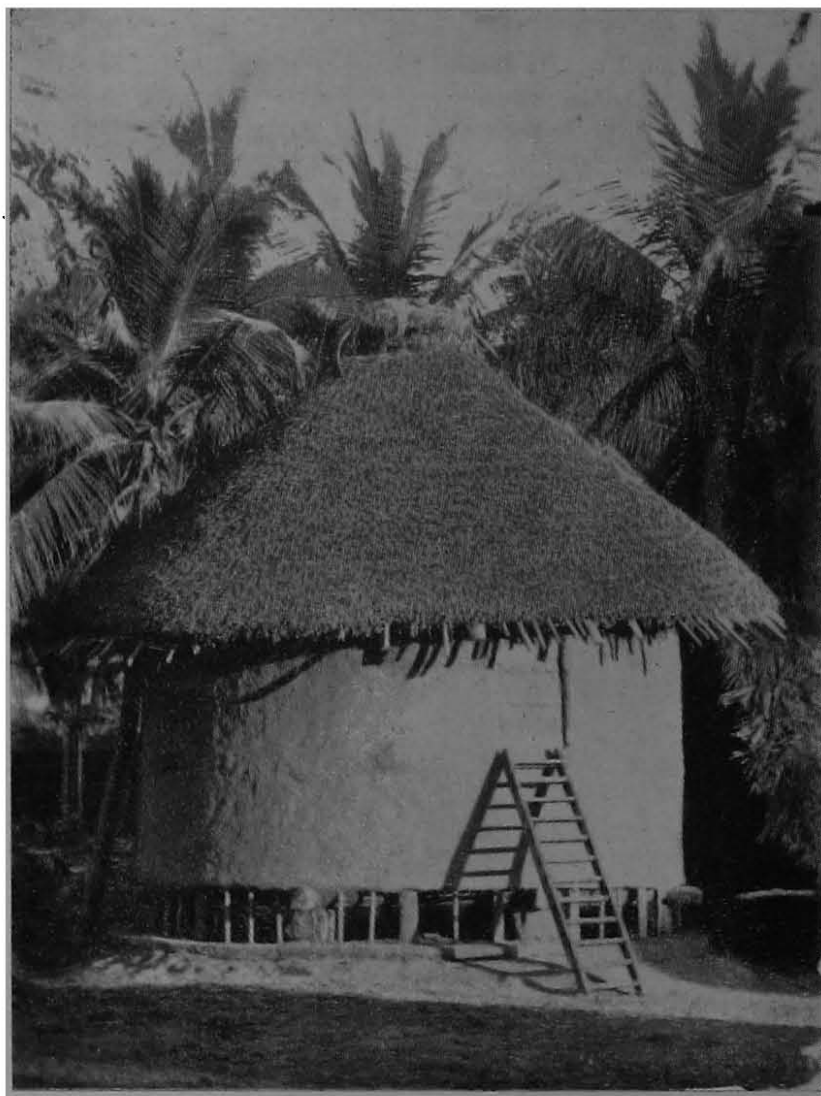
In the United Provinces *kothas* (small rooms of masonry construction) are also used for the bulk storage of paddy. In addition to ordinary godowns two other types of granary are found in the markets of Madras. These are the *gadi* and the *dhanyappa kottu* which are both used fairly extensively. A *gadi* (see plate facing page 327) is a cylindrical structure consisting of a bamboo framework plastered over with mud, and placed either directly on ground level or on a stone platform about 3 feet high. The base of this receptacle is formed usually of slates of palmyra fronds and the top provided with a thatch. A *dhanyappa kottu* is a wooden box-shaped container and is placed on the floor or on a brick or wooden base. The capacity of an average sized receptacle of either kind varies from about 500 to 700 maunds.

The storage facilities provided by the authorities in Kashmir are worthy of special note. The system originated as a result of the unsettled condition which prevailed in the latter years of the War of 1914-18 and in the seasons immediately succeeding. By the autumn



STORING PADDY IN A STRAW LINED PIT AT BERHAMPUR (MADRAS PRESIDENCY).

Facing page 327.]



THE GADI—USED FOR STORING PADDY IN THE  
WEST GODAVARI DISTRICT OF MADRAS.

of 1921 the position had become very serious. A co-operative credit scheme having failed, the Kashmir Durbar set up a board of control which evolved a scheme whereby the city population of Srinagar and the other inhabitants of the Kashmir Valley are secured against the danger of famine and unduly high prices. The success of the scheme rested on the construction of 40 large granaries, each capable of storing some 370 tons (10,000 maunds) of paddy in bulk. The design of the containers was evolved locally and they were built of local wood. The constructional features of this type of granary will be readily apparent from the illustration facing page 325. Briefly it may be stated that the containers are circled by a spiral ramp. The paddy is man-handled up the ramp and is discharged through a half way door until a level weight of rice gives ballast to the granary. This door is then sealed and the upper half is filled from the opening at the top. When it is desired to draw off supplies the paddy issues from the 4 small trap doors at the base and used in rotation as experience has shown the necessity for keeping the weight symmetrically distributed. Interior temperatures are regularly recorded and if any abnormal rise occurs, cool air is forced into the bulk by means of small transportable mechanically driven blowers which are applied to vents specially let into the walls of the structure. The arrangements for ventilation, turnover of stocks and extermination of vermin are such that over a period of 12 years the average loss from deterioration, driage and rats is as little as two-thirds of one per cent.

### (3) AT MILLS.

Storage accommodation in the average rice mill consists of godowns with cemented floors and masonry or corrugated iron roofing. While paddy is kept both in bulk and in bags, the finished rice is invariably packed and stored in bags. Stocks of rice are rarely kept for any length of time, the goods being generally despatched as soon as milled.

### (4) AT THE PORTS.

Comparatively little paddy is handled on the docksides of the various ports in India but wherever this product is imported or exported the goods are always contained in bags and are thus stored pending clearance. This is also invariably the case with rice. Good and ample storage facilities are provided by the port authorities at all the major ports and at most minor ports. At Calcutta, Bombay and Madras, for example, there are large completely covered-in sheds—many double-storied—giving full protection from the elements, a very necessary condition as the monsoon or rainy season is severe. At Karachi where rainfall is scanty, the Port Trust provides many open plinths paved with large flag stones for the storage of agricultural commodities. There are also a number of closed sheds, several of modern construction, into which imported cargoes are received and stored temporarily until despatched to their ultimate destinations. As a general rule imported rice and paddy is rarely kept for any length of time in the port authority warehouses, owing to the relatively high scale of charges. The goods are removed to the private godowns of the importing merchants soon after they are

discharged from the ships' holds. These godowns are often located in fairly close proximity to the docks. In Calcutta, stocks of rice may be found stored in the lower stores and basements of houses in the business quarter in the heart of the city some distance from the point of landing.

(5) NOTE ON THE USE OF PRESERVATIVES.

In the case of paddy, the husk with which the rice kernel is covered is sufficiently tough and hard to safeguard the grain from damage or loss by weevils or other insects without the need of any special precautions. As far as could be ascertained, however, preservatives or insecticides are very rarely used to protect the more susceptible hulled rice from the depredations of these pests nor did fumigation appear to be practised. The only measures which appeared to be taken consisted of mixing ashes with the rice in order to ward off insect attack. This practice was observed in many areas especially in Northern India where it is very commonly applied to wheat. Bran was also reported to be helpful in reducing insect damage to the rice owing possibly to the fact that the insects concentrate on the former and leave the rice alone.

The use of powdered lime as a protective agent was also noticed in the case of several stockists in Burra Bazar (Calcutta). This method was only applied when storing fine rices for a period of one year or more. The produce to be treated is mixed with a blend consisting of equal quantities of powdered lime and ground rice at the rate of 5 seers per maund of rice (12.5 per cent). When the rice is finally disposed of it is winnowed carefully, the lime mixture separated and retained for further use later.

**B.—Costs.**

(1) IN THE VILLAGES.

It is impossible to give an accurate estimate of the costs of conservation on the holding or in the villages, as in the majority of instances the produce is stored in home-made receptacles the value of which is not easy to assess owing to the fact that the material used in their construction is usually some by-product of the field and the labour expended thereon is that of the cultivator or his family. The cost of the more durable type of receptacle made of mud, bamboo, or wood and used for the storage of paddy has, however, been roughly computed. For example, in the United Provinces the average initial cost of a *kothi* with a capacity of 60 maunds is between Rs. 8 and Rs. 9. Its life depends upon the care with which they have been originally constructed and the frequency of renewals of mud plaster. It would seem that a well tended *kothi* has a useful life of anything between 5 and 10 years. In Bengal, a *gola* made of bamboo splits and holding some 100 maunds costs about Rs. 5, but lasts a shorter time than the *kothi*. In the Central Provinces a *dhola* or *dholi* of 180 maunds capacity built of somewhat similar materials is estimated to cost about Rs. 9. Thus the initial cost of an average receptacle made of interwoven bamboos, stalks, etc., may be placed at Rs. 5 per 100 maunds capacity. As regards the average life of

this type of container, four years may be considered a reasonable expectation.

## (2) IN THE MARKETS.

In organised trading, storage costs depend primarily upon the three main factors of warehouse or godown rent, handling charges (filling or stacking and removal) and interest. The first two items hinge on the type of storage accommodation available and the last on the amount of capital invested, money market conditions and the duration of storage. These are liable to vary from place to place and in different seasons. Fire or any other form of insurance against loss or damage is generally regarded as an unnecessary luxury.

It will be recalled that paddy and rice are stored in bags as well as in bulk but the most common usage in all the major rice growing provinces is to store paddy in bulk and rice in bags. The latter practice does not seem to have any definite advantage over the former except that rice is constantly moving into the channels of distribution for eventual consumption and if already bagged is more convenient to handle expeditiously. In the large assembling and milling centre of Burdwan in Bengal, for instance, 90 per cent of the paddy is stored in bulk while rice is exclusively stored in bags.

The data contained in Appendix LXXVII and relating to typical costs of storing paddy and rice in a number of important markets in 10 provinces and States are based on these conditions, storage expenses on paddy being reckoned on bulk and rice in bags. The position in each area may be briefly summarised as follows :

In Bengal the average lengths of time paddy and rice are stored was ascertained to range from 6 to 8 months in the former case and 5 to 8 months in the latter. The total cost of storing paddy at two large assembling centres, Burdwan and Hili, worked out at 5.56 and 6.70 pies per maund per month. As regards rice, data for three markets showed a considerable degree of similarity and ranged from 7.32 to 7.85 pies per maund per month.

In Madras the cost of storing paddy was found to be relatively low and at Ellore amounted to 3.44 pies per maund pre month in *gadi* and 3.64 pies in *dhanyappa kottu* (both varieties of receptacles are described on page 326). At Madras, where large quantities of rice are regularly held in stock, storage in *pucca* godowns costs 6.28 pies per maund per month. The average storage period in both cases is roughly 6 months.

In Bihar, paddy storage at the important markets of Dinapore and Muzaffarpur was found to be relatively costly owing to the fact that the produce was bagged and depreciation of the gunnies had to be accounted for. At the former centre, the cost worked out to 6.60 pies per maund per month and at the latter 8.30 pies. As regards rice 8.29 and 8.39 pies per maund per month are the calculated costs of holding rice at the two centres respectively. The average duration of storage ranges from 1 to 3 months in respect of paddy and from 2 to 6 months in respect of rice.

In Assam, storage costs on paddy at Silchar amount to 6.35 pies per maund per month and 7.20 pies at Karimganj, the corresponding



figures for rice being 9·40 and 10·26 pies per maund per month. In this province paddy is generally stored for longer periods than rice, it being ascertained that 6 to 9 months was the average duration of storage at Silchar and 3 to 6 months at Karimganj as against 2 to 4 months in respect of rice.

At Raipur and Drug in the Central Provinces, rice is stored on an average for 10 and 8 months respectively, the cost working out at 5·14 pies per maund per month at Raipur and 5·30 pies at Drug.

In the United Provinces, paddy stored for an average period of 6 months at Saharanpur costs 6·02 pies per maund per month. In the same market and for the same period rice was found to incur a charge of 7·12 pies. At Naugarh, this item was lower by 1 pie and the average duration of storage in respect of rice was 8 to 12 months. Both markets are well-known for their high grade produce, an essential characteristic of which is maturity or age.

In Bombay, paddy held in store for average periods from 10 to 12 months costs from 7·06 to 7·77 pies per maund per month to carry, the former rate applying to Bombay and the latter to the large producing and milling centre at Bhiwandi. At Poona, the average cost is 7·50 pies per maund per month. Rice is turned over fairly rapidly in Bombay and Bhiwandi, the average duration of storage being 2 to 3 months only. In the former centre, the monthly charge works out at 12·62 pies per maund and in the latter 13·86 pies. At Poona, it was found that rice was carried generally for a period of about 6 months at a cost of 8·82 pies per maund per month. Part of the high costs noticed in this province was due to the incidence of dear rents.

In Sind, storage charges on paddy are comparatively low. Data obtained at Larkana and Tando Mohammed Khan showed the average monthly costs to be 3·36 and 3·73 pies per maund respectively on produce stored in mud-plastered heaps in the open air. On the other hand, storage costs in respect of rice are very variable and were found to range from 7·10 pies per maund per month at Karachi to 14·68 pies at Larkana. In all cases godown rents formed a comparatively large proportion of these costs while handling charges were also more burdensome than in any of the other areas from which data had been collected. The average storage period varied from 4 to 6 months in the case of paddy and from 1 to 6 months in the case of rice.

There appears to be comparatively little difference between the costs of storing paddy and rice in the Punjab. At Amritsar and Kamoke, the former a very important distributing centre and the latter an assembling market of note, the average monthly cost came to 4·66 and 4·46 pies per maund respectively, the average duration of carrying being 6 months. Rice, stored for an average period of 12 months, cost 5·11 pies per maund per month at Amritsar and 5·02 pies at Kamoke.

In Hyderabad 4·19 pies per maund per month is the calculated figure of costs on stored paddy at Warangal, while the corresponding charge on rice at the same centre was found to be 7·25 pies. In Hyderabad city, the charge came to 8·16 pies. The average duration

of storage is 12 months in respect of paddy at Warangal and 6 and 4 months in respect of rice at Warangal and Hyderabad.

To summarise, therefore, it is clear that where paddy is carried the duration of storage is generally longer than is the case with rice. Rice costs more to carry than paddy. This is due to the higher interest charges—rice is always dearer than paddy—and the cost of gunny bags, the depreciation on which may sometimes be fairly considerable. The relationship between carrying charges on paddy and rice is highly variable owing to the number of intervening factors. The results of the actual instances examined and quoted in Appendix LXXVII show that paddy storage cost may range within the limits of 3·36 and 7·77 pies per maund per month, the corresponding figures for rice being 5·02 and 14·68 pies per maund per month.

### (3) AT THE MILLS.

Mill godowns are generally of masonry construction with cement floors and corrugated iron roofs. The question of storage charges at this point does not arise, as the storage accommodation is part and parcel of the mill premises. Where outside accommodation is hired owing to the mill godowns being full, rents vary with the locality and range from less than 1 pie per maund per month to approximately 3 pies.

### (4) AT THE PORTS.

A few examples of rents charged by the port authorities at Calcutta and Madras are given in the succeeding chapter and need only be cursorily referred to here. At Calcutta, the Port Commissioners levy rent in the general sheds at Kantapuker at the rate of 3 annas per ton per week for the first four weeks of storage, 5 annas per ton per week for the next three weeks and 7 annas for the ninth and subsequent weeks. Shed accommodation is normally leased out for Rs. 60 per 1,000 square feet per month, which would work out at about 3 pies per maund per month if the rice is stacked 14 bags high. At Madras, if the goods are allowed to remain in Port Trust premises longer than the free period stipulated in the rules, 2 annas per ton per day is charged. At Bombay, ground rent charges in covered dock storage sheds cost Rs. 75 per 500 square feet per month, while the rate for open yards and open sheds is Rs. 45.

### C.—Loss in storage.

In common with other food grains and most other agricultural produce, paddy and rice not only undergo changes arising from variable atmospheric conditions but are also susceptible to losses in storage on account of floor damp, weevil infestation and vermin attack. In assessing these losses it should be borne in mind that the produce is kept for part of the storage period in the form of paddy and for some time as rice, the relative duration of storage of paddy and rice varying in different tracts according to local conditions. It is necessary to observe this distinction between paddy and rice in endeavouring to estimate losses since other things being equal paddy suffers much less damage or deterioration than rice owing to the protection afforded to the rice kernel by its covering of husk.

With the exception of Kashmir, Assam and a few other districts paddy, generally speaking, is stored until it is converted into rice, the period of storage for the greater proportion of the marketable surplus covering possibly 3 to 4 months on the whole. Comparatively smaller quantities are carried upto 7 or 8 months particularly in areas where the milling season is a protracted one as, for example, in Bengal. In contradistinction, rice is generally stored for longer periods in these parts, much of the marketable surplus being carried in stock for about 6 to 8 months. In the areas which constitute the exceptions recorded earlier (notably Kashmir and Assam) and in parts of Bombay and peninsular India paddy is often stored for longer period from 6 to 12 months, as compared with 2 to 6 months in the case of rice. It has, however, been very roughly computed that approximately one-fourth of the total marketable surplus comprising mainly the rice of bold and medium categories finds its way to the consumer shortly after arrival in the market and is, therefore, not subject to any appreciable loss in storage. Losses in respect of the quantities retained in the villages have been separately estimated on account of the fact that owing to the different conditions of storage which prevail in the rural areas the extent of losses is of a different order.

#### (1) VARIATIONS OR LOSSES IN WEIGHT.

(a) *Paddy*.—As paddy is often harvested slightly under-ripe the moisture content of the grain is fairly considerable. After harvesting some of this moisture disappears in the natural course of events and generally the process is hastened by drying the produce in the sun. Loss in drriage has been ascertained to vary from about 10 per cent in those tracts in which reaping is followed immediately by threshing as, for instance, in the Punjab, to about 3 or 4 per cent in areas where threshing is done some weeks after reaping as is the practice in most provinces and States.

After the excess moisture has been more or less eliminated to the point at which the paddy grain is considered fit to be stored (or hulled) further shrinkage on this account may take place to the approximate extent of 1 to 3 per cent depending on the period and method of storage. The maximum loss has been observed to occur if the grain is stored in bags for three or four months during the warm dry season which precedes the monsoon.

As regards any countervailing increase in weight during the rainy season it should be remembered that it is only in a few regions that any appreciable quantities of paddy are stored from one harvest to the next. By the time the monsoon arrives the great bulk of the marketable surplus has already been converted into rice. Where paddy is stored during the rainy season, the regain in weight due to the absorption of atmospheric moisture is generally estimated by the trade at 0.50 to 1 per cent according as the produce is stored in bulk or in bags.

(b) *Rice*.—When rice is carried for two to four months under comparatively dry conditions the loss in weight is generally reckoned to amount to 0.50 to 1.50 per cent according to season, rice stored during the hot months (April-June) losing most moisture. When

storage extends over longer periods of say 6 to 8 months, a shortage of 2 to 3 per cent is usually allowed for. Any decrease in weight on account of driage ceases when the monsoon breaks, after which the goods re-absorb moisture to the extent of about 1 to 1.50 per cent, thus making up a part or sometimes whole of the weight lost during the pre-monsoon period. Experience has shown that rarely is there a net increase in weight as a result of the rains.

## (2) WEEVIL DAMAGE.

(a) *Paddy*.—In Sind, the Punjab and the United Provinces, where paddy is not carried for any great length of time, no damage by insect attack occurs. This is apparently due to the fact that in addition to the relative shortness of the storage period the dry atmospheric conditions and low temperatures which prevail during the harvest, post-harvest and milling seasons are unfavourable for the development of weevils. In the extreme eastern parts of the Central Provinces a loss of about 0.50 per cent is stated to occur when paddy is stored in bags over periods upto 6 months or more. No such wastage was reported in any other part of this province. In other provinces and States insect damage was reported by the trade to range between 0.25 and 1 per cent, an average estimation for Bihar and Orissa amounting to 0.25 to 0.50 per cent, for Bengal from 0.50 to 1 per cent and for Assam 0.25 per cent.

In the markets of the Madras Presidency fairly wide variations in loss by insect attack were reported as between different methods of storage. For example, at Shiyali and Mayavaram (district Tanjore) bulked paddy stored in *pattarais* apparently suffers to the extent of about 1.50 per cent in 6 to 8 months storage, whereas at Ellore in the West Godavari district the loss in respect of *gadelu* and *dhanyappa kottu* stored paddy is only 0.25 and 0.50 per cent respectively over a similar period. The highest loss reported in this province was 2.50 per cent at Coimbatore in respect of paddy stored in bags in masonry godowns with tiled roofs.

In the Bombay Presidency, a loss of 1.50 to 2 per cent is estimated to be incurred in the case of paddy kept in storage for a period of 8 to 12 months. In other South India markets, *e.g.*, in Hyderabad and Mysore loss by weevil attack is commonly reckoned to lie between 0.50 and 1 per cent, if the produce is carried for 6 to 12 months.

Excluding these areas in which no weevil attack to paddy is reported and calculating the amount of loss separately for each of the other major rice growing tracts on the basis of an approximate proportion of the produce which is stocked for a sufficiently long period to become liable to weevil infestation, the total damage by these pests may be estimated at something in the neighbourhood of 30,000 tons annually in terms of rice in respect of the marketable surplus. Applying the same ratio of loss to the quantities retained on the holdings and in the villages a further 45,000 tons could be written off making a total loss of some 75,000 tons.

(b) *Rice*.—In the Punjab and the United Provinces markets, observations have shown that there is very little loss to rice as a result of insect attack during the pre-monsoon period. (After the rainy season has begun weevil infestation develops with increasing)

humidity and is eventually responsible for a loss of about 1·0 per cent in the Punjab and 1·50 per cent in the United Provinces. (Rice stored from the beginning of the milling season upto the commencement of monsoon, a period which varies from 5 to 8 months in different sections of these two provinces is reported to suffer hardly 0·25 per cent loss.) In the case of fine rices such as the *Basmatis* which may also be stored for periods exceeding one year weevil loss after the first year of storage is of the order of about 1·0 per cent per annum over and above the loss that has already taken place during the harvest year. It should be noted that the total quantity stored for such long periods is not very large and does not probably exceed 50,000 tons.

In Bihar and Orissa and Bengal six months storage results in a loss of 1·00 to 1·50 per cent at different centres. In Assam, where the period of storage of rice does not extend beyond 2 to 4 months, the weevil damage is estimated at about 0·25 per cent only. In the Central Provinces markets for a period of 6 to 8 months the loss in bag storage is placed at about 1 per cent the corresponding figure for bulk storage being half of that figure.

In Madras, as is the case with paddy, fairly wide variations were also found to exist in weevil losses caused to rice. In the northern districts of Kistna and Godavari, for instance, nowhere was a loss of more than 0·25 per cent reported in rice stored over 2 or 3 months. (On the other hand in the south of the province, the wastage apparently caused by this agency is considerable. Tanjore reports indicate a loss of 2·50 per cent over 4 to 6 months and Coimbatore 4 per cent over 2 or 3 months.)

In the Bombay Presidency, the average loss in the inland districts of Dharwar, Belgaum and Poona ranges between 0·75 and 1·50 per cent but in other areas the normal wastage is estimated to lie between 2·00 and 3·00 per cent, the period of storage in all cases being 2 to 3 months except at Poona where rice may be carried for about 6 months.

In Sind, the average loss is usually reckoned at 1·00 to 1·50 per cent for rice stored up to 6 to 8 months.

In Hyderabad markets the loss by weevil attack is reported to be between 0·75 and 1·50 per cent for a storage period of 4 to 6 months.

An estimate of the incidence of loss to rice by weevil attack based on the approximate quantities of the produce subject to such wastage works out to about 75,000 tons in respect of the marketable surplus. The loss in the case of village retention is much less proportionately owing to the fact that in many rural areas, notably in South India and Assam, the produce is kept largely in the form of paddy and is only converted into rice as and when actually needed for consumption. In other areas, where hulled rice is stored with the express object of maturing by aging a certain amount of wastage through insect attack is inevitable in spite of the measures taken to prevent such loss by the use of admixtures of bran and ashes with the rice. Having regard to all these factors the estimate loss in respect of village retention may be put very roughly at 20,000 tons. Thus the total extent of weevil losses averages about 95,000 tons or expressed roundly 100,000 tons.

## (3) DAMAGE BY DAMP.

(a) *Paddy*.—When paddy is stored in bulk the lower portions of the heap are liable to deteriorate in quality as a result of damp seeping through the floor especially if it is *kachcha*. In order to avoid this some sort of material such as straw matting is generally laid on the floor, while if the paddy is bagged the bags are stacked on wooden sleepers. The damage by this factor on the whole is, therefore, not considerable. In Assam, Bengal, Bihar and Orissa and the Central Provinces, where deterioration in quality has been observed, the quantity of stored produce seriously affected by damp, appears not to exceed roughly 0·25 per cent.

In Sind, where the paddy is commonly stored in the open air in heaps plastered over with earth, damage by damp affects about 2 per cent of the heap on an average.

As far as any estimates can be made it is probable that out of the total marketable surplus about 10,000 tons of paddy equivalent to about 7,000 tons of rice are so affected by damp annually as to render the produce unfit for human consumption. No evidence has been obtained to indicate the extent of the loss, if any, caused by damp to paddy retained in the village for domestic consumption and seed purposes.

(b) *Rice*.—A good deal of care is generally taken when storing rice to protect it against damp. In the comparatively rare instances in which rice is stored in bulk the floor is either bricked over, paved with flagstones or cement overlaid with some kind of matting. If kept in wooden receptacles, as in some South Indian markets and Kashmir, the produce is practically immune from the effects of damp. Rice packed in bags is almost always stacked on *pucca* flooring protected from below by mats or on wooden sleepers. In spite of these precautions quality may be slightly affected by way of discolouration arising from the natural moisture of the atmosphere. The extent of discolouration varies from practically nil in the drier parts of the country, such as the United Provinces and the Punjab, to 0·25 to 0·50 per cent in the provinces of Assam, Bengal, Bihar and Orissa and the Central Provinces. The estimated total quantity of rice affected by damp in India may be expressed very approximately at 20,000 tons which on the basis of a discount in value of 50 per cent would be equivalent to a net loss of 10,000 tons. As with paddy the rice retained in villages is not appreciably affected by damp as it goes into consumption almost as soon as the paddy has been hulled.

## (4) LOSS BY VERMIN.

(a) *Paddy*.—In Madras depredations by rats, mice, etc., account for a loss of about 0·25 per cent only in the case of paddy stored in *dhanyappa kottu*. The damage caused by this agency to paddy held in other types of godown or receptacle is reported as attaining 1 per cent. In most other provinces and States 0·25 to 0·50 per cent is estimated to be the normal proportion of loss. In the Bombay Presidency, however, loss through the attacks of vermin may reach 2 per cent in some areas. The comparatively high wastage is conse-

quent on the long period of storage which it will be recalled may cover 12 months.

It is estimated that out of the total quantity of paddy entering trade channels approximately 40,000 tons in terms of rice is destroyed by rats. Losses in respect of village retention are lower and may account for about 30,000 tons. The total losses, therefore, approximate 70,000 tons.

(b) *Rice*.—Apart from short term storage which gives little opportunity for destruction by vermin, the consensus of trade opinion regards 0·25 to 0·50 per cent as the average annual wastage by the depredations of rats, mice, etc. However, in some markets of the Central Provinces and Madras Presidency, a loss as high as 1·50 per cent on an average has also been reported. Having regard to the volume of rice exposed to damage by vermin pests in different areas the total wastage of the marketable surplus is about on a par with that of paddy, namely, 40,000 tons.

Large quantities of rice are not exposed to vermin attack in the villages for the reasons already given. Moreover, the use of securely closed rat-proof containers such as scaled earthen pots, etc., keeps wastage down to the minimum. Probably not more than 15,000 tons are annually lost through this agency.

#### (5) TOTAL VALUE OF LOSSES.

The quantitative estimate of losses by weevil, damp and vermin attack as given in the preceding sections totals up to 317,000 tons of rice annually or slightly more than 1 per cent of the average production for the three years ending 1936-37. Of this loss about 48 per cent takes place in paddy storage and the remainder in rice. At a conservative estimate the total value of this loss on the basis of an average price of Rs. 3-8-0 per maund for rice works out at Rs. 302 lakhs.

#### D.—Effects of storage on quality.

The wastage or losses which are liable to occur to paddy and rice when stored have already been assessed, very roughly, in terms of quantity and total value. Apart from the natural tendency to discolouration caused by heating resulting from dampness or atmospheric humidity and by excessive moisture carried in the grain itself, there is an important factor peculiar to rice, namely, the improvement in cooking quality brought about by age or maturity. This feature of rice conservation is worthy of special attention as high premiums are paid for old well matured qualities. (See Chapter III, pages 168 to 172 and 176). Before proceeding to discuss the factors thought to be responsible for improvement in the cooking quality of stored rice—the precise relationship of the changes which take place in the rice kernel owing to storage are not yet conclusively established—it may be desirable to dispose of other aspects of this question.

Paddy, it will have been gathered, keeps almost indefinitely provided the grain has been properly dried and is stored in a dry place.

When subsequently hulled for use, such produce retains its original colour and, when cooked has the flavour characteristic of the variety.

As regards rice highly variable results are obtained with different qualities. For instance, hand-pounded rice or rice which has been very lightly milled undergoes rapid deterioration if stored for any length of time. This is due to the fact that the outer coating of the under-milled rice kernel contains an enzyme (lipase) which in combination with the action of moisture results in the bran—which contains a certain amount of oil—decomposing and forming free fatty acids. These in turn undergo oxidation and the fats become rancid, acquiring an unpleasant odour and taste. Polishing or milling to normal commercial standards removes most, if not all of the oil-bearing bran and eradicates the source of rancidity or decomposition. Hence well milled rices keep better and for longer periods than hand-pounded or under-milled grains. As far as can be ascertained the question of the rate of deterioration in relation to different varieties and under varying conditions has not been studied in detail although the general conclusions on which the above mentioned statements are based have been established by experiments undertaken at the Indian Institute of Science, Bangalore, in recent years. The rice trade (and the consuming public) is also well aware of the relative keeping qualities of well-milled and under-milled or hand-pounded rice and it is significant that a comparatively small proportion only (about 26 per cent) of the total supply of hand-pounded rices is marketed while the great bulk of the machine-milled product enters commerce.

Parboiled rices and raw rices react somewhat differently to storage. The former have been observed to discolour and become yellowish due possibly to the greater moisture content in the grain when as may frequently happen the paddy has been insufficiently dried after the steeping process. As the bulk of the parboiled rice production in India is centred in areas subject to heavy rainfall and humid conditions this factor probably increases the tendency to discolourisation. This characteristic of parboiled rice is well recognised in the trade and efforts are always made to store parboiled qualities for as short a period as practicable.

Parboiled rice, however, has one advantage over raw rice as regards storage in that it is less affected by weevil attack. The comparative immunity of parboiled rices would seem to be largely due to the toughness imparted to the grain by the parboiling treatment. Kernels of parboiled rice acquire a hard smooth glassy surface which apparently affords a poor grip for the mandibles of insect pests. Experiments recently made in the United Kingdom in connection with the keeping quality of parboiled rice prepared by a new process\*

\*The H. R. Conversion Process. This has been developed in Europe within the past two or three years and consists of two methods, one for use where a light to dark amber grain and the other for a white translucent grain is required. The fundamental principle of the process—for which it is understood British and foreign patents have been obtained—is a combination of vacuum, pressure and saturated steam application to the paddy, variations in the steaming period and steam pressures controlling the tint or colourisation of the grain.



and stored for 6 months under artificially created temperature and humidity conditions specially suitable for activity and virility of weevils confirmed this. So far as improvement in the cooking quality of stored or matured rice is concerned experiments undertaken at the Indian Institute of Science, Bangalore and at the Rice Research Station, Coimbatore, have confirmed ordinary domestic experience, namely, that (when matured rice is cooked the grains retain their individuality. New rices tend to cook rapidly into a meshy glutinous consistency. Further, stored or matured rice absorb more water than unstored rice and swells or elongates to a greater extent. *In vitro* experiments have shown that un-matured or new rice by reason of its tendency to cook into a pasty mass cannot be digested as satisfactorily as grains which retain their individuality and present a larger reactive surface to the digestive ferments. Investigation into changes in enzymic hydrolysis of rice starch during storage has also been undertaken at the Indian Institute of Science. The latest available results indicate that as a result of storage there is a decreased activity of amylases and an increased saccharification and liquefaction at any given temperature. These findings are of a preliminary nature and are, it is believed, being further investigated.

The optimum length of storage is difficult or almost impossible to determine with any degree of accuracy and if ascertainable its value would probably be of doubtful practicability owing to the diversities of consumer preference and the variability of the times and methods adopted by consumers to cook this cereal. The trade, however, has a rough and ready classification for stored rices. For instance, in the United Provinces where rice is stored in the form of the husked produce and not paddy 3 years is supposed to be the optimum period of storage for fine rices and 1 to 1½ years for medium and coarse types. In the Punjab, also noted for its fine scented rice, 2 to 3 years must elapse before these qualities are considered to be at their best. In Sind the period is from 1 to 1½ years in respect of the high grade *Sugdasi* variety. In regard to the ordinary run of cheap or medium rated rices these are not, for preference, consumed until about 3 months have elapsed from the time of harvesting, the greater the intervening period, however, the better they are.

#### E.—Comparison between different methods of storage.

##### (1) PADDY VERSUS RICE.

As already pointed out the custom in many parts of South India, in Assam, Kashmir and in a few other areas is for rice to be stored in the form of paddy or rice in the husk. In other regions the produce is generally conserved in the form of the husked grain (rice). As far as India is concerned there is little doubt as to the superiority of the keeping quality of this cereal when stored as paddy for while improvement in quality due to aging is similar in both un-husked and the husked grain loss by weevil is kept at a minimum in the case of paddy.

In those areas in which the practice is to store rice in the form of the husked grain, it is held from practical experience that when paddy is stored for long periods the kernel tends to become brittle and liable to heavier breakage when hulled. In view of the comparatively lower costs of storage and reduced losses involved in carrying stocks in the form of paddy it might be useful to investigate the optimum period of storage of paddy compatible with good milling results particularly in respect of the fine rices which are stored often for a year or more.

### (2) BULK VERSUS BAGS.

There seems to be no doubt but that bulk storage is better and more economical than storage in bags. Indeed, the greater part of the paddy reaching the markets is kept in bulk until converted into rice.

In the case of rice, however, bulk storage is not so common. This is mainly due to the fact that rice is continually on the move, flowing into the channels of distribution for eventual consumption, and if already bagged it is more convenient to handle expeditiously.

### (3) TYPE OF STORE ACCOMMODATION.

As regards the storage of paddy (in bulk) any kind of granary designed to minimise insect and rat attack as well as being damp proof would serve the purpose. Probably the best type of storage is the ferro-concrete under-ground bin full constructional details of which have been given in the Report on the Marketing of Wheat in India (Marketing Series No. 1). Its extra cost is more than compensated for by its durability and efficiency. The smooth concrete walls offer no lodging places for the larvæ of weevils. The interior can be fumigated easily, and the whole is proof against damp and weevil. Wooden bins wherever good hard wood is cheaply available appear to be satisfactory both for paddy and rice in bulk. For storage in bags *pucca* masonry godowns with wooden, stone or cement flooring are most useful.

### F.—Storage costs in relation to seasonal variations in price and improvement in quality.

The cost of holding produce which is such an important factor in determining the post-harvest prices of certain agricultural commodities such as, for example, wheat, does not appear to exercise much influence on seasonal fluctuations in rice (and paddy) values. This is not easy to explain but is probably due to a combination of four factors, namely, the absence of "futures" trading, the "domestic" or "personal" character of rice trade, the localised nature of the demand and the generally unorganised and primitive conditions in which this cereal is put on the market, particularly in its primary stages in the form of paddy. To appreciate to the full the conditions governing rice it may be useful to glance very briefly at the example of wheat, a commodity which affords a striking contrast in respect of

trading methods. Wheat is regarded throughout Northern India and in some commercial centres in Bombay and Central India as a popular form of investment and is regularly purchased at the harvest, when prices are normally low, for the express purpose of holding for a period. These operations are facilitated by the existence of many large points of assembly—*mandis* such as Hapur (United Provinces), Amritsar and Lyallpur (Punjab) and others where ample storage accommodation is available and the produce can be "hedged" on the "futures" markets which function in most of the centres in which stocks are held. Thus, "ready" and "futures" prices tend to become more or less closely related and since a future contract involves an undertaking to deliver at some future date a specified quantity of produce at a specified price, the existence of certain stocks to "back" such transactions is an essential pre-requisite.\*

Rice has no parallel features. There are no what might be termed "key centres" in the rice trade to which heavy supplies, surplus to immediate or short-term requirements, tend to gravitate. In any event the systems of purchasing paddy by mills and professional dehuskers are such as to throw upon the growers' shoulders the main burden of carrying stocks, for a large proportion of the marketable surplus never passes through the markets until it is converted into rice. Further, the rice crop moves fairly rapidly into consumption and so far as can be ascertained carry-overs of Indian rice seem to be very small in normal years, a circumstance which is not surprising having regard to the heavy importations which have to be made annually to supplement India's deficit. These conditions and the fact that there is such a large number of varieties of different and variable grades or qualities, the vast majority of which have to be sold on sample, militate against any organised stock-holding operations especially as no price insurance facilities exist. The lack of inter-relationship in prices between different markets has already been commented on in Chapter III and is a noteworthy feature of the trade.

The following table will enable a comparison to be made between the price differences in seasonal lows and highs in different areas based on the data already discussed in the section on seasonal variations in Chapter III, and the calculated costs of storage over the same respective periods. In most instances it will be recalled, the annual lows occur during the harvest or in the immediately succeeding weeks.

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\* It is interesting to note that the Commodity Exchange Act operative in the United States lays down that before permission to establish a "futures" market can be obtained, the Secretary of Agriculture has to be satisfied as regards certain conditions of which the following has special relevance.

"Section 5.—The Secretary of Agriculture is hereby authorised and directed to designate any board of trade as a 'contract market' when, and only when, such board of trade complies with and carries out the following conditions and requirements.

When located at a terminal market where any cash commodity of the kind specified in the contracts of sale of commodities for future delivery to be executed on such board is sold in sufficient volumes and under such conditions as fairly to reflect the general value of the commodity and the differences in value between the various grades of such commodity, \* \* \* \* \*

*Comparison between storage costs and seasonal variations.*  
(Per maund).

	Paddy.			Rice.		
	Average difference between seasonal lows and highs.	Period.	Cost of carrying.	Average difference between seasonal lows and highs.	Period.	Cost of carrying.
	Rs. A. P.		Rs. A. P.	Rs. A. P.		Rs. A. P.
Bengal .. ..	0 5 1	March to Sept.	0 3 0	0 5 9	May to Nov.	0 3 6
Madras .. ..	0 6 11	Jany. to Oct.	0 2 7	0 3 0	Jany. to Oct.	0 6 3
Bihar .. ..	0 5 2	Dec. to July	0 4 3	0 4 6	Jany. to Aug.	0 4 10
Assam .. ..	0 2 4	Dec. to July*	0 4 6	0 4 6	Dec. to Aug.	0 6 3
Bombay .. ..	..	..	..	0 8 1	Jan. to Nov.	0 9 9
Central Provinces	..	..	..	0 3 10	March to Aug.	0 2 2
Sind .. ..	..	..	..	0 4 6	Jan. to July	0 5 5
United Provinces..	..	..	..	0 5 5	Jan. to Aug.	0 3 4
Punjab .. ..	..	..	..	0 1 7	Dec. to July	0 3 3

It will be clear that in the case of paddy in three areas out of four (Bengal, Madras and Bihar) it would apparently pay to hold paddy for the normal seasonal rise which attains its height in September in Bengal, October in Madras and July in Bihar. The table below based on actual transactions recorded in the Tanjore district in Madras may amplify the foregoing.

*Comparison between storage costs and seasonal gain in price in respect of paddy (Tanjore district, Madras).*

	1931.	1933.	1935..
	Rs. A. P.	Rs. A. P.	Rs. A. P.
Purchase price .. ..	2 7 0	1 7 0	1 13 0
Godown rent for six months .. ..	0 2 0	0 1 0	0 1 6
Handling charges .. ..	0 0 4	0 0 3	0 0 3
Interest on loan .. ..	0 2 0	0 1 0	0 1 6
Insurance .. ..	0 0 2	0 0 2	0 0 2
Loading out of godown .. ..	0 0 3	0 0 3	0 0 3
Commission .. ..	0 1 0	0 0 6	0 0 9
Shortage and wastage .. ..	0 1 0	0 0 6	0 0 9
	2 13 9	1 10 8	2 2 2
Margin .. ..	0 2 3	0 2 4	0 1 10
Sale price .. ..	3 0 0	1 13 0	2 4 0

\* The year's high actually falls in November and the spread between this and the annual low is Re. 0-2-9. In practice paddy would not be held for so long a period. Accordingly the next high point which occurs in July has been taken as representing the maximum post-harvest rise.

The conclusions to be drawn from these figures would seem to indicate that in so far as Bengal, Madras and Bihar are concerned there is sufficient inducement for growers to co-operate for storing and holding their paddy until the post-harvest depression had disappeared.

As regards rice, carrying charges are less than the seasonal rise in only three instances out of nine. These occur in Bengal, the Central Provinces and the United Provinces. In the remaining six areas the seasonal rise would not normally cover the outlay incurred on storing the produce.

The position in regard to the relation between storage costs and the premiums obtained on fine rices is somewhat unique as the following examples in the Punjab show. The cost of storage including interest at 6 per cent per annum and wastage at 1.5 per cent is normally 7.6, 7.5 and 7.4 pies per maund at Lahore, Amritsar and Kamoke respectively. The total cost, therefore, over a full twelve-month would approximate Re. 0-7-6 per maund. In November, 1938 at Lahore one year old *Basmati* rice was quoted at Rs. 5-8-0 per maund as compared with Rs. 4-14-0 for goods of the newly harvested crop. The premium of 10 annas thus obtainable leaves a margin of Re. 0-2-6 per maund. It will be appreciated of course that these instances are merely general indications of the relation between storage loss and premiums obtained for improvement in quality. In very high grade fine scented varieties profit margins are far greater and may even exceed Re. 1 per maund.

#### G.—Stocks and storage accommodation.

##### (1) STOCKS AND CARRY-OVERS.

The position in regard to the recording of stocks of rice and paddy is extremely unsatisfactory. No records are kept and no published data of any practical value are available to the trade or the general public. In the case of wheat, for example, the trade is by comparison well organised and reasonably accurate records of stocks are maintained at a number of important centres especially where "futures" trading takes place, some of the associations handling this type of business keeping a register of supplies held in *khattis* (underground pits). Unfortunately no such arrangements exist in regard to rice. Consequently any estimation of carry-overs—difficult enough to make in respect of commodities for which some data are available—becomes virtually impossible with rice. For example, Bombay estimates an average carry-over at 15 per cent of the marketable surplus while Travancore places the figure at 15 per cent of the total available supplies. Impressions from other areas ranged from a nominal 5 to 20 per cent.

The port authorities maintain a register of stocks lying in the premises under their control but apart from being intended for private use only and not for publication these statistics refer mainly to goods which being in transit, inwards and outwards, are accommodated for short periods only and are, therefore, not really indicative of the actual stock situation. None of the smaller mills operating, say, one or two hullers only keep any records whatsoever while the majority of the larger mills do not maintain detailed figures. In any

case the total quantity of paddy or rice for which any reliable figures of mill stock could be obtained is so insignificant that no valid conclusions could be arrived at for the country as a whole. Such estimates as are made by the trade periodically are largely founded on intelligent guess work based on long experience of market conditions.

Estimates of stocks obtained from private trade sources in different parts of the country have revealed somewhat conflicting tendencies which may possibly be accounted for the localised nature of the demand. In four provinces, however, data in respect of certain important markets show that rice stocks rise in the immediate post-harvest months and throughout the height of the milling season which begins to wane after May. As the following table, based on three years average figures, shows, stocks are normally greatest between March and June and begin to diminish thereafter reaching their lowest levels in December and January at a time when new crop arrivals have not yet made their presence felt in the market.

*Monthly stocks of rice at representative centres in four provinces expressed as a percentage of the annual total.*

	United Provinces.	Punjab.	Central Provinces.	Bombay.
	Benares.	Amritsar.	Raipur.	Bombay.
January .. .. .	8	8	9	5
February .. .. .	9	9	11	8
March .. .. .	10	10	11	9
April .. .. .	11	9	12	11
May .. .. .	10	10	10	12
June .. .. .	10	8	9	12
July .. .. .	10	7	7	8
August .. .. .	7	7	4	10
September .. .. .	7	7	6	7
October .. .. .	6	7	7	7
November .. .. .	6	9	7	10
December .. .. .	6	9	7	1
Total ..	100	100	100	100

In regard to other areas detailed figures of sufficient reliability could not be obtained. Enquiries, however, showed that in Bengal and Bihar stocks of rice were normally greatest in February and March and continued to maintain a high level until June and July

when they began to diminish reaching bottom from November to December. Stocks of rice in the United Provinces and the Punjab were also reported to be highest in February and March but the period of low supply extends from July to September. In Madras rice stocks do not exhibit any marked seasonality although April, May and June appear to have relatively greater supplies than any other period of the year when stocks are maintained at a fairly constant level.

As regards paddy the stock position varies in different areas. In Bengal and Bihar markets supplies begin to rise with the arrival of the autumn crop in October and November. These are later swelled by winter crop harvestings which accumulate heavily between January and March. As the milling season advances paddy holdings steadily decrease until stocks are least in July and August. In Orissa stocks of paddy are highest between February and April and lowest in December and January. In Madras generally stocks are also at their greatest between February and April and fall thereafter until September when third crop arrivals coming to the market increase supplies and then decline to touch the lowest levels of the year in December. In Bombay stocks of paddy are on the average highest from October to February. Supplies dwindle progressively touching bottom about August. In Sind, November to February shows the highest and July to September the lowest stock position. As regards the Punjab paddy stocks begin to increase in September and attain high levels from October to December. From January onwards supplies are steadily drawn on for milling requirements until they are reduced to very low levels by May or June. In July and August stocks of any commercial size are practically non-existent. In the United Provinces market supplies of paddy are most abundant from January to March and scarcest from June to September.

Broadly speaking, stocks may be regarded as being related in some measure to the flow of supplies, discussed on pages 27 to 33 in Chapter I. Large stocks synchronise with heavy movements of this food grain and vice versa.

## (2) TOTAL STORAGE ACCOMMODATION.

Storage accommodation in India is extremely elastic owing primarily to the fact that storage is not localised in any special area or confined to structures exclusively designed for the purpose, as is the case in Europe, America, Australia, etc. In those countries it is usual for warehouses, elevators, etc., at large points of assembling and distribution to be more or less concentrated in the commercial quarter which will often be found to have grown up and developed near transport facilities such as railway termini, docks, etc. In India any kind of covered accommodation is pressed into service, as occasion arises, including rooms in dwelling houses. It is in fact quite common to find an overflow from the trader's godowns stacked or heaped in his residential quarters. The dispersion of storage over wide areas is wasteful in that it involves expenditure in handling (and transportation) which might be saved if storage were more centralised in or near the market place or railway yards. Apart

from this it is obvious that actual physical losses in the shape of leakage or deterioration of containers, etc., increase in proportion to the amount of handling.

Having regard to these circumstances the potential storage capacity in respect of rice would seem to be much in excess of any demands likely to be made on it. At the major ports alone storage accommodation in port authority control must amount to something not far short of 2 million tons. It must, however, be borne in mind that rice is only one of many commodities handled at the ports and that the space normally allocated by the respective port authorities to rice storage is only a small part of the total accommodation available in the dock areas. Importers of Burma rice at Bombay have been heard to complain of restrictions on rice storage facilities in Port Trust sheds particularly from April to June when imports are generally heavy and synchronise, somewhat inconveniently, with the movement to the port terminals of new crop domestic produce such as linseed and wheat, receipts of which are very large in those months.

## BURMA.

### A.—Methods of storage.

The simplest form of storage used in the villages is the *pok*, a circular basket or tub made of split bamboos, flattened and plaited (see plate facing page 346). This may hold anything up to a hundred baskets. Usually it is placed under cover on a platform of earth or on piles, raising it to a height 2 or 3 feet above that of the surrounding ground, so giving protection against flood. The plaited bamboo of the basket is plastered over with a mixture of clay and cowdung to prevent the grain escaping and to exclude damp and insects. A piece of jute sacking or other material is usually placed loosely on top. In the main its use is for storing seed-paddy.

A development of this storage receptacle is the rectangular godown, similarly constructed of plaited bamboo, with corner posts and wood and having a roof of leaves of *kaing* grass. This is almost invariably built on piles and has a floor of bamboo matting or plank, and sometimes of both, the space between the upper floor of bamboo matting and the lower one of plank being filled with paddy husk to support the weight and keep out damp. Corrugated iron sheets are sometimes used for the roof and instead of the bamboo wall. The paddy is stored in bulk and is thrown in through a doorway which, as the grain rises, is closed from the bottom upwards by dropping planks into vertical slots in the door-posts. Mill godowns and those of the larger stock holders are usually of corrugated iron, but plaited bamboo often finds a place in them either for making compartments or for flooring. A typical godown belonging to a mill is shown in plate facing page 347.

### B.—Loss in storage.

The main pests of stored paddy are the rat, the mice, weevil (*Calandra oryza*) and the caterpillar of the moth *Sitotroga cerealella*, the rice weevil being of most importance.



Rats do a good deal of damage, but they are a known enemy and can be dealt with fairly effectively by trapping and poisoning. (The rice weevil is less obvious but its potentialities for damage are much greater. It attacks both husked and unhusked grain but has an evident preference for grain in the husked or rice form. - In this it multiplies at such a rate that a stock of milled grain moderately free from infection can, within a period of a couple of months, become fairly riddled with weevil. A dry heat is unfavourable but the pest thrives in an atmosphere of moist warmth. Conditions of the Burma Delta areas, and particularly those of the main milling centres, Rangoon, Bassein and Moulmein, with their huge stores of paddy and rice, are, therefore, ideal for the weevil.)

(The godowns of these areas are seldom free from grain for any length of time, and the cleaning which is given to them between times is generally of a perfunctory nature. The interstices in the framework of these godowns (particularly those of which bamboo forms a part), the grain which remains unswept from the floor, and the paddy husk which is often to be found between the bamboo flooring and the lower plank floor or the ground, all afford perfect breeding grounds and harbourage until the next stock of grain is brought in. With a breeding rate which has been estimated at fully a hundred fold per storage season of 5 or 6 months, the weevil soon manages to infest the new grain. It is on record that in a count of weevilled grains made from samples of paddy which had been in store for 10 months or so, the average number counted was 8.5 in each 100. It may be argued that paddy is not usually kept for ten months, but even so, on a crop worth, between 35 and 40 crores of rupees it is evident that the weevil is a grave source of loss to the country. At present, though there is no doubt of the damage done to milled rice, opinion seems to be divided as to the weevils capacity for damage to rice in the husk.)

(Unfortunately the moist heat in which the weevil thrives cannot be overcome under present storage conditions.) Wastage might, however, be reduced by a more thorough cleaning out of godowns between seasons or consignments. Simultaneously the destruction of the weevil and its larvæ by fumigation might be considered. For such fumigation carbon bisulphide is probably the best medium, but its use is attended by certain dangers, the gas being both poisonous and inflammable.

### C.—Possibilities of organised storage.

Opinions have from time to time been expressed that Burma would benefit if the flow of supplies of paddy to the mills and ports, and that of rice from these points to markets outside the country, could be regulated by being more evenly spread over the whole of the crop year thus avoiding temporary gluts and shortages and their concomitant disability. The argument has been that Burma loses much possible profit by placing her supplies on the world's market just when her main competitors, Siam and Indo-China are unloading theirs. These opinions have in the past given rise to proposals for the development of the elevator.



STORAGE POKS OUTSIDE A CULTIVATOR'S HOUSE (BURMA).



A WELL-DESIGNED PADDY GODOWN, WITH RAISED FLOORS (BURMA).

That these schemes have not hitherto materialised should not be allowed to obscure the essential fact that the average seasonal fluctuations in the case of paddy amounts to 14·3 per cent while that for rice is 11·4 per cent. These are comparatively large figures and show that in the existing conditions the normal margins of profit earned by holders of stocks buying during the early harvest depression and holding until July or August when values are usually at their highest, compares very favourably with the current rates of return on investments in general. Occasional years may of course be unprofitable from the stock-holder's point of view owing to abnormal weather or market conditions but such losses can be offset in Burma by hedging in the rice futures market at Rangoon.

The table on page 89 shows that some 30 per cent of Rangoon's yearly paddy imports are registered from June to September during the height of the rainy season, the volume of traffic involved averaging as much as 161,000 tons per month. As regards rice the figures are somewhat smaller some 23 per cent of the annual imports or 155,000 tons being received during the same period. The evidence, therefore, points to the fact that considerable quantities of paddy and rice (mainly the former) are held in the comparatively drier interior tracts by millers and large merchants and are only moved down to the ports for conversion into rice or for shipment as and when required.

Since the benefits accruing from the normal seasonal rise in price appear for the most part to be enjoyed by the trade it would appear to be worthy of serious consideration whether some part at least of the profit margins brought about by the seasonal fluctuation could not be diverted into the pockets of the cultivators by the growers themselves providing the means of storage by co-operative endeavour. For example, the cost of constructing efficient and long-lasting granaries on the Kashmir model described earlier in this chapter and illustrated in the plate facing page 325 should not be prohibitive having regard to the availability of abundant supplies of hard wood while the relative immunity of paddy from attack by insect-pests or serious deterioration provided the grain has received proper treatment at harvest by being adequately dried and handled, renders the produce in the unhusked form very suitable for storage over much longer periods than would be the case with its hulled counterpart rice.

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*Conservation.]*

## INTER-CHAPTER SEVEN.

In the villages, paddy is stored in a large variety of receptacles. Home-made structures of straw and bamboo splits are by far the most common. Mud bins, representative examples of which are the *kothi* of Northern India, and the tile roofed *panat* of Bombay Presidency are also used for storing paddy. Masonry structures, e.g., *kotha* in the north and *kanaj* in Mysore State are owned by big landlords only. Wooden bins are frequently employed for keeping the grain especially in Assam, Bombay, the States of Kashmir, Mysore and Travancore. Even ordinary pits (not *khattis* of the United Provinces) are used for the purpose by the cultivator in Orissa, the Madras Presidency and some parts of Bihar. Small quantities of hand-pounded rice meant for domestic consumption are kept in earthen pots or small home-made mud bins.

In markets, the most common storage is the masonry godowns in which paddy is generally stored in bulk and rice in bags. In the Madras Presidency markets the *gadi* made of bamboo and the wooden *dhan-yappa kottu* are also used for bulk storage of paddy. At rice mills while paddy is kept in godowns both in bulk and bags finished rice is invariably stored in bags.

Good and ample storage facilities are provided by the port authorities at all the major ports and at most minor ports ; and all paddy and rice, pending clearance is kept in bags. As a general rule, imported paddy and rice is rarely kept for any length of time in the port authority ware-houses owing to the relatively high scale of charges.

The cost of storage in villages is difficult to assess on account of the fact that the containers used are

generally built by the cultivator's family labour, the material employed in construction being in many cases, some by-product of the farm. At any rate the cost of storage in villages should be much less than in markets.

Storage costs in markets are found to be highly variable in different parts. The cost of carrying paddy may range within the limits of 3.36 and 7.77 pies per maund per month, the corresponding figures for rice being 5.02 and 14.68 pies. Generally, rice costs more to carry than paddy. This is due to the higher interest charges—rice being dearer than paddy—and depreciation on gunny bags incurred in rice storage.

A little over 1 per cent of the average production of the Indian rice crop valued at Rs. 302 lakhs is wasted every year through weevil infestation, damp, and vermin attack. Weevil alone is responsible for more than half of this loss, vermin being the next in importance.

It is important to note that other things being equal, paddy suffers much less damage or deterioration than rice owing to the protection afforded to the rice kernel by its covering of husk. Paddy which has been properly dried keeps well for a long time.

Hand-pounded rice or rice which has been very lightly milled undergoes rapid deterioration. Well milled rice keeps relatively well. Parboiled rices, though less susceptible to weevil attack than raw rices, are somewhat more liable to discolouration if kept long.

So far as improvement in quality due to storage is concerned, it is well-known that while newly harvested rice tends to cook into a pasty mass which cannot be digested satisfactorily, the grains of stored (matured) rice when cooked retain their individuality and are more easily digestible. Further, matured rice absorbs more

water and swells or elongates to a greater extent on cooking than new rice. For these reasons old rice (or rice produced from old paddy) fetches a premium over new rice.

The position in regard to the optimum length of storage to attain the necessary improvement in quality is not the same in different provinces and States, at least so far as fine rices are concerned. While in the Punjab and the United Provinces two to three years' storage is supposed to give the best results in these rices, in other tracts one to one and half years is generally regarded as sufficient to induce the required maturity. Some of the better types of medium rices may also be stored for preference, for one year or more. Ordinary cheap varieties are not generally consumed until about 3 months have elapsed from the time of harvesting, the longer the intervening period, however, the better.

Paddy is stored for maturity only in some areas, *e.g.*, Southern India, Assam and the State of Kashmir. In other areas where rice storage is the prevailing practice it is claimed from practical experience that when paddy is stored for long periods the kernel tends to become brittle and liable to heavier breakage in hulling. In view of the fact, however, that improvement in quality due to aging is similar in paddy and rice and the comparatively lower cost of storage and reduced losses involved in carrying stocks in the form of paddy it would be useful to investigate in these tracts, the optimum period of storage of paddy compatible with good milling results particularly in respect of fine rices which are stored often for a year or more.

Bulk storage is better and more economical than storage in bags and, in fact, the greater part of the paddy reaching the market is kept in bulk until converted into rice. But rice is generally kept in bags for conveniences of handling in the process of distribution.

For storage in bags, *pucca* masonry godowns with wooden, stone or cement flooring are most useful. For bulk storage of paddy any kind of granary designed to minimise insect and rat attack as well as being damp proof would serve the purpose. Probably the best type of storage for this purpose is the ferro concrete underground bin; details of which are described in the Marketing Series No. 1 (Report on the Marketing of Wheat in India). Wooden bins wherever good hard wood is cheaply available appear to be satisfactory both for paddy and rice storage in bulk.

The chief conclusion arrived at from a comparison between the price differences of seasonal lows and highs in different areas and the calculated costs of storage over the respective periods is that there is ample room for the producers to co-operate in the marketing of their produce with a view to bringing about a more even flow of supplies on the markets and thereby minimise the harvest depression in prices. The premium obtainable for age, especially in the case of fine rices, generally gives a net profit margin for carrying, which may be sometime as high as Re. 1 per maund. That the grower can share in this profit through co-operation is proved by the successful working of the Dehra Dun Basmati Rice Producers' Co-operative Society (United Provinces) referred to in the previous chapter.

The position in regard to recording of stocks of rice and paddy is extremely unsatisfactory. No records are kept and no published data of any practical value are available to the trade or the general public, except in the case of Amritsar from where stock figures of rice along with prices are received regularly in the Office of the Agricultural Marketing Adviser and published in the Weekly Market Bulletin issued by the Office. It is essential that some system should be devised for the collection and dissemination of figures of stocks at important centres.



In Burma, circular baskets and rectangular godowns made of plaited bamboo are used for storing paddy in the villages. Mill godowns and those of the larger stock-holders are usually of corrugated iron, but plaited bamboo often finds a place in them either for making compartments or for making flooring.

Rice weevil is a serious pest of stored grain in Burma. Though there is no doubt of the damage done to milled rice, opinion seems to be divided as to the weevil's capacity for doing damage to paddy. The wastage might be reduced by a thorough cleaning of godowns periodically.

The normal margins of profit earned by holders of stocks buying during the early harvest depression period and holding until July or August when values are usually at their highest compare very favourably with the current rates of return on investment. It is worthy of serious consideration whether some part of the profit margins brought about by the seasonal fluctuation could not be diverted into the pocket of the cultivator by co-operative endeavour. Availability of good hard wood in Burma presents opportunities of using wooden granaries for storing paddy which should prove more efficient than the bamboo structures at present used by the Burmese cultivator.

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## CHAPTER VIII.—HANDLING AND TRANSPORTATION. INDIA.

### A.—Handling.

#### (1) ON THE FARM AND IN THE VILLAGES.

(a) *Paddy*.—When paddy is sold directly off the threshing door, as often happens in all the main rice producing areas, the goods are generally weighed or measured over to the buyer by the village merchant or *bania* who often functions in the dual role of weighman and broker. The paddy is loaded into carts, in bulk, by the buyer assisted by the cultivator and the hired labourers, if any, employed by him. If the produce is first removed to the grower's home, the produce is handled in bulk and weighing or measuring may not be done. At the cultivators' dwelling, the paddy is usually heaped on the floor of a room, verandah or in an open courtyard while it awaits final disposal.

When the paddy is taken from the threshing floor or the grower's home in the village to the market, it is generally handled in bulk and rarely in bags. Carts lined with sheets of strongly woven fabric of cotton, hemp, or occasionally coarse wool, are used for transporting the paddy in bulk from the village to the market. The produce carried on pack animals, such as bullocks, ponies and donkeys, is placed in saddle bags slung across the backs of these animals. In the Punjab, camels are sometimes used. These are owned by tribesmen from across the frontier who migrate annually to the plains of the Punjab and eke out a living as carriers during the winter.

A departure from the usual method of handling paddy is seen in Madras where the produce may be taken to the market by cart, packed in straw containers known as *muras* (see plate facing page 354) or in bins made of bamboo matting.

In many tracts of Bengal, Assam, Bihar and Orissa, where communications are largely by water, paddy is moved by boat from the threshing floor or the village to a nearby *hat*, market or mill in bulk, but on reaching the destination it is packed into bags before unloading.

Apart from these instances, bags are seldom, if ever, used for handling paddy up to the first major point of assembly and when employed are almost invariably old second-hand jute sacks of non-descript type.

(b) *Rice*.—It will be recalled that in certain parts of India, where the production of hand-pounded rice is very large, as for instance, in Bengal, Bihar, Orissa, Assam and the United Provinces the bulk of the output of this type of rice originates directly in the villages where husking by hand is an important cottage industry. The rice so produced is handled in bags as well as in bulk. Large sized lots conveyed to the market by cart in the eastern districts of Bihar and the United Provinces are handled more often in bulk than in bags but in Bengal, when the rice is taken to the market by road, it

is packed in bags. Where transported by boat, both bulk and bag handling are equally common.

The cost of handling in the villages varies considerably and includes such items as weighing or measuring, loading the carts, filling the bags provided by buyers and cartage to the point of assembly including unloading there. Some of these operations may be performed by the producers in which case cash payments are not involved. But others are done by hired labour paid either in kind or cash, usually the former. Local conditions differ so greatly in these respects that it would serve no useful purpose to endeavour to analyse each case. It may, however, be stated broadly that handling in the villages, if reckoned on a cash basis, costs anything within a range of 3 to 9 pies per maund. In Bengal, for example, the estimated cost is roughly 3 pies, in Madras 9 pies (including brokerage at the rate of 6 pies per maund), in Sind 6 pies (including brokerage at 3 pies per maund), in Bombay 6 pies, in the Central Provinces 3 pies and in the United Provinces 7 pies.

## (2) AT THE MARKETS.

(a) *Paddy*.—When the paddy is brought to the market it may be sold to a buyer for despatch to another centre or the goods may be intended for milling locally. In either case the handling involved comprises weighing or measuring, bagging, stitching, loading into vehicles for transportation to the railway station or the mill as the case may be, and unloading at those points. In many instances, the paddy may be brought directly to the mill by the cultivator, the merchant or the mills' agent. In such cases, handling consists of unloading the goods, weighing or measuring, stacking (if the paddy is bagged) or heaping (if bulked).

(b) *Rice*.—In the areas in which hand-pounded rice is largely produced, the finished article brought to the market by the cultivator or the professional dehusker, is subjected to the operations of unloading, weighing and bagging, and is later removed for storage or taken to the railway station for despatch to other centres. Rice hulled by mills on their own account is similarly weighed or measured and bagged, and either stored on the mills premises or sent direct to the railway station for despatch.

The range of handling charges levied in the markets is not wide. In Bengal, weighing and bagging paddy or rice cost about 3 pies per maund, in Assam 4 pies, in Madras 5 pies and in Bombay 3 pies. In Sind, weighing alone costs 3 pies and in the Central Provinces about 9 pies per maund, the average charges on a 2½ maund bag being 3 pies for measuring, 1 anna for bagging, stitching and loading, 6 pies for cartage to the station and 3 pies for unloading.

After reaching the market both paddy and rice are handled in bags, the former usually in fillings of 1 maund 24 seers (131 lb.), 1 maund 30 seers (144 lb.) and the latter in a wide range of fillings varying from about 2 maunds (164 lb.) to 2 maunds 30 seers (226 lb.) normally and in occasional instances a little more.

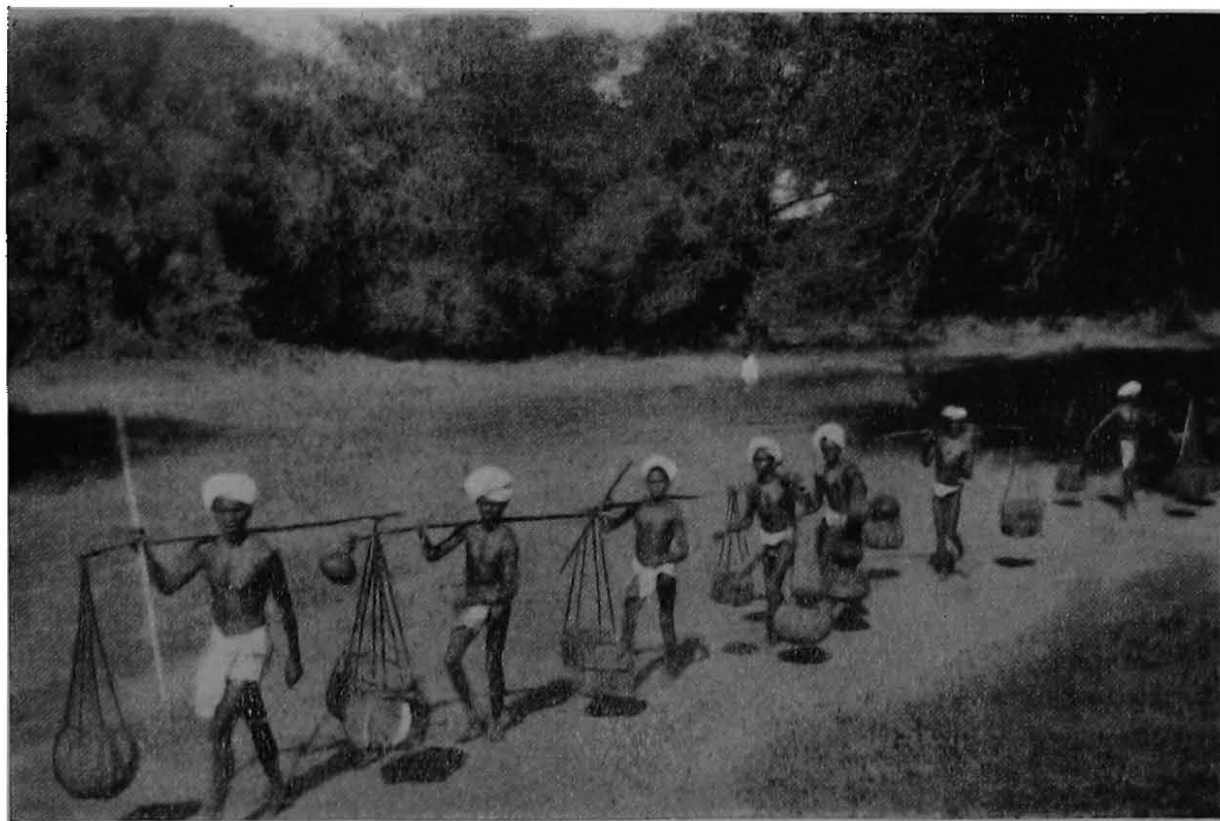
## (3) AT RAIL-HEAD.

Assam is the only part of India in which paddy is transported by rail in bulk. The cost of loading at source and that of unloading at

[Facing page 354.]



PADDY PACKED IN MURAS (SOUTH KANARA—MADRAS).



CARRYING SHOULDER LOADS OF RICE THROUGH THE FOREST FROM DUGALI PAR-  
GANA IN THE CENTRAL PROVINCES TO KONTA, A JOURNEY OF SOME  
100 MILES, PERFORMED ENTIRELY ON FOOT.

destination are borne by the consignor and consignee respectively. Loading paddy in bulk costs between Rs. 3 and Rs. 5 per wagon-load of 290 maunds (10½ tons) which works out to an average of 2 to 3 pies per maund. No storage accommodation in transit sheds is allowed in respect of paddy in bulk without special sanction. Elsewhere almost the entire rail-borne traffic in paddy and rice is handled in bags.

In the case of small despatches all bags are generally weighed, but for large lots packed in bags of uniform size, the weight is normally checked by weighing 10 to 20 per cent of the whole consignment. Loading and unloading are, as a rule, effected by the railway concerned, the charges for these operations being included in the rate of freight. The labour normally employed by the railways to load and unload the various commodities handled (including paddy and rice) is generally hired by the day or week, by contractors who are paid per unit of 1,000 maunds handled. At some stations, however, the railways maintain their own staff to handle goods.

Although forbidden by the regulations, the use of hooks by railway coolies is still common during loading and unloading. As a result, not only are the bags damaged—the damage increasing with the age of the container—but considerable loss may also occur by leakage especially in the case of well-dressed polished fine small grained types. Paddy is not so susceptible to loss resulting from torn containers on account of the friction offered by the rough, ribbed surface of the husk.

On arriving at destination the goods are unloaded and stacked in the railway sheds, where they are allowed to remain free of charge for a specified period, usually 72 hours, after which wharfage is levied at the rate of 6 pies per maund for every 24 hours, or part thereof. When the time comes for removal, the produce is loaded into carts or motor lorries and conveyed at the consignee's expense. The cost of handling at this stage is about 1 pie per maund, and the subsequent cartage to the merchant's godown and unloading and stacking there accounts for an additional 2 to 6 pies per maund according to the distance from the station. Dealers with a large turnover of various commodities find it more convenient to employ contractors or clearing agents to attend to the clearing of their goods at a flat rate of between half to one pie per maund.

Over and above the expenses above mentioned, it is customary for certain payments (*mamools*) to be made to the railway staff by the consignor and the consignee. These are estimated to range from half to one pie per maund of goods despatched or received. Probably not less than Rs. 10 lakhs annually change hands in this way on the three and a half million tons of paddy and rice carried by the railways each year. The acceptance of such payments is, however, entirely unauthorised by the railway authorities and cases in which the staff are found to have accepted such payments are severely dealt with.

#### (4) AT RIVER-HEAD.

Transport by water plays an important part in the movement of paddy and rice as many of the areas of large production are in-

tersected by rivers, canals and other water-ways. In Assam, paddy taken to the market in country craft is always conveyed in bulk, although the produce is bagged at the time of off-loading. If, however, the paddy is transported by steamer it is always handled in bags. In Bengal and Bihar, both paddy and rice are generally handled in bags when transported either by country craft or in steamers. On the Mahanadi river, however, in Orissa, the bulk handling of paddy in country boats is quite common.

Boat hire customarily excludes handling charges such as stowing and discharging which have to be paid for separately and on an average amount to rather less than 3 pies per maund. In Sind, however, boat hire includes handling charges and the boatmen load and unload their craft themselves. On this account the rates are somewhat dearer and include grain worth 4 annas for each lot of 25 maunds of paddy or rice carried.

#### (5) AT THE MILL.

At the rice mills existing stocks may be kept in bulk or in bags. Baskets of varying sizes being more convenient than bags are commonly used to move the grain from one point of processing to another (see plate facing page 222). The milled rice is filled into bags, in most instances by manual labour. In the self-contained type of milling plant, the rice (and by other products such as brokens and bran) runs out through ducts straight into the bags. In a few cases automatic filling and weighing machines are used. The mouths of the bags, when filled, are stitched by hand 14 to 18 stitches being normally given. Jute twine of the 3 or 5 ply kind is invariably used for this purpose.\*

The costs of handling at the mill are included in the costs of milling and form part of the hire charges levied, details of which are given on pages 229 and 230 in Chapter IV.

#### (6) AT THE PORT.

Paddy and rice are both received at and shipped from various Indian ports. This traffic may be carried in large sea-going steamers if the distances to be traversed are considerable or country sailing craft may be used on rivers, tidal waterways or coastal routes. In the former case, both paddy and rice are always handled in bags. In the latter, bags are generally used but paddy may sometimes be consigned in bulk. For example, paddy transported along the waterways of Travancore and Cochin in South India is almost invariably bulked while much of the coastal traffic in paddy on the Bombay sea-board is also in bulk.

The loading and discharging of sea-going vessels is done by cranes at all large ports, but where ships have to lie far out off-shore as on the Orissa and Coromandel coasts owing to the shallowness of the water, the rice (or paddy) is man-handled in bags from the

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\* Jute twine is made up into hanks or bundles and is packed in bales in the same way as other manufactured jute products.

stacks which line the shore well above high-water mark, to lighters or similar craft and then ferried over to the waiting ship which takes the goods aboard under its own tackle. These operations are fraught with some risk in stormy weather and the produce is liable to be damaged by spray and water inspite of every precaution.

A few typical examples of the cost of handling at the ports are as follows.

When rice (or paddy) is exported from Calcutta, the Port Commissioner's schedule of charges are, shipping charges 12 annas per ton, river dues Rs. 1-4-0 per ton, and fixed toll 4 annas per ton, making a total of Rs. 2-4-0 per ton or Re. 0-1-4 per maund. In the case of imported rice (or paddy), handling charges which include stacking in Port Commissioner's sheds and loading into railway wagons for removal to consuming centres are Re. 1 per ton. River dues account for 12 annas and a fixed toll for 4 annas making a total of Rs. 2 which works out to Re. 0-1-2 per maund. If the goods are unloaded over-side, no landing charges are paid, but river dues are charged at Rs. 1-4-0 per ton instead of 12 annas *plus* the usual fixed toll of 4 annas. When goods are removed by lorries or carts, an extra charge at the rate of one-third of the landing charges has again to be paid. Four days are allowed free at the dock transit sheds from the day actual landing commences.

After the expiry of the free days, wharf rent is charged at the rate of 3 annas per ton per week for the first four weeks, 4 annas for the fifth to the eighth week and 8 annas for the ninth and subsequent weeks. Sometimes owing to the lack of space in the transit sheds, the goods are removed to the Kantapukur grain sheds, and the cost of removal is charged at 75 per cent of the landing charges.

At Madras harbour dues for goods in transit are Rs. 2 for every ton of paddy, rice, or broken rice imported or exported, this includes handling and portorage charges up to the point of delivery and works out to Re. 0-1-2 per maund. Quay dues are levied at 8 annas per ton and includes crantage for packages up to 1 ton each. If the consignment is landed under an overside delivery order it has to be handled by the consignee and the harbour dues payable are reduced to Rs. 1-6-0 per ton or some 10 pies per maund. Goods arriving by rail are removed in the sheds free but unloading from carts or lorries has to be done by the booking merchants at their own expense. An additional fee of 2 annas per ton per day is levied if the goods are left in Port Trust premises for a period in excess of the time allowed by the rules.

Rice imported and landed at the Bombay docks incurs wharfage at the rate of 15 annas per ton *plus* 4½ per cent surtax. This is equivalent to nearly 7 pies per maund. Country craft plays an important part in the transport of imported Burma rice from Bombay port to the southern parts of the presidency, particularly in the fair season from about the end of September to the end of May or early in June. The imported produce is always packed in bags and is usually transhipped directly over-side from the steamer to the boat either in the dock or out in the stream. This apparently results in a saving of



handling costs amounting to 2 annas per bag and is popular on that account. Transshipment from the steamer to the boat is effected by means of the ship's own tackle.

At Cochin harbour dues include wharfage, crantage and portorage into transit sheds and amount to Rs. 2 per ton or Re. 0-1-2 per maund. If the rice is handled in the stream, landing and shipping fee of Re. 1 only is charged—this is equivalent to 7 pies per maund.

At Karachi, imported rice pays Rs. 1-3-0 per ton or over 8 pies per maund as dock dues at ships wharves but at other wharves or bunders for sailing craft the charge is Re. 0-9-6 per ton.

Rice exported by country craft or steamer from Karachi to Cutch and Kathiawar ports, and to Muscat in the Persian Gulf is always handled in bags. At Karachi, country sailing vessels lie at a special wharf and the goods destined for transport by them are loaded direct from the carts or lorries by manual labour. In the case of shipments by steamer, the rice may be first loaded on to lighters which are towed to the vessel and then discharged into the hold by the ship's own tackle or the goods may be railed alongside and slung on board by the Port Trust cranes.

#### (7) CONTAINERS.

The containers used in the wholesale rice trade are made of jute and are commonly referred to as "gunnies" or "gunny bags". These bags are normally packed in bales containing 300 each but a few mills use a packing of 400 bags to the bale. The jute manufacturing industry is concentrated in and around Calcutta but there are a few recent mills in the United Provinces, in North Bihar and at Chitavalsah Nellimaria, in Madras. The standard types of bags mostly used are the heavy C, DW (double warp) and the B twill. The first named is the cheapest and on that account is very popular in the internal trade. It measures 40 in.  $\times$  28 in., weighs 2 lb. and was quoted in July 1940, at about Rs. 28 per hundred f. o. r. mill. The B twill, as the name implies, is made from twill sacking, measures 44 in.  $\times$  26½ in. and weighs 2½ lb. It is a much used covering both in the internal and export trades. Exports of practically every type of agricultural commodity from India are packed exclusively in this bag. Its cost, in July 1940, was about Rs. 29 per hundred. The small DW bag is much used for paddy and is priced intermediately between the heavy C and the B twill.

#### B.—Transportation.

Road transport is used in the movement of the crops from the producing tracts to the assembling centres in the interior. Subsequently rail and river transport are important. The cost of transport constitutes the major proportion of the total cost of distribution between distant centres such as Calcutta and Delhi. For example, while the normal difference between the price of rice at Bolepur in the Burdwan district, north of Calcutta, and Delhi is Rs. 1-1-0 per maund, railway freight accounts for as much as Re. 0-10-9 or 63 per cent.

## (1) BY ROAD.

The village roads are generally unmetalled (*kachcha*) and are mostly tracks winding through the fields. Many of these roads lie below the level of the surrounding fields thus rendering them liable to inundation in rainy weather. The means of transport employed in different parts of the country to convey paddy and rice to the market consist mainly of two wheeled bullock carts of varying sizes and pack animals (mostly bullocks, ponies and donkeys and in a few areas, camels). Paddy and rice may also be carried considerable distances in head loads and baskets suspended from a pole balanced across the shoulder of the carrier. Possibly one of the most interesting examples of this method of transportation being employed over long distances is that which takes place from the Dugali Pargana of Dantewara tahsil in Bastar State in the south-east of the Central Provinces to Konta, a rice marketing centre on a tributary of the Godavari in the extreme south of the State bordering Madras territory. The distances covered by the Marias (Gonds) in traversing this part of the country may exceed 100 miles. The plate facing page 355 shows a line of Gonds carrying yoke loads of rice making their way along a forest path.

The types of bullock-carts used in India have capacities ranging from about 12 maunds to 40 maunds. In the South, the small size of the local draught animals necessitates relatively light loads but in Northern India, the average cart can handle as much as 40 maunds owing to the larger size and greater strength of the bullocks bred in those parts. Ponies, donkeys and camels are useful carriers where road conditions are so bad as to preclude the use of vehicular traffic. Donkeys, and to some extent ponies, are widely used but camels are employed mainly in the Punjab, Sind and Central India.

From the assembling markets the subsequent transportation of paddy and rice by road may take place by motor lorry, two-wheeled bullock cart, four-wheeled *thela* and camel cart. Often the points served by road are also connected by rail and although the freight per maund per mile charged by road is sometimes a little higher than that charged by the railway, the former is generally the more economical for the reason that the goods are loaded direct from the consignor's premises and delivered at the consignee's door. This reduces expenditure on handling and eliminates the cost of cartage to and from the railway station. In addition both the sender and the receiver of the goods are saved from the inconveniences and expenses which they undergo when consigning goods by rail. It should, however, be noted that motor lorries are generally employed for long distance haulage, while animal traction being slow, carts are not generally used over distances exceeding 30 miles—a full day's journey—excepting in Madras where bullock carts are known to travel as far as 80 miles, *e.g.*, from Godavari to Vizagapatam.

(a) *Cost of conveyance.*—The cost of transport by road varies enormously. Long-distance hire is relatively cheaper than short hauls and rates are frequently doubled during the monsoon. Sometimes hire charges may be paid in kind as in the Punjab where one-third

second part of the produce carried is handed over to the owner of the means of transport for a carry of about 4 miles.

In Bengal, transport in the villages and rural areas costs about 3 pies per maund per mile over unmetalled roads and 2 pies on metalled roads. In the towns, the normal charge is 3 pies. At Calcutta, the distance between the Kidderpore docks and Burra Bazar in the city is about 5 miles and a flat rate of 3 annas per bag of 2 to 2½ maunds is charged by lorry owners which works out to an average of about 3 pies per maund per mile. In the Brahmaputra Valley in Assam, transport by cart is fairly costly, and amounts to about 6 pies per maund per mile. Pony transport in the province costs anything from 9 to 12 pies and lorry transport about 2 pies. In Bihar and in Orissa, cart hire works out to 4 pies per maund per mile on metalled roads and 6 pies per maund per mile on unmetalled. Pack animals may be hired very cheaply at about 2 pies per maund per mile. In Madras, a cart with a capacity of 10 to 12 maunds may be obtained at the rate of 6 pies per maund per mile for distances up to 3 miles. For longer distances up to 10 miles, the rate falls to 1 to 1½ pies only. Where competition is keen and a large volume of produce moves between important centres, transport charges may be lower than 1 pie per maund per mile as, for example, in the Tanjore area between nearby villages and the town of Papanasam or from Chingleput to Madras. In the former instance the distance is about 10 miles and the charges .90 pie per maund per mile. In the latter the distance is 40 miles and the hire rate .60 pie per maund per mile. Other low rates are from Tirupur to Erode in the Coimbatore area, a distance of 30 miles, for which the charge is .80 pie per maund per mile, and from Tanjore to Trichinopoly the 31 miles separating which are charged for at the rate of .97 pie per maund per mile. Lorry transport is rather more expensive in Madras. Four representative costs ranged between 1.10 pies per maund per mile and 1.80 pies; the former applying to the 33 miles between Samalkot and Tuni and the latter to the 34 miles separating Karamadai and Ootacamund (Nilgiris). In the United Provinces, transport by cart costs about 2 pies per maund per mile on an average while in Bombay the rate is 1.6 pies only. Motor lorry transport in Bombay is comparatively cheap and costs .6 pie per maund per mile. In Hyderabad, transport by cart from producing to assembling centres costs 1.35 pies per maund per mile on metalled roads and 1.62 pies on unmetalled while by lorry the cost is reduced to .77 pie.

Carts equipped with pneumatic tyred wheels may on occasion be seen, mainly in towns and cities. Experiments have shown that with pneumatic equipment there is a gain of at least 20 per cent in speed while less damage is done to the road surface. The Central Public Works Department of the Government of India have, for example, calculated that the damage done to metalled roads by a fully laden iron tyred cart amounts to about Rs. 230 per annum.

## (2) BY RAIL.

(a) *Classification of goods and rates of freight.*—The number of classes was revised, as from 1st May 1936, as follows.

Class.	Maximum per maund per mile.	Minimum per maund per mile.	Class.	Maximum per maund per mile.	Minimum per maund per mile.
	(Pies).	(Pies).		(Pies).	(Pies).
1	.38	} .100	4B	.72	} .166
2	.42		5	.77	
2A	.46		6	.83	
2B	.50		6A	.89	
2C	.54		7	.96	
3	.58	8	1.04		
4	.62	9	1.25		
4A	.67	10	1.87		

Rice, paddy and beaten rice are included in the first class with the maximum and minimum freights of .38 and .1 pie per maund per mile respectively. Owing to the greater bulk of this commodity as compared to its weight, parched rice is included in Class 4, the maximum and minimum rates of which are .62 pie and .166 per maund per mile respectively.

In addition to the class rates quoted above there are also schedule rates and special rates between specified stations. The former are rates quoted generally on a basis lower than the maximum of the class, and may be on a uniform basis, *e.g.*, .25 pie per maund per mile for any distance, or may be based on the telescopic (cumulative) principle.

There are twenty-seven schedule rates formulated by the Indian Railway Conference, eight on uniform basis, *i.e.*, at a flat rate for any distance, and nineteen on the telescopic principle. Most railways have adopted one or more of the above and in addition some lines operate their own schedules.

The carriage of rice and its products, with the exception of parched rice, is governed on all the principal railways by schedule rates subject to one or more of the following conditions.

- (a) Booking may not be permissible on some sections of a railway.
- (b) Terminals are levied in addition to freight in some cases.
- (c) Booking is done in some cases on owners' risk and not on railway risk.
- (d) A certain minimum distance is specified in some cases.
- (e) In most cases a minimum weight is specified for the consignment, *e.g.*, 400 maunds for broad gauge four-wheeled wagons.

(f) The rate may be applicable only to paddy or rice in the husk and not to rice as, for instance, on the Bengal Nagpur Railway.

It should be noted that when goods are carried over more than one railway, the rates are not calculated on the through distance between the station of origin and destination, but separately for the different railway lines involved. As a result the traffic receives the benefit of the telescopic scale of rates only on the local distance of each railway line over which the goods move, and not on the total distance.

Bookings of a lesser distance than 75 miles have to pay a short distance charge of 3 pies per maund. The minimum weight for charge is 20 seers.

A station to station rate is special rate per maund for the total distance between two specific points. A special rate may be operating between two stations on the same railway, between two stations on different railways, between a junction and a station or between two junctions. These rates are inclusive of terminals, short distance charges, tolls, etc.\*

A few instances of comparative freight rates operating on different lines are given in the table below and will enable some idea to be formed as to the relationship existing between class, schedule and special rates.

*Specimen rates of freight between certain important centres.*  
(Per maund).

—	Mileage.	Class rate.	Schedule rate.	Special reduced rate.
		Rs. A. P.	Rs. A. P.	Rs. A. P.
<i>Assam Bengal Railway.</i>				
Chandpur to Silchar ..	222	0 8 0	0 6 7	0 6 7 Rice only.
Chittagong to Mymensingh.	241	0 8 8	..	0 4 7 Paddy and rice.
Chittagong to Karimganj.	240	0 8 7	0 7 0	0 6 7 Paddy only.
Gauhati to Tinsukhia.	320	0 11 2	0 9 0	0 6 0 Do.
<i>Bengal Nagpur Railway.</i>				
Betnoti to Balasore ..	27	0 2 9	0 2 9	0 1 3 Do.

\*It is interesting to observe that the Road-Rail Traffic Act of 1934 conferred upon the railway companies of Great Britain the right to charge freight in accordance with "business ethics". The English Act allows railways to quote a flat rate for transport of all the products of any particular firm to a number of different stations and the principle of "agreed charges" has led in some cases to the transport arrangements of manufacturers and shippers being entrusted wholly to the railway companies who collect, transport, store and deliver the goods as required.

*Specimen rates of freight between certain important centres—contd.*  
(Per maund).

	Mileage.	Class rate.	Schedule rate.	Special reduced rate.
		Rs. A. P.	Rs. A. P.	Rs. A. P.
<i>Bengal Nagpur Railway—contd.</i>				
Baitarani Road to Vizagapatam port.	348	0 12 4	0 11 4	0 7 9 Rice only.
Cuttack to Vizagapatam port.	296	0 10 8	0 10 8	0 6 7 Do.
Raipur to Madras ..	813	1 11 1	1 8 7	1 0 9 Do.
<i>Bengal and North Western Railway.</i>				
Jaynagar to Darbhanga	42	0 2 4	..	0 1 10 Paddy and rice.
Nirmali to Darbhanga	45	0 2 5	..	0 1 11 Do.
Tulaipur to Bahraich ..	80	0 3 6	..	0 1 7 Paddy only.
Balrampur to Bahraich	61	0 2 11	..	0 1 7 Do.
Basti to Marufganj ..	192	0 8 1	0 5 6	0 3 6 Paddy and rice.
<i>Bombay, Baroda and Central India Railway.</i>				
Bombay (Carnac Bridge) to Nausari.	147	0 6 2	0 5 7	0 2 9 Rice only.
Bombay Central to Surat.	165	0 6 9	0 6 1	0 3 9 Do.
<i>Eastern Bengal Railway.</i>				
Khulna to Calcutta ..	109	0 4 3	0 3 6	0 2 1 Paddy and rice.
Calcutta to Dacca ..	398	0 13 9	0 7 8	0 3 6 Do.
Chitpur to Baharpur ..	144	0 5 5	0 4 1	0 3 0 Do.
<i>East Indian Railway.</i>				
Buxar to Patna ..	74	0 3 1	0 2 5	0 1 6 Do.
<i>Great Indian Peninsula Railway.</i>				
Kalyan to Bombay ..	34	0 2 8	0 2 6	0 1 9 Rice only.

*Specimen rates of freight between certain important centres—concl'd.*  
(Per maund).

—	Mileage.	Class rate.	Schedule rate.	Special reduced rate.
		Rs. A. P.	Rs. A. P.	Rs. A. P.
<i>Madras and Southern Mahratta Railway.</i>				
Bezwada to Dharwar	451	0 15 3	0 14 2	0 11 6 Rice only.
Bezwada to Madras ..	268	0 9 6	0 9 6	0 7 0 Paddy and rice.
Bezwada to Vizagapatam port.	220	0 8 0	0 8 0	0 6 0 Rice only.
Coconada to Madras ..	401	0 13 8	0 13 0	0 7 0 Paddy and rice.
<i>North Western Railway.</i>				
Quila Sheikhpura to Lahore.	31	0 1 9	0 1 9	0 0 9 Do.
Gujranwala to Lahore	43	0 2 3	0 2 1	0 1 11 Rice only.
Amritsar to Poona ..	1,267	2 8 0	1 8 5	1 6 1 Do.
<i>South Indian Railway.</i>				
Tuticorin to Madura Jn.	99	0 4 2	..	0 3 11 Do.
Chingleput Jn. to Madras Beach.	38	0 2 5	..	0 1 3 Do.

It will be observed that in certain instances special rates are only granted to one or other of the two commodities paddy or rice, and not to both. Where this policy has been adopted a clear indication is given of the character of the local trade. For instance, Kalyan to Bombay has a special rate for rice partly because Kalyan is probably the largest milling centre in the province and has a considerable surplus to be moved to consuming centres and partly because of road competition. Bezwada in Madras has a large export trade in rice which is given the facilities of a special rate to Vizagapatam, the nearest port of shipment at which ships can call all the year round. Bahraich in the United Provinces has a paddy husking industry of some magnitude and a special rate is given to nearby surplus growing areas. There appears to be scope for granting special rates on a wider scale than is done at present.

With certain exceptions which include food grains such as wheat, rice (including paddy), etc., rates of freight were, as a result of the War, been enhanced from 1st March, 1940, by 2 annas in the rupee

[Facing page 364.]



**TRANSPORTING PADDY PACKED IN MURAS (SOUTH  
KANARA—MADRAS).**



## DISTRIBUTION OF RAIL & RIVER - BORNE TRADE IN PADDY & RICE IN INDIA.

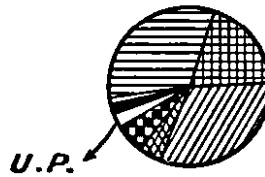
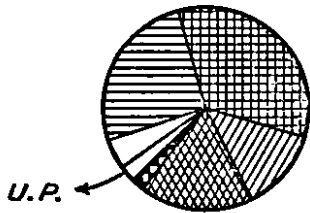
*(Drawn to scale)*

### PADDY

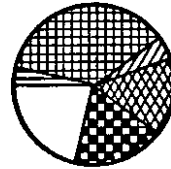
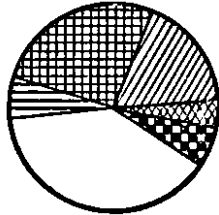
1911-12 / 1913-14 .

1936-37 / 1938-39 .

IMPORTS



EXPORTS

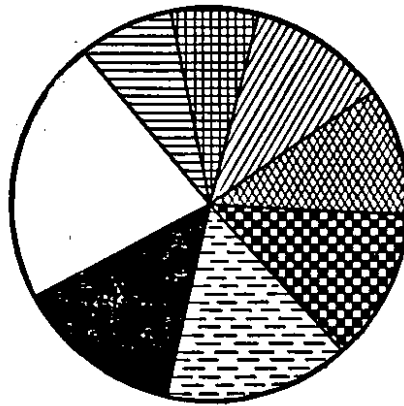
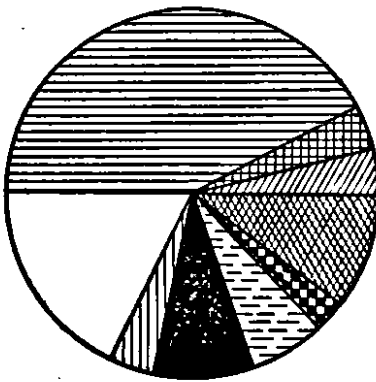


### RICE

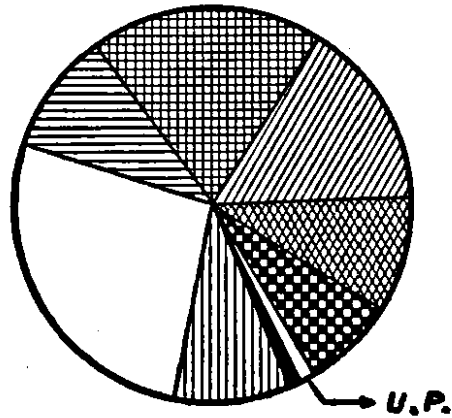
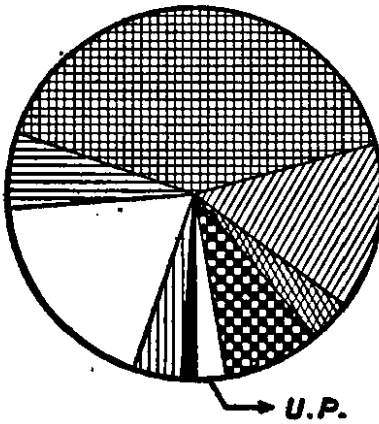
UNITED PROVINCES.  
 BOMBAY.  
 BOMBAY PORTS.  
 OTHERS.



IMPORTS



EXPORTS



(12½ per cent) of the total freight on each consignment, with a minimum surcharge of 1 anna when the total freight is 8 annas or under.

(b) *Terms and conditions of booking and delivery.*—Paddy and rice are generally booked at railway risk, but where consignments are packed in old or defective bags they are only accepted by railways at owner's risk. As a rule the condition of the gunnies used for packing paddy and rice is satisfactory and the greater proportion of this traffic is carried at railway risk.

Covered wagons are always used to carry paddy, rice and their various derivatives. The capacity of wagon varies considerably, the common four-wheeled types running on broad-gauge lines carrying between 14 and 24 tons and those operating on the metre-gauge systems from 9 to 11 tons. Eight wheeled bogies are occasionally used and these have a capacity of roughly double the smaller four-wheelers.

Covered accommodation at stations for goods awaiting despatch or delivery is generally provided on an adequate scale as the greater part of the rice growing tracts lie within zones of heavy rainfall. Facilities for transit storage are, however, best at large terminals such as Howrah and Chitpore in Calcutta and the various railway and port authority godowns in Bombay.

(c) *Extent of rail-borne traffic.*—Tendencies in regard to the volume of internal movement by rail and rivers have already been noticed briefly on page 126 and a fuller analysis is given in a later section of this chapter. These statistics, however, only take account of traffic passing from one trade block to another and ignore the volume of traffic that has its origin and termination within the individual trade blocks. In the case of rice this intra-provincial trade assumes very considerable proportions owing to the somewhat localised nature of the demand. Thus it will be clear that the data contained in the official publication "Accounts relating to the Inland (river and rail-borne) Trade of India" present a far from complete picture of the total quantity of paddy and rice actually put on rail.

Information specially obtained from the Railway Board is tabulated in Appendix LXXV, which shows the quantities of paddy and rice carried over the major railway systems of India for a number of years. It will, for example, be seen that some 934,000 tons of paddy were carried annually on an average between 1935-36 to 1938-39, while 3,587,000 tons of rice were similarly transported within this period making a grand total of 4,521,000 tons. The largest tonnage of paddy is handled by the South India, Eastern Bengal, Bengal Nagpur and East Indian Railways, in that order of importance, the first named line taking more than one-third of the total average annual traffic.

In regard to rice the volume of trade transported is fairly well divided between nine railways with, however, three occupying a somewhat outstanding position. These are the Bengal Nagpur with an average of 625,000 tons, the Madras and Southern Mahratta with

481,000 tons and the East Indian with over 430,000 tons. Other important carriers are the Eastern Bengal, the Great Indian Peninsula, North Western and the Bengal and North Western Railways. A considerable proportion of rice transported over the Madras and Southern Mahratta, South India and the Great Indian Peninsula systems consists of imported rice.

It will be appreciated that these figures do not represent the exact quantities moved over the railways as obviously a proportion of the traffic shown against one railway also passes over other linked systems before it reaches final destination and is to this extent registered more than once. For example, if a consignment of *Basmati* rice were to be despatched from Dehra Dun in the United Provinces to Hyderabad (Deccan), it would have successively to traverse the East Indian, the Great Indian Peninsula and the Nizam's State Railways and would be recorded on each. It is, however, possible to make a very rough estimate of the amount of paddy and rice carried by rail as these two commodities are not notable for long hauls such as, for example, take place in wheat moved from the Punjab to Karachi—an average distance of nearly 700 miles or to Calcutta some 1,250 miles away. For example, much of the paddy transported by rail moves within a province or trade block while the localised nature of the demand for rice does not necessitate anything like the large scale long distance movements associated with wheat. Thus, the rice imported from sources outside India and distributed from the ports situated in Madras (including Cochin) are to a considerable extent consumed within that province, the traffic being handled by the South Indian and the Madras and Southern Mahratta Railways. Similarly rice imported into Bombay is consumed largely within the presidency and a considerable proportion of the traffic carried by the Great Indian Peninsula and the Bombay, Baroda and Central India Railways within the boundaries of the Bombay limit comprises Burma rice. Having regard, therefore, to the general lines of movement of paddy and rice it may be estimated that the total quantities of paddy and rice actually put on rail in an average year are something like 3,500,000 tons consisting of some 800,000 tons of paddy and 2,700,000 tons of rice.

### (3) BY INTERNAL WATERWAYS.

Since rice is largely the product of low lying areas intersected by rivers and canals, transportation by water is a common feature in Bengal, Assam, Bihar, Orissa, Madras, Travancore and Cochin. A considerable amount of paddy and rice is also carried on some of the rivers of the United Provinces, notably the Ganges, while the Indus is much used for the transportation in Sind. The Ganges in its lower reaches and the Brahmaputra, together with their numerous tributaries, link up Bihar and Assam respectively with Bengal while rivers such as the Mahanadi and Brahmani in Orissa all play an important part in the distribution of paddy and rice. Canals and other artificial waterways capable of navigation either seasonally or throughout the year also carry much traffic in paddy and rice, as, for example, in Madras and Travancore.

It is unfortunately impossible to ascertain precisely how much paddy and rice is carried by water in India but judging from the ex-

tent of this traffic in Madras in respect of which detailed figures are available the probable total traffic of rice and paddy by internal waterways can hardly fall short of 1 million tons and may indeed be much greater. In Madras, for example, the Kistna and Godavari canal systems and the Buckingham canal carried an average of 224,900 tons of paddy and 44,225 tons of rice annually during the period 1930-31 to 1934-35. Expressed in terms of rice, the canal-borne traffic above mentioned constitutes about 4 per cent of the production of rice in Madras and 17 per cent of the crop grown in the East and West Godavari districts and the districts of Kistna and Guntur served by this network of canals.

**Assam.**—In the Surma valley, country boats are much more largely used than the paddle steamers and their accompanying "flats"\* which ply up and down the main streams of the Brahmaputra and the Ganges. Persons engaged in country boat traffic in Assam are mostly *farias* and *beoparis*, many of whom belong to the cultivating classes and who combine the occupations of trade and boatmen. Large numbers of buyers of paddy also come to Assam from East Bengal in their own or hired craft. Most of the river traffic in Assam consists of paddy and there is little rice carried by country boat except along the Surma river in the Sylhet district.

**Bengal.**—Rather similar conditions prevail in this province. Country boats with capacities varying from 200 to 800 maunds (8 to 30 tons), or more, carry the major proportion of the river-borne traffic in this cereal, particularly that of paddy. The reason for the popularity of the country boat lies partly in low transport costs which offset the longer time taken as compared with the more rapid steamer routes, and partly in the fact that country boats can navigate in very shallow water and are thus enabled to operate over a wider area. Most of the country craft in this trade are manned by Mohammadans from East Bengal or by persons from Bihar and the United Provinces.

**Bihar.**—Traffic by boat is generally heaviest in the rainy season from July to about the end of September when there is plenty of navigable water. Apart from this period there is quite a considerable trade by country boat throughout the year, especially on the Ganges where boats with a capacity of 2,000 maunds or 75 tons are often seen. The boatmen plying their craft on this great waterway are usually natives of the United Provinces hailing from the Mirzapur and Benares districts.

**Madras.**—With the exception of the Kistna and the Godavari, the other rivers of this province are generally unsuitable for navigation and are not used for the transportation of paddy and rice. A good deal of canal-borne trade is carried in punt-shaped flat bottomed craft of a size which enables them to be poled along shallow water by two or three men. (See plate facing page 364).

**Sind.**—The amount of river traffic in Sind has been somewhat adversely affected with the spread of canal irrigation in the Punjab

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\* Large flat bottomed shallow-draught barges with a covered-in superstructure of corrugated iron within which produce is stacked. These flats are very extensively used to carry raw jute down to Calcutta and other baling centres in Bengal.

and Sind. Rivers which were formerly navigable have been tapped at various points in the Punjab and at Sukkur in Sind so that the volume of water flowing down the Indus has been reduced. Nevertheless water-borne trade is still considerable and large country boats, some with a capacity of 1,400 maunds or over 50 tons, carry quantities of rice down the main river from Larkana to Hyderabad (Kotri) while rice grown in the Indus delta area of the Karachi district is transported by sea going country craft of the dhow type round to Karachi itself. There is a good deal of traffic too on the Fuleli canal, in Hyderabad, during the inundation period of July to September.

It has already been pointed out that paddy and rice consigned by steamer is always bagged but paddy, in the main, may often be found bulked when carried in country boats particularly in Bengal, Assam and Orissa. In order to protect the grain from damage by water planks and straw or pieces of old gunny cloth may be placed in the bottom or along the sides of the boat but this does not always prevent a certain amount of damage taking place through water percolating through the seams of the vessel's sides.

(a) *Rates of freight.*—The cost of transport by water, particularly by country boat, is on the average cheaper than that by road or rail, but the time taken is considerable. The boatmen have, however, been known to tamper with the produce, during transit and consignments are exposed to the risk of total loss or damage in bad weather. As far as could be ascertained no insurance of any kind is taken out against these or any other contingencies. Rates of freight by country boat are always open to negotiation, as is the case with lorry and cart transport, and on that account vary considerably. Only the organised transport agencies such as river steamer companies quote fixed rates.

A few examples of freight rates are as follows. In Bengal, country craft charge from 2 annas to Re. 0-2-6 per maund from Bagabunder in the Bakargunj district to Chandpur higher up the river, a distance of well over 100 miles. Thus the net cost per maund per mile works out at about .25 pie. The charge by steamer for this journey is only slightly higher at Re. 0-3-6 per maund or about .40 pie per maund per mile. The Steamer rate from Narayangunj and Dacca to Calcutta for distances of 259 and 269 miles respectively is only Re. 0-3-6 or about .16 pie per maund per mile. Barisal to Calcutta by country boat costs about 1 anna per maund for 104 miles or about .11 pie per maund per mile. Chandbali, on the Orissa coast off the mouth of the Hooghly is some 200 miles from Calcutta by water and the freight charge between these two points is 2 annas per maund for paddy and Re. 0-2-9 for rice, the difference being due to the fact that the paddy is bulked while the rice is in bags. On this basis the cost per maund per mile would be .12 pie for paddy and about .16 pie for rice. In Assam, Silchar to Sylhet is over 100 miles by river and the usual charge made by country craft is Re. 0-1-6 per maund or less than .18 pie per maund per

mile. In Madras, Rajahmundry to Coconada, about 40 miles by canal, costs Rs. 8 per 100 bags or 6 pies per maund which is the equivalent of .15 pie per maund per mile. On the East and West Godavari canal systems, the boats are owned largely by merchants and are hired out to boatmen at about Rs. 150 per annum. These craft carry about 300 bags each. In Bihar, Patna to Palezghat, a distance of some 18 miles, is charged at the rate of 6 pies per maund or less than .40 pie per maund per mile. In Sind, the rate of boat hire for the 32 miles separating Matli and Hyderabad is 9 pies per maund or below .30 pie per maund per mile. The corresponding railway freight would be Re. 0-1-8 per maund or more than double the rate by water. Larkana to Hyderabad, a down-river journey of some 160 miles is charged for at the rate of 2 annas per maund or .15 pie per maund per mile, while the railway freight is five annas per maund, or two and a half times greater. From points on the Indus Delta, in the Karachi district, to Karachi port—partly by sea—the distance is on an average from 60 to 70 miles and the rate of freight 2 annas per maund or less than .40 pie per maund per mile.

(4) NOTE ON RAIL AND RIVER-BORNE TRADE BETWEEN TRADE BLOCKS.

It will be recalled that whereas some 3,500,000 tons of paddy and rice are estimated to be actually carried over the Indian railway systems in a normal year the quantity recorded in the official publication "Accounts relating to the Inland (rail and river-borne) Trade of India" as passing between the various trade blocks is only about half this figure. Reference to Appendices XXXVII and XXXVIII will enable comparisons to be made between the movements of paddy and rice, by rail and river, between the different trade blocks of India, for the triennia 1911-12 to 1913-14, 1918-19 to 1920-21 and 1933-34 to 1935-36 and for each of the years 1936-37 to 1939-40. It will be seen, for example, that the quantity of paddy handled by rail and river (the latter excludes much country boat traffic which cannot be registered) has averaged some 245,000 tons between 1936-37 and 1938-39, as compared with nearly 439,000 tons in 1911-12 to 1913-14. Similar data in respect of rice covering the same periods show 1,561,200 and 1,323,700 tons respectively. The sum total of traffic has, therefore, changed comparatively little although its constitution is slightly different there having been a fall in the recently recorded movements of paddy as compared with 1911-12 to 1913-14 and an increase in those of rice which has rather more than offset the decline in paddy.

It will also be observed that the relation between the volume of rail and river-borne traffic in paddy and rice shows some change. Whereas the paddy transported in 1911-12 to 1913-14, averaged 25 per cent of the total traffic in paddy and rice of that period, the proportion fell to about 17 per cent in 1918-19 to 1920-21, 15 per cent in 1933-34 to 1935-36 and less than 14 per cent in 1936-37 to 1938-39. This points to the growth of the local milling industry in several rice growing tracts in recent years.

Again, there have been significant changes in the inward and outward traffic of some of the major provinces and States. In

recent years Bengal, Madras and Calcutta have been the largest importing units in respect of paddy and between them in 1936-37 to 1938-39, accounted for about 83 per cent of the total volume of paddy consigned by rail and river, Bengal's share being 19 per cent and that of Madras and Calcutta 31 and 33 per cent respectively. In 1911-12 to 1913-14, Bengal's share was nearly 34 per cent while Calcutta handled 26 per cent and Madras only 13 per cent.

As regards rice, the chief importers in recent times are the United Provinces, Bombay, the combined trade block of Bihar and Orissa, Madras, the Madras ports, Calcutta and Bengal in that order of importance. Between 1936-37 and 1938-39, the United Provinces took on an average a little less than 237,000 tons of rice or about 15 per cent of the total quantity of rice moved by rail and river during that period. Bombay imported about 217,000 tons or 14 per cent. Bihar and Orissa's inward traffic amounted to some 193,000 tons or over 12 per cent, that of Madras and the Madras ports to 171,000 and 165,000 tons respectively, in both cases representing a proportion between 11 per cent, while Calcutta received 122,000 tons and Bengal 113,000 tons or the equivalent of roughly 8 per cent in each instance. These six trade blocks alone accounted for 78 per cent of the total rail and river-borne imports.

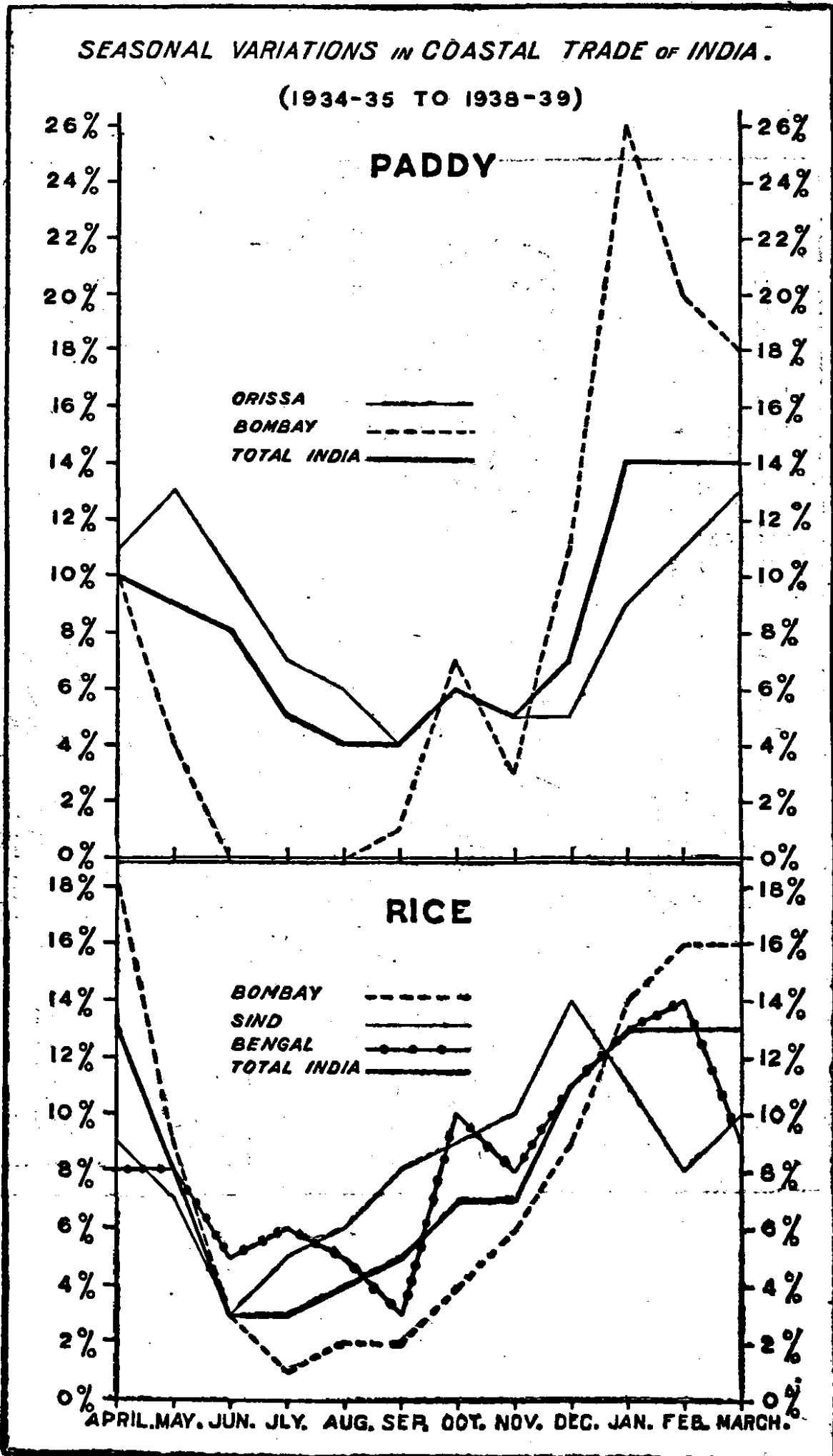
In 1911-12 to 1913-14, by contrast, Calcutta, the Madras ports, Bombay and the United Provinces were the main destinations of traffic in rice. During that period Calcutta alone absorbed on an average about 555,000 tons annually or 42 per cent of the 1,323,700 tons handled each year by rail and river. The Madras ports dealt with nearly 10 per cent or 131,000 tons. Bombay imported 114,000 tons or 9 per cent and the United Provinces rather less than 7 per cent. The considerable imports into Calcutta formerly were mainly due to the large rice export trade from that port which has now greatly diminished.

In regard to outward traffic the trade blocks from which paddy is mainly exported at present are Bengal, Bihar and Orissa, the Madras ports, Assam and the Central Provinces. Between 1936-37 and 1938-39, Bengal exported over 89,000 tons annually or 36 per cent of the 245,000 tons recorded for the period; Bihar and Orissa 44,000 tons or 18 per cent, the Madras ports 38,500 tons or 16 per cent, Assam close on 25,000 tons or 10 per cent and the Central Provinces some 22,000 tons or 9 per cent. Going back to 1911-12 to 1913-14, however, Bengal, Assam and Madras will be found to have taken the lion's share of rail and river-borne traffic. Of the 439,000 tons handled by rail and river annually during this period, Assam was responsible for over 135,000 tons and Bengal more than 115,000 tons while Madras ranked third with 77,000 tons. Thus these three areas alone were the source of origin of 75 per cent of the outward traffic in paddy.

In regard to rice, of the 1,561,000 tons annually transported between the various trade blocks by rail and river during 1936-37 to 1938-39, Bengal is again seen to be the largest exporting unit with over 297,000 tons followed fairly closely by Madras with nearly







242,000 tons while the Central Provinces is another important exporting area with a share of 183,000 tons. The proportions represented by these figures are roughly 19, 15 and 12 per cent respectively. Although the production of Sind cannot compare in point of size with that of the three provinces just mentioned there is a considerable export trade as shown by the fact that in the triennium under discussion Sind's outward traffic in rice amounted to not less than 155,000 tons ; this giving that province fourth place. Calcutta ranks a close fifth with an average of 154,000 tons, the Madras ports and Bombay port sixth and seventh with approximately 144,000 tons each and the trade block of Bihar and Orissa eighth with 119,000 tons.

In 1911-12 to 1913-14, the 1,775,000 tons of rice carried in that period derived mainly from Bengal with a total of over 533,000 tons or 30 per cent, from Calcutta with 381,000 tons or 21 per cent, from Bombay port with 311,000 tons or 18 per cent while Madras and the Madras ports despatched approximately 8 per cent and 10 per cent with 135,800 and 180,500 tons respectively.

The diagram facing page 365 will show at a glance how the distribution of rail and river-borne traffic in paddy and rice has altered between 1911-12 to 1913-14 and 1936-37 to 1938-39. Directional movements are indicated in the map facing page 370.

#### (5) BY SEA.

(a) *Coastal trade.*—The extent of coastal traffic in paddy and rice is fairly considerable especially in the fair season which lasts from about the end of September to the following May. A large proportion of this traffic is between one maritime province and another but a good deal of trade also goes on between ports in the same province or customs area, as, for example, between Bombay and the smaller ports of that presidency or between the various Madras ports or between Madras and Cochin. Coastal shipments are only recorded at the more important ports where custom offices are established, but paddy and rice carried between villages and small towns situated on the sea coast or up inlets or creeks by sea-going sailing vessels are not registered and can only be very roughly estimated.

Appendix LXXVI shows that on an average between 1934-35 and 1938-39, a total of 93,528 tons, comprising 32,140 tons of paddy and 61,388 tons of rice, were recorded as having been shipped annually from maritime provinces to coastal ports in India. The volume of inter-coastal trade, varies from year to year and has ranged from 17,436 tons in 1934-35 to 40,961 tons in 1936-37 in the case of paddy and from 53,226 tons in 1935-36 to 75,579 tons in 1938-39 in the case of rice.

Shipments of paddy are largest from the Orissa coast and in the five year period 1934-35 to 1938-39 accounted for 63 per cent of the total recorded volume of despatches from maritime provinces. Much of this trade consists of the *Kalambank* variety which is identical with *Patnai* of Bengal, largely from Chandbali, the port for Balasore, and is directed to Calcutta where the paddy is

bought by the local mills to supplement their purchases of the latter quality. Bombay's share amounts to 33 per cent that of Madras to 3 per cent while Bengal ships only 1 per cent.

As regards rice Bombay's coastal shipments rank first with 36 per cent, Sind handles 27 per cent, Bengal 23 per cent, Orissa 8 per cent and Madras 6 per cent. Bombay's importance in this respect is due to the large coastal trade in rice imported from Burma into Bombay port and transhipped there into small sea-going steamers and sailing craft which ply up and down the seaboard of that province.

The periodicity of India's coastal trade, as will be seen from Appendix LXXVI and the diagrams facing page 371, is quite marked. Shipments contract during the monsoon from June to September and expand in the fair season. The movement of supplies by the larger ocean-going steamers which operate along the coast is, however, unaffected by the weather, but the ports at which such vessels can call in the monsoon are few and the proportion of the purely coastal trade handled by them throughout the year relatively small.

In addition to the coastal trade of which records are available and which as mentioned has averaged 93,528 tons in recent years, it is roughly estimated that there is probably at least an equal amount of unrecorded traffic passing between points on the coasts of individual maritime provinces and States. All told, therefore, it may be reckoned that the extent of India's coastal trade in paddy and rice is of the order of 200,000 tons in an average year.

The steamship lines engaged in coastal trade in India normally operate under a Conference whereby rates are fixed in order to eliminate excessive competition. In normal times, rates are infrequently changed and carry a rebate, usually of 10 per cent, which is refunded to shippers who have exclusively patronised the Conference Lines over a specified period.

Rate cutting has, however, taken place on more than one occasion. A notable instance was in 1934, when the freight war over wheat resulted in rates from Karachi to Calcutta being reduced to the level of Rs. 1-8-0 per ton as compared with a normal average of about Rs. 5 per ton. Recently the merging of two old established Indian owned lines was largely the direct outcome of fierce competition for the Malabar and Konkan maritime trade on the west coast of India.

Before the out-break of War in September 1939, the rates of freight on rice from Calcutta to Madras, Bombay and Cochin were respectively Rs. 7, Rs. 8 and Rs. 12 per ton of 20 cwt., less 10 per cent. Rates for paddy for the same destinations were Re. 1 higher in each case. The rates subsequently were uniformly enhanced by 35 per cent over pre-war quotations. Vizagapatam to Madras now costs Rs. 6-8-0 per ton net, to Cochin Rs. 8 net and to Bombay Rs. 12-8-0 net.

Steamer freight from Bombay to coastal ports further south, e.g., Ratnagiri, Kumta and Karwar, is charged uniformly, the

present rate being Rs. 5-15-0 per ton of paddy or rice. This works out to about 40 per cent higher than the pre-War freight which was Rs. 4-4-0 per ton. The cost of shipping by country craft operating along this part of the coast varies according to the seasonal conditions. During September and October and also for a part of May, when squally weather prevails, the usual rate charged by country boats is Rs. 35 per 100 bags of paddy or rice from Bombay to Ratnagiri and Rs. 40 to Karwar or Kumta, the approximate equivalents per ton being Rs. 4-10-9 for rice and Rs. 5-3-9 for paddy to Ratnagiri, and Rs. 5-5-3 and Rs. 5-15-6 for rice and paddy respectively to Karwar or Kumta. In the fair season from November to April, the rates fall to about 42 or 43 per cent of those prevailing in May, September and October.

(b) *Foreign trade.*—Foreign trade in paddy and rice has been discussed in detail in Chapter I. On an average the ports in Bengal (mainly Calcutta) handle about 46 per cent of the export trade to destinations abroad, those of Madras 37 per cent, Sind (mainly Karachi) 12 per cent and Bombay 5 per cent. Ceylon is India's best customer and is followed by Mauritius, South Africa and various Arabian ports. Rice is also shipped to a number of other countries but the quantities involved are small. As regards import, India obtains the great bulk of her sea-borne supplies from Burma. Indeed in some years Burma is India's only source of supply by sea.

Foreign sea-borne trade is almost wholly carried by steamers although large sea-going dhows ply between the west coast of India and destinations in the Persian Gulf, on the Arabian sea-board and even as far afield as the African continent. From Karachi, for example, a not inconsiderable proportion of the rice exported from Sind, is shipped to the Persian Gulf and Arabia by sailing craft. As far as the rice trade is concerned, however, connection between India and other countries, excluding Ceylon, is chiefly established and maintained by vessels belonging to one or other of the Conference Lines. Frequent and regular services are maintained in normal times. Shipments of paddy and rice from Indo-China and Siam are, however, made by "tramp" steamers chartered specially for the purpose. Apart from this exception, chartering "outside" vessels for full cargoes, as is often done in the case of groundnuts or wheat, is not a frequent occurrence in the rice trade, such space is usually chartered in London on the Baltic Exchange.

As regards Ceylon, from 40 to 50 per cent of the exports from India (Madras chiefly) are normally consigned by rail under special arrangements between the South Indian and the Ceylon State Railways. The goods are transhipped at Dhanushkodi, the Indian terminus, and ferried across to Talaimannar Pier on the Ceylon side. Station to station rates for rice are quoted, Kotallam and Kumbakonam to Colombo (Fort) being Rs. 14-1-0 per ton. All consignments of rice on this route are subject to a minimum of 10 tons.

Examples of freight rates between certain Indian and overseas ports are given below:—

	Per ton of 20 cwt.
Madras to Colombo ..	Rs. 18-0-0.
Calcutta to Mauritius ..	Rs. 25-0-0 less Rs. 3 rebata.
Calcutta to Durban and Natal ports ..	Rs. 53-6-0 net.
Calcutta to United Kingdom ports ..	S. 90 less S. 5.
Bangkok to Madras ..	Rs. 20-0-0.

**BURMA.****Note on the handling and transportation of paddy and rice in Burma.**

From the threshing floors and from the godowns of village stock-holders, the paddy purchased is taken by cart either direct to local mills or to collection points on rail or river for transshipment to more distant centres.

In despatching it from the village, a mat is spread on the bottom of the cart and on this a narrower mat is placed on edge forming a large oblong container. Into this the paddy is poured loose, the load per cart in level areas being about half a ton (24-25 baskets), or, where steep banks have to be negotiated, about a third of a ton (15-16 baskets).

The cost of carting is from 3 annas to 4 annas per cart per mile, the cost per mile decreasing as the distance increases. Usually the carting is done by the seller, and for this he is paid either directly as cart hire or indirectly in the form of an enhanced price for his paddy.

At the collecting point the paddy is measured from the carts into the purchaser's basket and poured on to a heap in the open to await transport for the next stage of its journey. Large heaps of paddy awaiting transshipment (each heap amounting to several hundred baskets) are a familiar feature of the country side along all the water-ways and railway lines of Lower Burma during January, February and March. As in the case of paddy on the threshing floors little fear of spoilage by rain need be entertained until the mango showers come in April.

From these collecting centres the bulk of the paddy going to the big mills at the ports is carried by boat, the net work of water-ways throughout Lower Burma making this the cheapest and most satisfactory form of transport.

Thousands of country-boats, each capable of holding 500 baskets and upwards, are engaged in this work, and most of the big milling firms have fleets of sailing barges which are hired out to their brokers and agents for this purpose. Each barge holds from 2,000 to 2,500 baskets and the hiring charge is from Rs. 5 to Rs. 6 per day, days spent along-side the mill wharf not being charged. The steamers and barges of the Irrawaddy Flotilla Company also carry considerable quantities.

Rail transport for paddy is naturally not prominent in the low-lying areas of the Delta where the bulk of the crop is produced. It is, however, of importance in dealing with the crop adjacent to the higher lands, the Henzada-Bassein line being the most important. On the Prome-Rangoon and Pegu-Rangoon lines transport by rail is mainly in the rice form.

Railway freight rates on paddy in Lower Burma are 1.69 pies per 100 viss\* per mile for distances up to 125 miles, 0.40 pies per mile for distances between 126 and 350 miles, and 0.30 pies per mile

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\*Viss=3.60 lb.

for all subsequent distances. There are no standard rates for transport by river except in the case of paddy conveyed by the Irrawaddy Flotilla Company steamers. The bulk of the paddy transported by water is, however, carried by sailing barges, sampans and country-boats. Transactions with these are arranged by bargaining.

Paddy sent by rail is bagged for some sections of the line and carried loose on others, but when transported by boat is invariably carried loose. The saving effected in not bagging adds another transport advantage to those already possessed by water-ways over rail, and though naturally the saving will vary with the number of times the gunnies are used it must on an average amount to full Re. 1 on each 100 baskets, apart from the charges for bagging and handling.

Lower working costs, cut rates induced by competition, and greater convenience over much of the area all favour the use of water transport in preference to rail wherever the two are in competition. It is mainly in the mid-zone and in the Upper Burma areas where water is not readily accessible that the railway comes into prominence as a carrier of paddy.

There has been in recent years a good deal of controversy on the subject of the differences between the rail freight rates on paddy and those on rice, and again between the rates for rice consigned to ports such as Rangoon, Moulmein and Bassein and those consigned elsewhere. On paddy there is no discrimination between the traffic to ports and traffic to other places. The rates are shown below :—

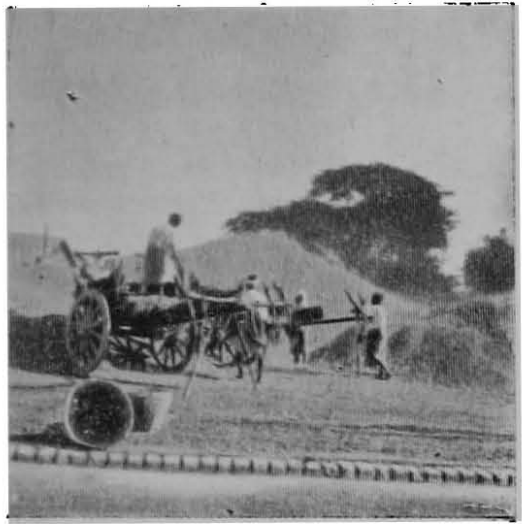
	Rates in pies per 100 viss per mile.				
	Miles 1 to 125.	Miles 126 to 150.	Miles 151 to 194.	Miles 195 to 350.	Miles 350 and over.
Paddy .. .. .	1-69	0-40	0-40	0-40	0-30
Rice consigned to Rangoon, Moulmein and Bassein.	2-25	1-02	0-49	0-49	0-37
Rice consigned elsewhere..	1-69	1-69	1-69	0-49	0-37

Up to 1922 the rates on paddy and rice were the same, but in that year the railways differentiated between them on the grounds that as the crop carried by them from within 150 miles of the ports was mainly destined for export and would have to make the journey anyway, the carrying of it by them in the less bulky form of rice, when they might be carrying it as paddy, was involving them in loss. The pitch of the rice rate was, therefore, changed to compensate them for the loss of freight resulting from conversion into the milled form. The encouragement which the common rate gave

[Facing page 376.]



**TRANSPORTING BULKED PADDY BY  
CART.**



**DISCHARGING PADDY FROM CARTS  
INTO LARGE HEAPS AT A POINT  
OF ASSEMBLY.**



**TRANSPORTING PADDY BY RAIL.  
Note the measuring baskets.**



**TRANSPORT BY WATER-WAYS.**



(within the 150 mile radius) to milling up country for export has thus been largely lost and the tendency to concentrate this milling for export in the neighbourhood of the ports correspondingly increased. The 150 mile radius, so far as Rangoon is concerned, would embrace areas up to about Prome and Toungoo. Beyond that point, except for the special Mu Valley and Shwebo crops, there is little rice grown for export.

With regard to ocean freights some dissatisfaction has been expressed in the virtual monopolies which control these rates. On account of its isolation from the main trade routes of the world, Rangoon is not a favourite port of call for tramp steamers. In order to prevent uneconomic competition, the shipping lines, as mentioned earlier in this chapter, combine in fixing the rates at which rice shall be carried from Rangoon to the ports in which they are interested. Even in the Far East trade the British, Dutch and Japanese steamship companies engaged are not so numerous as to rule out the possibility of their fixing rates by arrangement amongst themselves instead of leaving them to be fixed by competition.

In any sort of rate fixing the larger shippers and consignors are presumably the first to be consulted and due regard paid to their views. The rates fixed from time to time may even be mutually satisfactory to all parties but it is important that the Burma (and Indian) trade should not be called upon to bear an incidence of freight likely to place it at a disadvantage when competing with Indo-China and Siam where the freight market is a free one and the space offering sold in open competition. There are, in fact, indications that as a result of the higher level of freight ruling at Calcutta where Conference rates prevail in respect of all commodities, exports of linseed, to name one important export commodity, have in the past suffered somewhat in comparison with Bombay where foreign freights are not controlled by shipping companies in normal times. Current and pre-War rates of freight from Rangoon to destinations in India are given in the following table :—

	(Per ton of 20 cwt.)*	
	August 1939.	August 1940.
	Rs. A.	Rs. A.
Rangoon to Calcutta .. .. .	5 8	9 8
Rangoon to Madras .. .. .	9 8	17 0
Rangoon to Bombay .. .. .	10 0	17 0
Rangoon to Bhavnagar (Kathiawar) .. .. .	12 0	19 8
Rangoon to Cochin .. .. .	10 0	17 0

Freight from Rangoon to the United Kingdom was formerly Rs. 18-5-3 per ton and at present it is Rs. 50, i.e., more than two and a half times the pre-War rate.

\* Rates on paddy may be taken as Re. 1 over the rice rates quoted above.

## INTER-CHAPTER EIGHT.

When the paddy is taken from the threshing floor or the grower's home in the village to the market it is generally handled in bulk and rarely in bags.

In many tracts of Bengal, Assam, Bihar and Orissa, where communications are largely by water, paddy moved by boat from the threshing floor or the village to a nearby *hat*, market or mill is generally taken in bulk, but before unloading at the destination it is packed into bags.

The hand-pounded rice which largely originates in the villages may be conveyed to the assembling points in bulk as well as in bags.

From the market or the mill the subsequent movement of the produce by rail, road or water takes place generally in bags. Owing to a great multiplicity of trade descriptions and differences in quality on account of which individual consignments are usually relatively small the possibilities of bulk handling, especially of rice, are limited. Paddy, however, is usually carried in larger quantities and is transported in bulk to a small extent. Assam is the only part of India in which paddy is transported by rail in bulk. Country sailing crafts plying on coastal routes and internal water-ways also sometimes carry it in this manner. With these exceptions the traffic in rice and paddy is handled almost entirely in bags. The standard types of bags mostly used are the heavy C, DW (double warp) and the B twill. The B twill is a much used covering both in the internal and export trades, while the heavy C type is very popular in the internal trade. The small DW bag is much used for paddy. Rice is handled in a wide range of fillings varying from about 164 lb. to 226 lb. normally and in occasional instances a little more, while those of paddy may be 131 lb. to 144 lb.

The use of hooks by railway coolies is still common during loading and unloading. As a result, not only are the bags damaged—the damage increasing with the age of the container—but considerable loss may occur by leakage especially in the case of well-dressed polished fine small grained types.

The carriage of rice and its products, with the exception of parched rice, is governed on all the railways by schedule rates, which are quoted on a basis lower than the maximum of the class, and may be on a uniform basis or may be based on the telescopic (cumulative) principle.

It should be noted that when goods are carried over more than one railway, the rates are not calculated on the through distance between the station of origin and destination, but separately for the different railway lines involved. As a result, the traffic receives the benefit of the telescopic scale of rates only on the local distance of each railway line over which the goods move, and not on the total distance. Special rates (between specific points) are operating on various Indian railways in respect of paddy and rice or in some cases only one of them. There is perhaps scope for granting such concessional rates on a wider scale.

Over and above the normal expenses at the rail-head it is customary for certain payments to be made to the railway staff by the consignor and the consignee. Probably not less than Rs. 10 lakhs annually change hands in this way on account of the paddy and rice carried by the railways. The acceptance of such payments is, however, entirely unauthorised by the railway authorities and cases in which the staff are found to have accepted such payments are severely dealt with.

Covered accommodation at stations for goods awaiting despatch or delivery is generally provided on an adequate scale as the greater part of the rice growing tracts lie within zones of heavy rainfall. Facilities for

transit storage are, however, best at large terminals such as Howrah and Chitpore in Calcutta and the various railway and port authority godowns in Bombay.

The transportation of paddy and rice by road from one centre to another may take place by motor lorry, two-wheeled bullock cart, four-wheeled *thela* and camel cart. Often the points served by road are also connected by rail and although the freight per maund per mile charged by road is sometimes a little higher than that charged by the railway, the former is generally preferred as more economical for the reason that the goods are loaded direct from the consignor's premises and delivered at the consignee's door. This reduces expenditure on handling and eliminates the cost of cartage to and from the railway station. In addition, both the sender and the receiver of the goods are saved from the inconveniences and expenses which they undergo when consigning goods by rail. It should, however, be noted that motor lorries are generally employed for long distance haulage, while animal traction being slow, carts are not generally used over distances exceeding 30 miles—a full day's journey—excepting in Madras where bullock carts are known to travel as far as 80 miles with paddy.

The cost of transport by water, particularly by country boat, is on the average cheaper than that by road or rail, but the time taken is considerable. The boatmen have, however, been known to tamper with the produce, during transit and consignments are exposed to the risk of total loss or damage in bad weather. As far as could be ascertained no insurance of any kind is taken out against these or any other contingencies. Rates of freight by country boat are always open to negotiation, as is the case with lorry and cart transport, and on that account vary considerably. Only the organised transport agencies such as river steamer companies quote fixed rates.

It may be observed that the relation between the volume of rail and river-borne traffic in paddy and rice has undergone some change. Whereas during the immediate pre-War triennium paddy formed 25 per cent of the total traffic of rice and paddy, it fell to 14 per cent during the three years ending 1938-39. This points to the growth of the local milling industry in several rice growing tracts in recent years.

The amount of paddy and rice actually put on rail in an average year is estimated to be 3,500,000 tons. The probable total traffic by internal water-ways between different trade centres can hardly fall short of 1 million tons and may indeed be much greater, while the extent of coastal trade is of the order of 200,000 tons annually. This gives a total of 4.7 million tons and does not include road traffic of which figures are not available.

In Burma, from the threshing floors and from the godowns of the village stock-holders, the paddy is taken by cart either direct to local mills or to collection points on rail or river for transshipment to more distant centres.

Paddy sent by rail is bagged on some sections and carried loose on others. When transported by boat it is invariably carried loose. As handling in bulk is cheaper than in bags the use of water-transport is preferred to rail wherever the two are in competition. It is mainly in the mid-zone and in the Upper Burma areas where water is not readily accessible that the railway comes into prominence as a carrier of paddy. In the Delta area where the bulk of the crop is produced rail transport is naturally not prominent.

There are no standard rates for transport by river except in the case of paddy conveyed by the Irrawaddy Flotilla Company steamers. The bulk of the paddy transported by water is, however, carried by sailing barges, sampans and country boats. Transactions with these are arranged by bargaining.

581. As regards ocean freights it is worth mentioning that the shipping lines concerned combine in fixing the rates at which rice shall be carried from Rangoon to the ports in which they are interested, which virtually amounts to monopoly. It is important that Burma (and Indian) trade should not be called upon to bear an incidence of freight likely to place it at a disadvantage when competing with Indo-China and Siam where the freight market is a free one and the space offering is sold in competition.

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## CHAPTER IX.—WHOLESALE DISTRIBUTION.

### INDIA.

Of the total marketable surplus of rice amounting to nearly 11·50 million tons, it will be recalled, 89 per cent is estimated to enter the normal channels of wholesale trade, the remaining 11 per cent being distributed directly in the villages and periodical markets by growers and petty traders such as, village merchants, professional dehuskers, etc. Supplies reaching the wholesale assembling markets consist not only of paddy, the form in which the crop is harvested but also of hand-pounded rice. The former with the exception of relatively small quantities used for making parched products is converted into rice by power-driven rice mills. Of the total quantity milled it may be reckoned that about 0·48 million tons or about 4 per cent comprises rice milled on hire at milling centres by growers, village merchants, etc., to be marketed later. The remaining quantity of something a little less than 6 million tons is milled by wholesale merchants on hire and by rice mills on their own account. The relative shares handled by these two agencies vary considerably in different provinces and States and could not be determined with any degree of accuracy, but personal observations would seem to place the proportion of rice milled on hire by wholesale merchants throughout India at 40 or 45 per cent leaving 55 to 60 per cent as representing the rice milling industry's output on its own account. The areas in which the mills are the most important buyers of paddy and where milling on hire by traders is comparatively less are Bengal, Madras, Bombay, Sind and Mysore and Travancore.

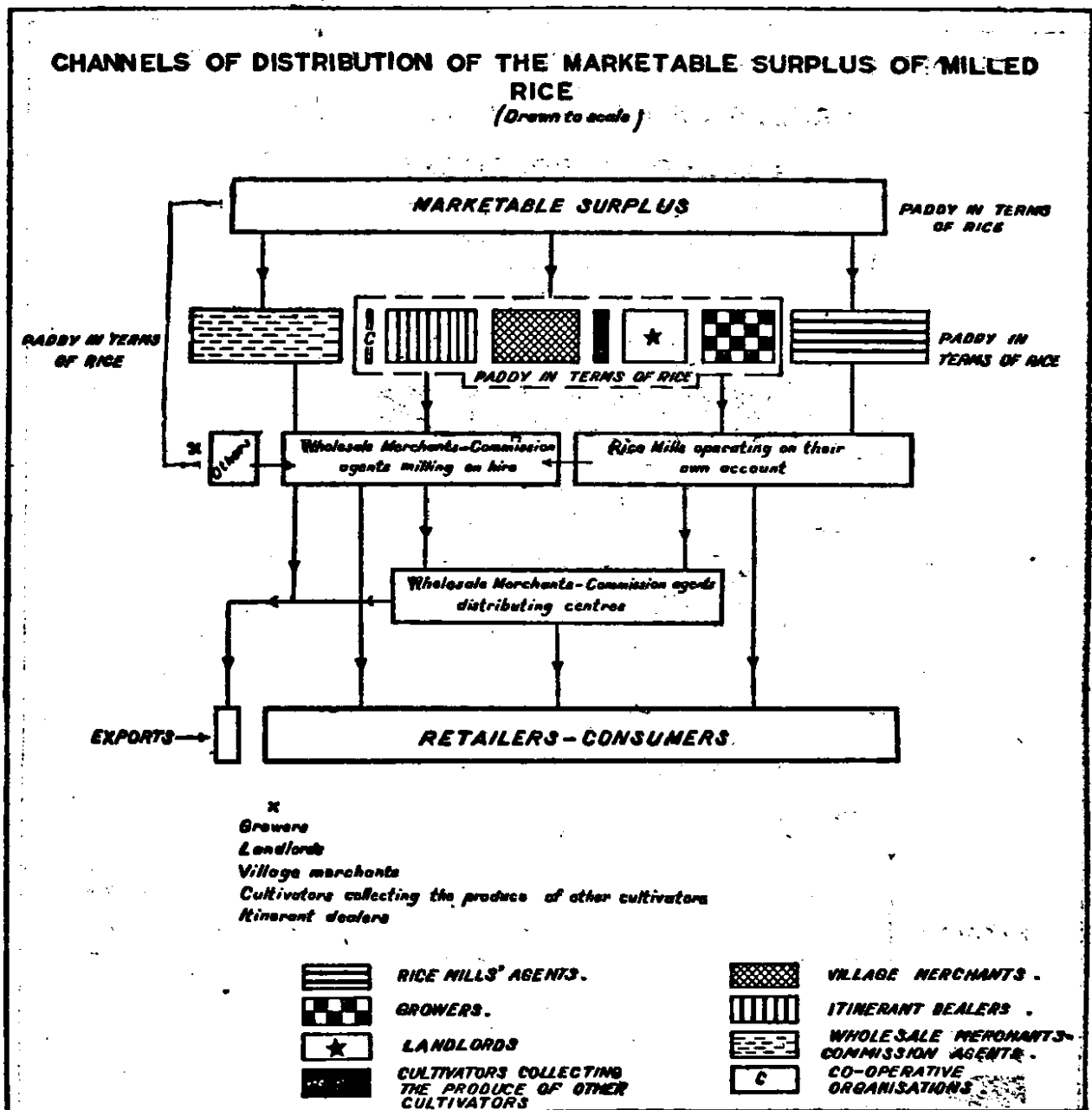
#### A.—Agencies and methods.

The diagrams on pages 384 and 385 show the channels through which the Indian marketable surplus of hand-pounded and machine-milled rices flows on its way from the producer to the ultimate consumer. A third diagram facing page 386 illustrates the course of distribution of the total available supplies in India including imports. These diagrams are drawn to scale and represent the approximate shares of the agencies concerned. A brief description of the part played by these agencies in the distributive process is as follows:

#### (1) CULTIVATORS, LANDLORDS, VILLAGE MERCHANTS, ITINERANT DEALERS AND PROFESSIONAL DEHUSKERS.

Practically, none of these agencies play a significant part in the distribution of rice and paddy. As pointed out earlier in this chapter, altogether about 11 per cent of the marketable surplus or approximately  $1\frac{1}{2}$  million tons is handled in this way, of which approximately two-fifths is retailed direct to consumers by the growers themselves and the remainder sold for the most part to retailers in villages and near-by towns, especially in the periodical markets. The transactions involved at any one time may range from produce worth a few annas to several rupees.

Instances of wholesale distribution by these agencies involving large quantities sent direct to consuming centres are rare. For





established and proven reputation, orders may be placed directly by buyers in distant markets without the prior examination of samples. Such transactions, however, constitute a very small proportion of the rice trade in India, the bulk of the business being conducted on commission sale or on sample. This is primarily due to the fact that quality in rice is a highly variable and specialised factor and until quite recently when the AGMARK scheme was applied to certain varieties, there has been nothing in the nature of defined standards for rice.

### (3) CO-OPERATIVE ORGANISATIONS.

The extent of participation in the marketing of the rice crop by co-operative organisations has already been referred to in Chapter V, where it was pointed out that in many cases the produce of individual sellers is sold separately on a commission basis. Thus it will be clear that the operations of several purchase and sale societies in India are primitive and do not generally extend beyond the assembling stage. A few societies, however, have attained some measure of success in wholesale distribution as well. For example, the Parbatipur Paddy Sale Society in Bengal, purchases the produce of its members at the time of harvest at the current market rate and sells it later to local wholesale merchants and mills as well as to more distant consuming centres in the province. The working of this Society has, on the whole, been financially successful since the produce has generally been disposed of at a profit of one to two annas per maund. If the proposal materialises to own and operate a rice mill, the Society should be able to mill, grade and then distribute the rice, with enhanced returns to the members. The Sittang Colonies Banking Union in Burma is an interesting example of this type of development and a brief account of its activities will be found in Appendix LXX.

The Provincial Co-operative Marketing Society, Madras, is concerned solely with the distribution of agricultural products. It is a central society registered in October 1936, with the crop and loan societies, referred to on pages 254 and 255, as well as co-operative consumers' societies and individuals constituting its membership. The chief function of the central body is to bring the loan and sale societies in different districts into contact with buyers and consumers particularly the co-operative consumers' societies at various centres. The central society sells goods on commission basis and at the end of each year the profits after deducting the reserve fund contribution are divided among the members. The Society handles a number of farm products including hand-pounded and machine-milled rice. The total quantity of rice marketed through it in 1937-38 was about 2,200 bags or roughly 5,000 maunds valued at Rs. 16,700.

Another co-operative marketing organisation which deserves mention is the Dehra Basmati Rice Producers Co-operative Marketing Society at Dehra Dun in the United Provinces. This Society was inaugurated in November, 1936, with the object of safeguarding the interests of producers and consumers of *Dehra Basmati* rice. The Society assembles the paddy of its members and gets it hulled on hire, under supervision, at a small mill situated a few yards away from the Society's headquarters at village Sheola. The rice is then graded

and marked under the AGMARK scheme and distributed by the Society to consumers direct or through its eleven agencies in various cities. In the year ending 30th June, 1940, the Society distributed 3,233 maunds of AGMARK *Basmati* rice worth Rs. 23,284. The activities of this organisation are steadily expanding.

#### (4) IMPORTERS AND EXPORTERS.

*Importers and exporters.*—These two sections of the trade must be regarded as resembling the wholesale merchant or commission agent class, which handles the distribution of Indian rices. Indeed many importing firms participate in the trade in the indigenous product while a number of concerns not only import rice but are also interested in the relatively smaller export trade particularly from Calcutta. It is interesting to observe that many of the largest import houses are owned and directed by Cutchi Muslims or by Hindus, from Kathiawar and Gujarat. On the Madras coast members of the Chettiar community which has a long tradition of business and financial relations with Burma are also a very important trading element. The reason for the predominance of these communities in the rice import trade and particularly those of the Muslims undoubtedly lies in their sea-faring habits. In the seventeenth, eighteenth and nineteenth centuries Muslims owned sailing crafts and were probably the chief carriers of produce between India, Burma, Siam, the East Indies and the Straits Settlements. Gujaratis and Cutchis from the maritime tracts of Kathiawar plied their vessels mainly in the Arabian Sea but many traded in the Bay of Bengal and adjacent waters. Thus the origin of some of the most reputed Indian firms handling imported rices goes back to remote times. European shippers who take such a large share of the export trade of agricultural products other than rice and who have close associations in the international market play practically no part in the trade in imported rice.

In many instances importers have their own branch offices in Burma. A few also maintain establishments at Saigon and Bangkok in Indo-China and Siam whence in occasional years appreciable quantities of rice and paddy are shipped to India.

#### B.—Finance of wholesale distribution.













The distribution of rice from the assembling to the terminal markets or centres of consumption is mainly financed by wholesale merchants or commission agents. The actual provision of funds is effected through *shroffs* or indigenous bankers and through the modern joint stock banks the activities of which have greatly expanded since the War of 1914-18.

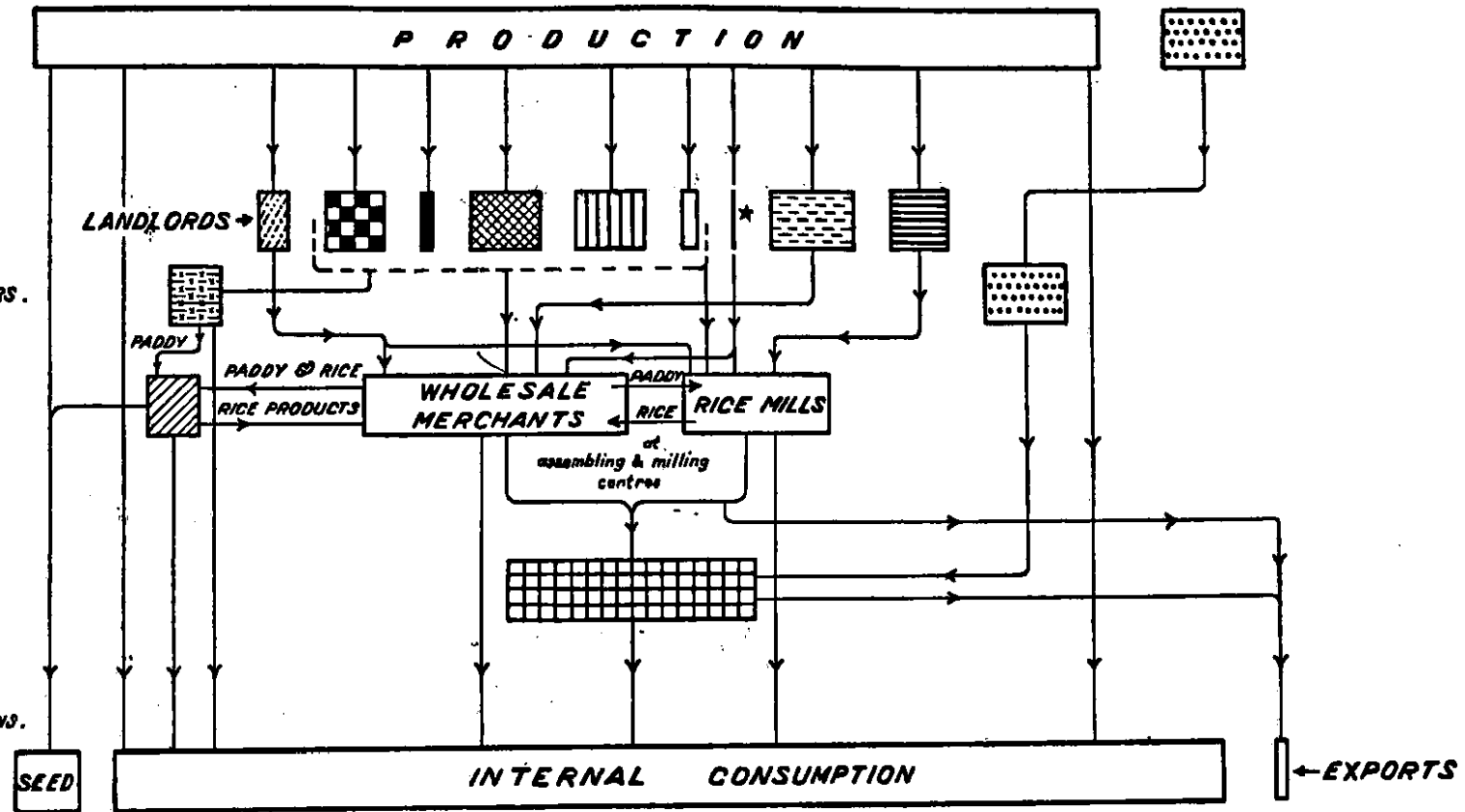
#### (1) WHOLESALE MERCHANTS AND COMMISSION AGENTS.

The main distributing agents are the wholesale merchants or commission agents who are often concerns of long standing and possessing substantial capital. Deposits are often received from the relations and acquaintances of the firm's proprietors or partners at rates of interest varying from 3 to 9 per cent. There is reason to believe, however, that large sums of money from widows and minors are held in trust without interest. Some big merchants who fre-

# CHANNELS OF DISTRIBUTION OF RICE IN INDIA .

(Drawn to scale)

-  **GROWERS .**
-  **CULTIVATORS COLLECTING THE PRODUCE OF OTHER CULTIVATORS .**
-  **VILLAGE MERCHANTS .**
-  **ITINERANT DEALERS .**
-  **PROFESSIONAL DEHUSKERS .**
-  **WHOLESALE MERCHANTS OR THEIR AGENTS .**
-  **RICE MILL'S AGENTS .**
-  **IMPORTS & IMPORTERS .**
-  **DIRECT DISTRIBUTION IN VILLAGES & PERIODICAL MARKETS .**
-  **GRAIN PARTNERS .**
-  **WHOLESALE MERCHANTS-COMMISSION AGENTS. DISTRIBUTING CENTRES .**
-  **CO-OPERATIVE ORGANISATIONS.**





A RETAILER'S SHOP IN CALCUTTA.

In addition to rice, other food grains and edible oils may also be handled.

quently operate as *shroffs* make advances, discount *hundis* or drafts with smaller merchants and town retailers. Where goods are consigned for commission sale, advances are given to the extent of 70 to 80 per cent of the value of the goods. The rate of interest charged on such advances depending entirely on the credit and business relations existing between the parties concerned. Short or long term loans may be taken from the banks or from *shroffs* depending on the money market.

## (2) SHROFFS.

The indigenous banking communities usually belong to the Vaish community, which for the most part have their places of origin in Marwar (Rajputana), Multan and Sind. The Chettiars of the South are also a powerful and influential factor in the internal trade of South India and Burma. Besides Muhammadan Cutchi Memons of the North and Lubbais and Rowthers of the South have considerable share in the distribution of rice. Many of the *shroff* firms engaged in the grain trade are firms of very long standing, some of them established as far back as the times of the Moghul emperor, Shah Jahan. The main activities of the *shroffs* are to discount *hundis*, demand drafts or bills and advance money on promissory notes. Loans are also granted against stocks.

(a) *Hundis*.—The *hundi* is for all practical purposes a draft or bill of exchange and the *hundi* system is peculiar to India. It is a negotiable instrument and the cheapest and the most convenient method of transferring money from one place to another and for obtaining credit. The *darshani hundi* and the *muddati hundi* whose functions have been explained in detail in the Reports on the Marketing of Wheat and Linseed are the equivalent of the sight and long-term drafts of modern banking. *Muddati hundis* are written on government stamped paper paying a duty of Re. 0-1-6 per cent for amounts up to Rs. 2,500 and Rs. 2-4-0 for every additional Rs. 2,500 or part thereof. These *hundis* are generally drawn for periods varying between 21 and 61 days. The *darshani hundi* is the demand draft of Indian banking, payable on presentation.

The rates charged by the joint stock banks to discount *hundis* vary ordinarily from one to one and a half per cent. The *shroffs*, however, have a highly elastic scale adjusted to the status of the drawer. In some cases it may be anything up to 4 per cent higher than the bank's rate. Discount is always payable in advance. In the discount business brokers play a very important role, the clients of highly reputable brokers being given preference by the best of the *shroffs*. Parties of whose stability there is some doubt are invariably charged a heavy brokerage amounting to as much as 5 per cent. It is noteworthy that the security offered against these *hundis* is mainly personal. Endorsements from persons or firms well known to the discounting house are some times insisted on as a kind of guarantee. The inability to honour a *hundi* is considered a very serious event virtually amounting to insolvency.

(b) *Promissory notes*.—A promissory note is sometimes considered a better means of obtaining funds as it is non-negotiable and in consequence entails very little publicity. In addition to the saving

in stamp duty, the rules regarding repayment are not very rigid. This method is frequently resorted to when large amounts are involved.

### (3) BANKS.

In addition to providing credit against pledged stocks, the banks buy and discount *hundis*, remit money by telegraphic transfer, and in general provide all the financial accommodation necessary for trade. The *shroff* and the modern banks work along similar general lines but the spread of modern banking facilities dates only from recent years and in this respect the *shroff* has the advantage of being longer established, in closer touch with his clients and better acquainted with their personal, domestic and business affairs. In consequence, the *shroff* is often prepared to undertake risks which a bank could not possibly entertain. Joint stock banks perhaps do not fully appreciate the relative safeties of advances made against paddy—as distinct from rice—compared with some other commodities. The *shroff*, therefore, remains the main factor in the financing of distribution.

### (4) CO-OPERATIVE SOCIETIES.

Recently several co-operative loan and sale societies and co-operative stores have been undertaking the wholesale purchase and the retail distribution of rice. The provincial and district co-operative urban banks, particularly in Madras, are, of late, beginning to have some share in financing the distribution of rice through what are known as multipurpose societies.

### (5) REMITTANCES.

By far the most important instrument of credit for the adjustment of trade accounts between different markets is the *darshani hundi* or sight draft. The consignee may purchase a *darshani hundi* payable at the consignor's market or the consignor may draw on the consignee and discount the *hundi* in his own market. The banks make advances only against such *hundis* as are accompanied by railway receipts. In other cases where the value of the goods is below Rs. 100 the railway receipts are forwarded direct to the buyer by V. P. P. (value payable post). The average commission on bank drafts may be reckoned to be about 2 annas ( $\frac{1}{8}$  per cent). But *hundis* drawn on well-known houses would cost rather less to discount or something in the neighbourhood of 1 anna ( $\frac{1}{16}$  per cent). The *hundi* system of remittance is, therefore, much cheaper than bank drafts. Though in practice only a small portion of the total value of the produce is required to be remitted from one centre to another owing to the balanced nature of trade, adequate provision of funds and quick and cheap transfers from centres of consumption to the supplying markets are factors of importance in the system of distribution of rice.

### C.—Cost of wholesale distribution.

When paddy and rice are directly distributed in the villages and periodical markets by growers, professional dehuskers and petty traders, distribution costs may be said to be negligible as market charges, where levied, are small and any handling and transportation that may be involved are performed by the sellers themselves.

As regards wholesale distribution by merchants and mills, this may be purely local in which case the only expenditure incurred is on account of handling and cartage to the buyers' premises *plus* market charges, if any, including commission and/or brokerage. On the other hand, if goods are consigned to distant consuming centres the distribution costs incurred fall under the following three main heads.

(a) Expenses at the forwarding centre up to the point where the goods are put on rail at the station, or *ghat* (if the journey is done by boat). The charges at this stage comprise handling (filling, bagging, etc.), cartage to station (or *ghat*), station (or *ghat*) expenses and commission, the latter being payable at this stage in the case of outright purchase.

(b) Railway freight or boat hire to destination.

(c) Expenses at destination including handling and cartage from station (or *ghat*) to the buyer's or consignee's godown, octroi or terminal tax where levied, and market charges including commission, charity, godown, rent, etc., which are payable in the case of consignments received for sale on commission.

When goods are consigned for sale on commission, all expenses at source including freight are borne by the seller, the incidental charges at the receiving end being defrayed in the first instance by the commission agent who deducts these together with his selling commission when making up the final account and remitting the net sale proceeds of the parcel in question. On the other hand, when the buyer at the consuming centre orders supplies, he is responsible for all incidental expenses at both ends. A few examples of the cost of wholesale distribution between some important producing and consuming centres, based on actual invoices, are as follows. These will illustrate the various items of charges which have formed the subject of discussion:

(a) Cost of distribution of rice consigned for sale on commission basis.

(i) Cost of ralling per bag (180 lb.) of rice (*Kolamba*) valued at Rs. 11-7-6 @ Rs. 5-3-9 per maund from Chinchini—Thana district in Bombay Presidency (5 miles from Wangaon railway station) to Surat.

	(Per bag).		
	Rs.	A.	P.
Value of gunny bag 4 annas less 2 annas recovered by sale of used gunny .. .. .	0	2	0
Handling and cartage to Wangaon station .. .. .	0	3	6
Railway freight from Wangaon to Surat .. .. .	0	6	3
Handling and cartage from Surat station to godown .. .. .	0	2	3
Town duty .. .. .	0	2	6
Selling commission @ 1½ per cent .. .. .	0	2	9
Discount @ 2 per cent .. .. .	0	3	0
Cost of remitting funds by cheque .. .. .	0	0	3
<b>Total</b> .. .. .	<b>1</b>	<b>6</b>	<b>6</b>

The cost of distribution per bag of rice from Chinchini to Surat is thus Rs. 1-6-6 or 0-10-4 per maund. This equals 12·3 per cent of the prime cost, of which railway freight is Re. 0-6-3. Excluding railway freight the cost works out to 8·9 per cent.

(ii) Expenses incurred on a consignment of 14 bags (35 maunds) of *Kangni* rice from Larkana (Sind) to Karachi, valued at Rs. 111-9-0 at source, the basic wholesale price being Rs. 3-3-0 per maund.

(Per 35 maunds).

	Rs.	A.	P.
Handling and cartage to station @ 1 anna per maund ..	2	3	0
Value of second-hand gunny bags @ 6 pies per maund ..	1	1	6
Railway freight to Karachi .. ..	18	9	6
Cartage from Karachi city station to buyer's godown ..	1	10	3
Municipal tax .. .. .	0	9	0
Interest .. .. .	0	4	0
Charity ( <i>dharmada</i> ) .. .. .	0	0	6
Trade association fee ( <i>panchayat</i> ) .. .. .	0	1	9
Selling commission .. .. .	0	10	0
Godown rent and miscellaneous expenses .. .. .	1	0	9
Discount .. .. .	1	3	0
Total .. .. .	27	5	3

The expenses from Larkana to Karachi godown work out at Re. 0-12-6 per maund or 24·5 per cent of the cost at source. Excluding railway freight the cost of distribution comes to 7·8 per cent.

(iii) Account relating to a parcel of 100 maunds (40 bags) of *Basmati* rice worth Rs. 550 (at Rs. 5-8-0 per maund) from Amritsar to Calcutta.

(Per 40 bags).

	Rs.	A.	P.
Value of new gunnies (double bagging)* less half the price of the used bags realised by sale at destination ..	10	0	0
Handling and cartage to station @ Re. 0-1-3 per bag ..	3	2	0
Railway freight to Howrah @ Rs. 1-1-9 per maund ..	110	15	0
Clearing agent's fee at Howrah station .. .. .	1	4	0
Cartage from railway station to buyer's godown @ 2 annas per bag .. .. .	5	0	0
Selling commission @ Rs. 1½ per cent .. .. .	10	8	0
Selling brokerage @ 12 annas per cent .. .. .	5	4	0
Godown rent and miscellaneous expenses .. .. .	3	2	0
<i>Muddat</i> (discount) @ 2 per cent .. .. .	12	0	0
Total .. .. .	161	3	0

Including railway freight, the cost of distribution from Amritsar to Calcutta works out at Rs. 1-9-9 per maund or 29·3 per cent of the value of rice at Amritsar, of which railway freight alone accounts for Rs. 1-1-9 or 20·2 per cent, the remaining 9·1 per cent being other expenses.

\*Costly rices such as *Basmati* are often consigned packed in double bags to prevent wastage *en route*.



(iv) Cost of distribution per maund of *Dudhkalma* rice consigned by a rice mill at Bolpur (Bengal) through a local commission agent to Delhi for commission sale there, the basic price *ex-mill* being Rs. 3-10-0 per maund.

		(Per maund).		
		Rs.	A.	P.
Value of gunny bag (single bagging) less realisation from the sale of used bags .. ..	..	0	0	6
Filling and sewing .. ..	..	0	0	3
Cartage to station .. ..	..	0	0	9
Station expenses .. ..	..	0	0	3
Bolpur commission agent's fee .. ..	..	0	0	6
Railway freight to Delhi .. ..	..	0	10	9
Terminal tax at Delhi .. ..	..	0	0	6
Handling and cartage to godown at Delhi .. ..	..	0	0	6
Seller's commission at Delhi .. ..	..	0	1	6
Total .. ..	..	0	15	6

The cost of distribution in this case inclusive and exclusive of railway freight is Re. 0-15-6 and 0-4-9, or 26·7 and 8·2 per cent of the cost at source.

(b) Some examples illustrating the cost of wholesale distribution of rice purchased by wholesale merchants at consuming centres from or through commission agents at producing centres are quoted below. In each case the actual invoice values have been given as recorded in the trade documents concerned.

(i) Expenses on 31 bags (82 maunds) of *Hansa* rice ordered by a wholesale merchant at Harda (Central Provinces) from a wholesale merchant/commission agent at Raipur (Central Provinces) costing Rs. 274-3-6 net.

		(Per 31 bags).		
		Rs.	A.	P.
Charges at origin (Raipur)—				
Value of gunny bags .. ..	..	7	12	0
<i>Arahat</i> (commission) @ Re. 1 per cent .. ..	..	2	12	0
<i>Dharmada</i> (charity) @ 1 anna per cent .. ..	..	0	2	9
Postage ( <i>chiti</i> ) .. ..	..	0	4	0
Handling and cartage to Raipur railway station @ 8 annas per bag inclusive of terminal tax .. ..	..	5	13	0
Miscellaneous ( <i>gowshala</i> ) or cattle home .. ..	..	0	2	9
Total expenses at origin .. ..	..	16	14	6
Discount on <i>hundi</i> @ Re. 0-4-6 .. ..				
		0	14	0
Expenses at destination (Harda)—				
Railway freight .. ..	..	67	0	0
Terminal tax 6 pies per maund .. ..	..	2	9	0
Cartage from station to godown .. ..	..	1	15	0
Total expenses at destination .. ..	..	89	4	6
Less value of used gunny .. ..	..	3	14	0
Net total .. ..	..	85	6	6

The total expense on the consignment from Raipur to Harda, therefore, will be Rs. 1-0-8 per maund or 31·1 per cent of the prime

cost. If railway freight be excluded, the cost would work out to 6·7 per cent.

(ii) Expenses incurred per bag 246 lb. of *Kusuma* rice railed from Bezwada (Madras) to Gadag (Bombay). The value of the produce being Rs. 10-8-0 net at Bezwada.

	Per bag of 246 lb.		
	Rs.	A.	P.
Charges at origin (Bezwada)—			
Value of gunny bags .. .. .	0	4	0
<i>Arhat</i> (commission) .. .. .	0	2	0
<i>Dharmada</i> .. .. .	0	0	0
Postage .. .. .	0	0	0
Handling and sewing ( <i>hamali</i> and <i>silai</i> ) of bags ..	0	1	0
Cartage .. .. .	0	1	0
Miscellaneous (station charges including <i>hundekarai</i> , forwarding agent or station broker) .. .. .	0	0	6
<b>Total expenses of origin .. .. .</b>	<b>0</b>	<b>8</b>	<b>6</b>
Expenses at destination (Gadag)—			
Railway freight .. .. .	2	7	0
Terminal tax .. .. .	0	1	6
Cartage from station to godown .. .. .	0	1	6
Station expenses .. .. .	0	0	6
<b>Total expenses at destination .. .. .</b>	<b>2</b>	<b>10</b>	<b>6</b>
<i>Less</i> value of used gunny .. .. .	0	2	0
<b>Net total expense .. .. .</b>	<b>3</b>	<b>1</b>	<b>0</b>

or Rs. 1-0-5 per maund.

The expenses from Bezwada to Gadag including railway freight come to 29·2 per cent of the Bezwada price. If railway freight be excluded, they work out at 6 per cent.

(iii) Cost of wholesale distribution of 51 bags (127½ maunds) of *Basmati* rice despatched from Amritsar (Punjab) to Hyderabad (Deccan), the value of the goods at origin being Rs. 826-10-0.

(Per 51 bags).

	Rs. A. P.		
Charges at origin (Amritsar)—			
Cost of 102 bags (double bagging) less realisation from sale of used bags .. .. .	14	12	6
<i>Arhat</i> (commission) .. .. .	6	5	0
<i>Dharmada</i> (charity) .. .. .	0	8	6
Postage .. .. .	0	0	0
Labour (filling and sewing) including cost of twine ..	1	13	6
Cartage to station .. .. .	3	3	0
Miscellaneous charges at Railway station .. .. .	1	9	6
<b>Total expense at origin .. .. .</b>	<b>29</b>	<b>4</b>	<b>0</b>
Expenses at destination (Hyderabad)—			
Railway freight @ Rs. 1-13-6 per maund .. .. .	235	1	3
Terminal tax, etc., @ Rs. 1-4-0 per <i>palla</i> of 3 maunds	45	8	7
Cartage from station to the local market or <i>gunj</i> ..	4	5	11
Postage, etc. .. .. .	0	4	0
<b>Total expenses at destination .. .. .</b>	<b>285</b>	<b>3</b>	<b>9</b>
<b>Net total expenses .. .. .</b>	<b>313</b>	<b>7</b>	<b>9</b>

or Rs. 2-7-4 per maund.

As the distance involved in this case is very long and railway freight high, the cost of distribution in relation to the prime cost works out to 37.9 per cent without railway freight it is only 9.5 per cent.

#### D.—Trade associations.

Although organised trading in cereals and other kinds of agricultural produce has been in existence for many years, especially in the port terminals of Calcutta, Bombay and Karachi, comparatively few associations are interested in the rice and only one in the conduct of "futures" transactions of a kind in this commodity. This association, it would be recalled, is the Bombay Rice Merchants' Association under the auspices of which a modified type of "futures" business is carried on solely in imported Burma rice of the *Small Mills Special Quality* of certain specified mills.

The majority of the rice trade associations are small bodies of purely local influence and the only ones of any size and importance are the Calcutta Rice Merchants' Association, the Calcutta Grain, Rice and Oilseeds Association and the Bombay Rice Merchants' Association, bodies registered under Section 26 of the Indian Companies Act which applies to concerns operating on a non-profit sharing basis. Some of the main objects for which the above associations have been established are, to quote the Memorandum of Association of the Calcutta Rice Merchants' Association as a typical example :

- (a) to promote and protect the trade, commerce and manufacture relating to rice and other commodities in India—to promote and foster ideas of co-operation and mutual help among all persons engaged in the trade of rice—and to adjust controversies between members of the Association,
- (b) to collect and circulate statistics and other information,
- (c) to promote or oppose legislature and other measures relating to trade, commerce or manufacture,
- (d) to arbitrate in the settlement of disputes between parties willing or agreeing to abide by the judgment and decision of the Association.
- (e) to establish just and equitable principle in trade,
- (f) to maintain uniformity in rates, regulations and trade usages,
- (g) to provide rooms and other facilities for holding and conducting sales of property, brokerage or commercial transactions,
- (h) to construct upon any premises required for the purpose of the Association any building, or buildings, to alter; add to or remove any building upon such premises,
- (i) to borrow or raise moneys required for the purposes of the Association,
- (j) to subscribe towards religious or charitable or other public purposes.

The Memorandum of the Association also lays down that "The income and property of the association, whencesoever derived, shall be applied solely towards the promotion of the association..... and no portions thereof shall be paid or transferred directly or indirectly, by way of dividend or bonus or otherwise howsoever by way of profit to the persons who at any time are, or have been, members of the association.....".

The management of the affairs of a typical association of this kind is vested in a committee, the strength of which may be anything from four to twelve exclusive of a president, vice-president, secretary or treasurer. The managing committees are elected each year at the annual general meeting.

In addition to the two Calcutta associations referred to there are four other smaller institutions in that city. These are (a) The Ramkistopur Rice Merchants' Association, (b) The Rice Merchants' Association, Taltalla, (c) The Chetla Paddy Merchants' Association and (d) The Paddy Merchants' Association, Daspara.

The Bombay Rice Merchants' Association is composed of two classes of members which may for convenience be termed shipper members and buyer members. The former number 60 and have to pay an entrance fee of Rs. 100 and an annual subscription of Rs. 20. The latter number 233 and pay an entrance fee of Rs. 20 and a yearly subscription of Rs. 10. There are also 70 brokers who are associate members and whose entrance fee is Rs. 20 with annual subscriptions of Rs. 20 or Rs. 10 for companies or individuals respectively. The buyer members are firms who do not import rice directly and who have no branches in Burma. Many of the shipper members, on the other hand, have their own firms in Rangoon and some are also established at Bassein, Moulmein or Akyab. The Association has an office and large committee room at Carnac Bunder in the Port Trust area close to the docks.

The Bombay Rice Merchants' Association is not directly concerned with the recording or registration of transactions between members and it does not derive its revenue from a commission charged on each contract as is the procedure in profit sharing futures trading associations. A small fee only is charged on delivery orders and the adjustment of accounts or differences arising out of the settlement or liquidation of outstanding contracts is the responsibility of the parties to the contracts. It is not possible, therefore, to state with any degree of accuracy the extent of forward business done by members of the Association but a rough estimate given by the officials of this institution places the volume of trading at between 250,000 and 300,000 tons in an average year. Of this quantity, roughly 20 to 25 per cent is liquidated by actual delivery. This would involve some 50,000 to 60,000 tons. It may be of interest to mention that of the 400,000 and odd tons of Burma rice annually imported into Bombay about 90,000 tons consist of the *Nani Mills* or *Small Mills Quality*, mostly of the special marks tenderable against the association's contract. Thus approximately 60 per cent of these qualities are delivered against the contract. As far as could be ascertained disputes in regard to quality are rare and are almost always settled amicably.

Apart from the registered associations at Calcutta and Bombay there are a few places at which the rice trade has any organised institution to watch over its interests. In Sind, for example, there are at Larkana and Jacobabad *panchayats* of the local milling industry, merchants and brokers formed for the purpose of settling disputes. At Karachi, the Import Grain Merchants' Association looks after the interest of importers and the Buyers and Shippers Chamber that of exporters. At Madras, there is a Grain Merchants' Association for safeguarding the general interests of the members. In the Punjab, United Provinces and Central Provinces there appears to be no trade associations concerned with rice.

In addition to purely trade associations there are also a few associations of rice mills. The objects for which these bodies have been established are much the same as those of the trade associations but their more immediate problems concern such matter as factory legislation, the adequate supply of paddy, railway freight rates, etc. Some of the better known rice mills associations are :—

(a) The Rice Mill Owners' Association, Tollygunge, Calcutta, (b) The Marwari Rice Mills Association, Tollygunge, Calcutta, (c) The Northern Rice Mills Association, Shambazar, Calcutta, (d) The Hili Rice Mills Association, Hili (Dinajpur district, Bengal), (e) The Barrackpore Rice Mills Association, Barrackpore, Calcutta, and (f) The Tanjore-South Arcot Mill Owners' Association (Madras).

It would be observed that more than one association frequently operates in the same market. This seems to be unnecessary from many points of view and is an index of the lack of cohesion which is unfortunately so characteristic of many trade interests in this country.

### E.—Retail distribution.

#### (1) AGENCIES AND METHODS.

In the rural areas the village *bania* is the most important factor in the retail distribution of rice as also of other articles of daily consumption. In the rice producing areas his source of supply is mainly the cultivator who may dispose of his produce for cash or part with it in settlement of previous loans. The barter system is also not uncommon and paddy or rice may be exchanged for groceries.

The cultivators themselves also play some part in retail distribution. Besides selling in the village to individual consumers they attend periodical markets held at village centres or nearby towns and retail small quantities. This is very common in Bengal. Professional de-huskers in the United Provinces, Bihar, Orissa, Bengal and Assam also participate in the retail trade in much the same way as the growers.

In urban centres, the retail distribution of rice is carried on by a class of retailers who deal in several other articles of food such as flour, pulses, sugar, oil, spices, etc. A typical retailer's shop of this kind may be seen in plate facing page 387. Transactions are generally on terms of cash although credit may be allowed to some clients especially those who are known to have a regular monthly income such as persons of the professional classes.

*Consumer's co-operative stores.*—In a vast country like India the total number of consumers' co-operative societies in 1937-38 was only about 600 with a total annual sale of Rs. 82 lakhs. Some of these are operating successfully while other exist only in name. For example, in Bengal, out of 43 societies on record only 3 or 4 have been working.

The most successful institution of this kind in India is probably the Triplicane Urban Co-operative Society having over 30 branches in Madras. The Society handles fair quantities of rice as during the triennium ending 1939-40 the average annual turnover was over 19,000 bags valued at nearly 1½ lakh rupees representing about 32 per cent of the total sales of the Society. The total quantity of rice distributed by all the consumers' societies taken together is, however, negligible.

Any discussion on the advantages of consumers' co-operative societies in relation to agricultural marketing is probably unnecessary at this juncture, but it may perhaps not be out of place to indicate that co-operative stores could be made to play an important part in the distribution of products graded and marked under the provision of the Agricultural Produce (Grading and Marking) Act whose popularity with the consumer is now beyond question. The attainment of this object and its development is particularly to be desired in centres in which the trade shows opposition to graded produce or the AGMARK scheme. For example, in Bombay, the Gavti Rice Merchants' Association which is concerned with the trade in local rices has consistently discouraged its members from handling graded AGMARK *Zinia* (*Kolumba*) rice in bags carrying the AGMARK label and seals. The Consumers' Co-operative Society might, however, be expected to take an interest in the genuine product.

## (2) RETAIL MARGINS.

The difference between the price paid by the retailer when acquiring his stock-in-trade and that realised from his customer constitutes the retail margin. This includes the various items of expenditure incurred in transporting the goods to the shop from his source of supply and handling and manipulating the produce in preparing it for sale, rent rates and taxes and profits. These items (excluding profit) may, in the aggregate, amount to something between 6 pies and about 2 annas per maund, possibly even more in exceptional cases.

A somewhat remarkable fact about retail margin in the rice trade (the retailing of paddy is so small as to be negligible) is their extreme variability. This is in keeping with the price of this food grain which it may be remembered has an unique range of something like 700 per cent. Broadly speaking, it was found that costly rices carried relatively large margins while the cheap rices which have a rapid turnover were sold on a highly competitive basis with smaller margins and in some cases apparently at a loss. This seeming anomaly is readily explained by the fact that the confusing multiplicity of nomenclature and the outward similarity of a large number of varieties lend themselves to mixing or adulteration in the retail

trade for the most part. This is quite openly practised, the reasons given being that the rice was being "blended" to suit local taste. It is for this reason that a variety of rice alleged to belong to a certain trade description may actually be retailed at a price lower than that quoted in the wholesale market for the same description.

Another explanation for the wide variability of retail margins lies in the process of bargaining which accompanies almost every transaction. Retail prices are never marked on the articles offered for sale and the first price asked by a retailer is generally put forward more as a basis for argument than as a serious quotation. It is also common experience that the appearance and status of the prospective buyer is an important factor in determining the price to be asked. In other words the quotation is based on what the customer is estimated to be able to pay. In these circumstances it is only possible to refer to retail margins in the most general terms. A few examples selected at random are discussed below.

In Bengal, observations taken over a year (1936-37) showed that in respect of the non-descript *Mota* variety, retail margins at Calcutta (Bhawanipur market) ranged from 7 to 14 per cent, the equivalent values being Re. 0-4-3 and 7 annas per maund on a basic wholesale price of Rs. 3-11-9 and Rs. 3-2-0 respectively. In regard to the fine *Banktuli* variety sold in the same market, the retail margins over the period July 1936 to January 1937, varied between the limits of 5 and 11 per cent or Re. 0-4-3 and Re. 0-8-6 per maund on wholesale values of Rs. 4-15-9 and Rs. 4-11-6 per maund, respectively. In the case of the fine *Chamarmoni*, retail margins ranged from 6 to 12 per cent of the wholesale quotation or the equivalent of 5 annas and 9 annas per maund. At Muzaffarpore in Bihar, the bold non-descript variety *Mota* showed a retail margin of 9 per cent or Re. 0-4-9 per maund on a wholesale price of Rs. 3-4-3 while the *Small Mills Special* imported from Burma through a Calcutta commission agent was found to be retailed at 7 annas per maund or 11 per cent over the wholesale price. At Cuttack, a retail margin of as much as 17 per cent is apparently not uncommon. Two instances showed that the *Ballam* variety sold at Re. 0-15-3 and Re. 0-9-3 per maund dearer than the wholesale price.

In Bombay, market quotations of wholesale and retail prices obtained on different dates show that while in the case of ordinary varieties the retail margin varies from 4 to 5 annas per maund which works out to 8 to 10 per cent of the wholesale price, the margin in the case of quality rices ranges from 2 annas to anything upto one rupee per maund or approximately 2 to 10 per cent of the retailers' purchase price.

Average wholesale and retail prices for the popular *Nellore Sambha* in Madras city showed over a period of eighteen months that retail margins ranged from 1-2 to 3-3 per cent, the value represented by these proportions being 1 and 3 annas per maund respectively. Margins in respect of the *Fine Delhibhogam* were high and a comparison of two months' wholesale and retail prices showed 20 and 24-6 per cent difference. In Coconada, observations over a year revealed retail margins to range from 12-5 to 26-4 per cent in the

case of a bold type and from 4·8 to 22·2 per cent for a fine variety. At Coimbatore on the other hand, margins in this large consuming centre were found to be on the low side and averaged from 1·4 to 3·4 per cent or the equivalent of 1 to 2 annas per maund for a nondescript bold variety and from nil to 6 per cent for fine rices. In Sind, a retail margin of Re. 0-5-3 per maund or 10·9 per cent of the wholesale price was noticed in the *Kangni* variety, the corresponding figures for *Sugdasi* in the same period being 8 annas per maund and 11·1 per cent. At Karachi contemporary quotations showed retail margins of 7 and 12 annas per maund or 14·3 and 14·6 per cent for the *Kangni* and *Sugdasi* varieties respectively.

The table below gives the wholesale and retail prices of twenty-two varieties or qualities of rice quoted on one day at the large consuming and distributing market of Hapur in the United Provinces.

*Wholesale and retail prices of rice at Hapur.*

	Wholesale price per maund.	Retail price per maund.	Retail margin.	
			Actual.	Expressed as a percentage of the wholesale price.
	Rs. A. P.	Rs. A. P.	Rs. A. P.	
<b>Punjab Basmati—</b>				
1st Grade .. .. .	7 8 0	8 0 0	0 8 0	6·7
2nd Grade .. .. .	7 4 0	7 10 0	0 6 0	5·2
Ordinary .. .. .	6 4 0	6 10 8	0 6 8	6·7
Parmal .. .. .	5 8 0	5 14 0	0 6 0	6·8
Burdwan Sela .. .. .	4 14 0	5 5 4	0 7 4	9·4
<b>Chhanna—</b>				
No. 1 .. .. .	4 8 0	5 0 0	0 8 0	11·1
No. 2 .. .. .	4 4 0	4 11 3	0 7 3	10·7
No. 3 .. .. .	4 2 0	4 7 0	0 5 0	7·6
No. 4 .. .. .	3 14 0	4 3 0	0 5 0	8·1
Begami .. .. .	5 8 0	6 0 0	0 8 0	9·1
Dehra Dun Basmati .. .. .	8 8 0	10 0 0	1 8 0	17·6
Saharanpur Sela (Basmati) .. .. .	7 0 0	7 10 0	0 10 0	8·9
Saharanpur Arwa (Basmati) .. .. .	7 8 0	8 8 0	1 0 0	13·3
Raimunia Sela .. .. .	5 4 0	5 11 6	0 7 6	8·9
Ramjwain Sela .. .. .	4 12 0	5 0 0	0 4 0	5·3



*Wholesale and retail prices of rice at Hapur—contd.*

	Wholesale price per maund.	Retail price per maund.	Retail margin.	
			Actual.	Expressed as a percentage of the wholesale price.
	Rs. A. P.	Rs. A. P.	Rs. A. P.	
Ramjwain Arwa .. .. .	5 8 0	6 0 0	0 8 0	9.1
Sugandhi (Burma) .. .. .	3 15 0	4 8 0	0 9 0	14.3
Rangoon .. .. .	3 12 0	4 4 0	0 8 0	13.3
Hansraj Tands .. .. .	7 4 0	7 10 0	0 6 0	5.2
Cooki (Bengal) .. .. .	3 13 0	4 0 0	0 3 0	4.9
Sindh Shikarpur Sela .. .. .	3 11 0	4 0 0	0 5 0	8.5
Sindh Shikarpur Arwa .. .. .	4 3 0	4 8 0	0 5 0	7.5

The range of retail price margins will be seen to fall within 4.9 and 17.6 per cent the former occurring in the inferior *Cooki* variety imported from Bengal and the latter in respect of the costly *Dehra Dun Basmati*. The data quoted also confirm, if only in a general way, that the dearer rices are retailed with higher margins than the cheaper.

The following table gives a typical range of retail margins at the important centres of Raipur and Drug in the Central Provinces:

*Difference between the wholesale and retail price of rice at Raipur and Drug.*

	Wholesale price per maund.	Retail price per maund.	Retail margin.	
			Actual.	Expressed as a percentage of the wholesale price.
	Rs. A. P.	Rs. A. P.	Rs. A. P.	
<i>Raipur—Gurmatia:</i>				
January 1935 .. .. .	2 5 0	2 10 0	0 5 0	13.5
March 1935 .. .. .	2 3 0	2 6 0	0 3 0	8.6
May 1935 .. .. .	2 5 0	2 11 0	0 6 0	16.2
July 1935 .. .. .	2 5 0	2 14 0	0 9 0	24.3
September 1935 .. .. .	2 8 0	2 14 0	0 6 0	15.0
November 1935 .. .. .	2 13 0	3 0 0	0 3 0	6.7
December 1935 .. .. .	2 11 0	3 0 0	0 5 0	11.6

*Difference between the wholesale and retail price of rice at Raipur and  
Drug—contd.*

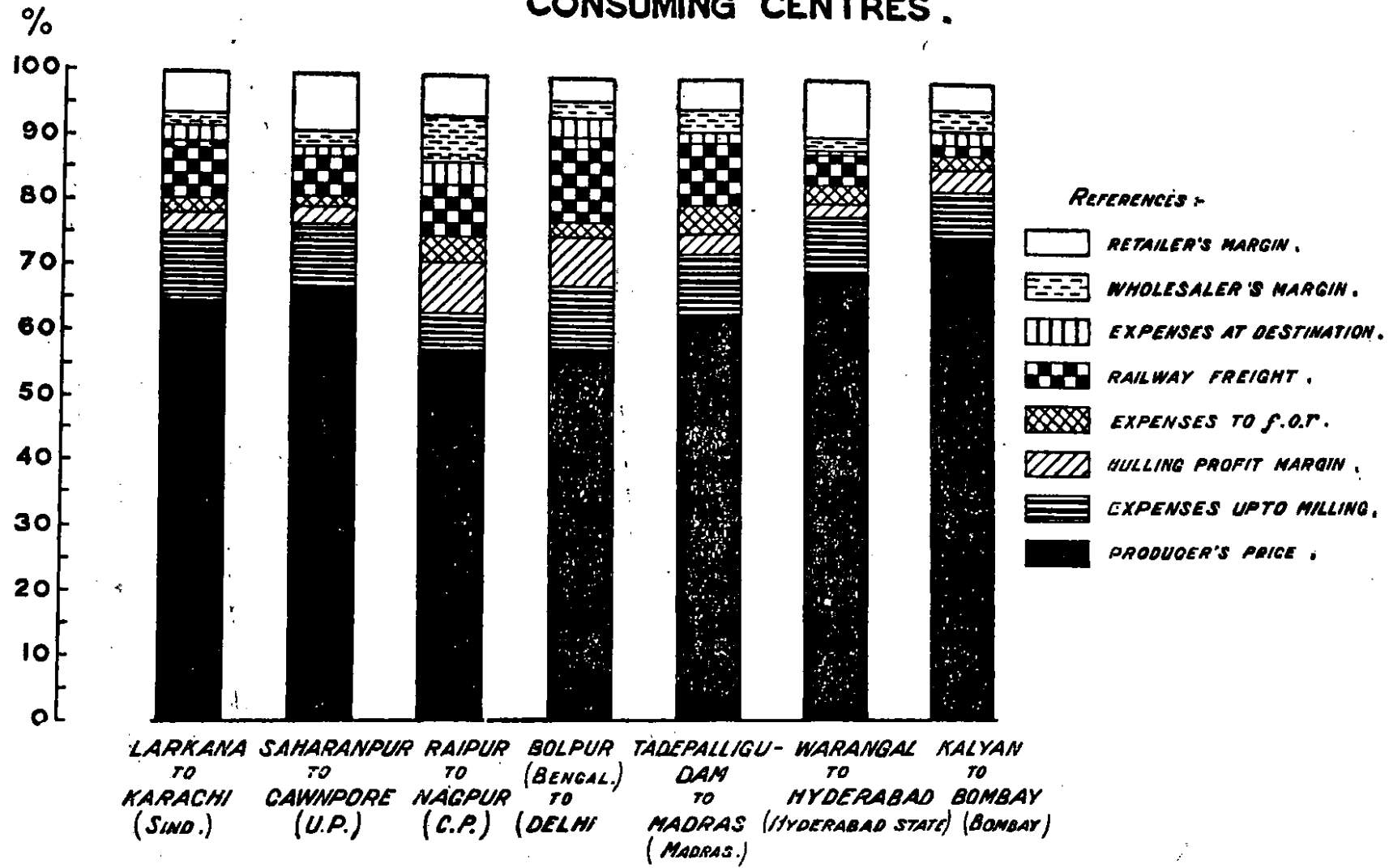
	Wholesale price per maund.	Retail price per maund.	Retail margin.	
			Actual.	Expressed as a percentage of the wholesale price.
<i>Drug—Gurmatia :</i>	Rs. A. P.	Rs. A. P.	Rs. A. P.	
January 1935 .. .. .	2 7 0	2 9 0	0 2 0	5.1
March 1935 .. .. .	2 11 0	3 2 0	0 7 0	16.3
May 1935 .. .. .	2 11 0	3 2 0	0 7 0	16.3
July 1935 .. .. .	2 15 0	3 2 0	0 3 0	6.4
September 1935 .. .. .	2 12 0	3 0 0	0 4 0	9.1
November 1935 .. .. .	2 12 0	3 0 0	0 4 0	9.1
December 1935 .. .. .	2 15 0	3 2 0	0 3 0	6.4

The following table in respect of quotations in Hyderabad city (Deccan) shows the variability of retail margins from one year to another.

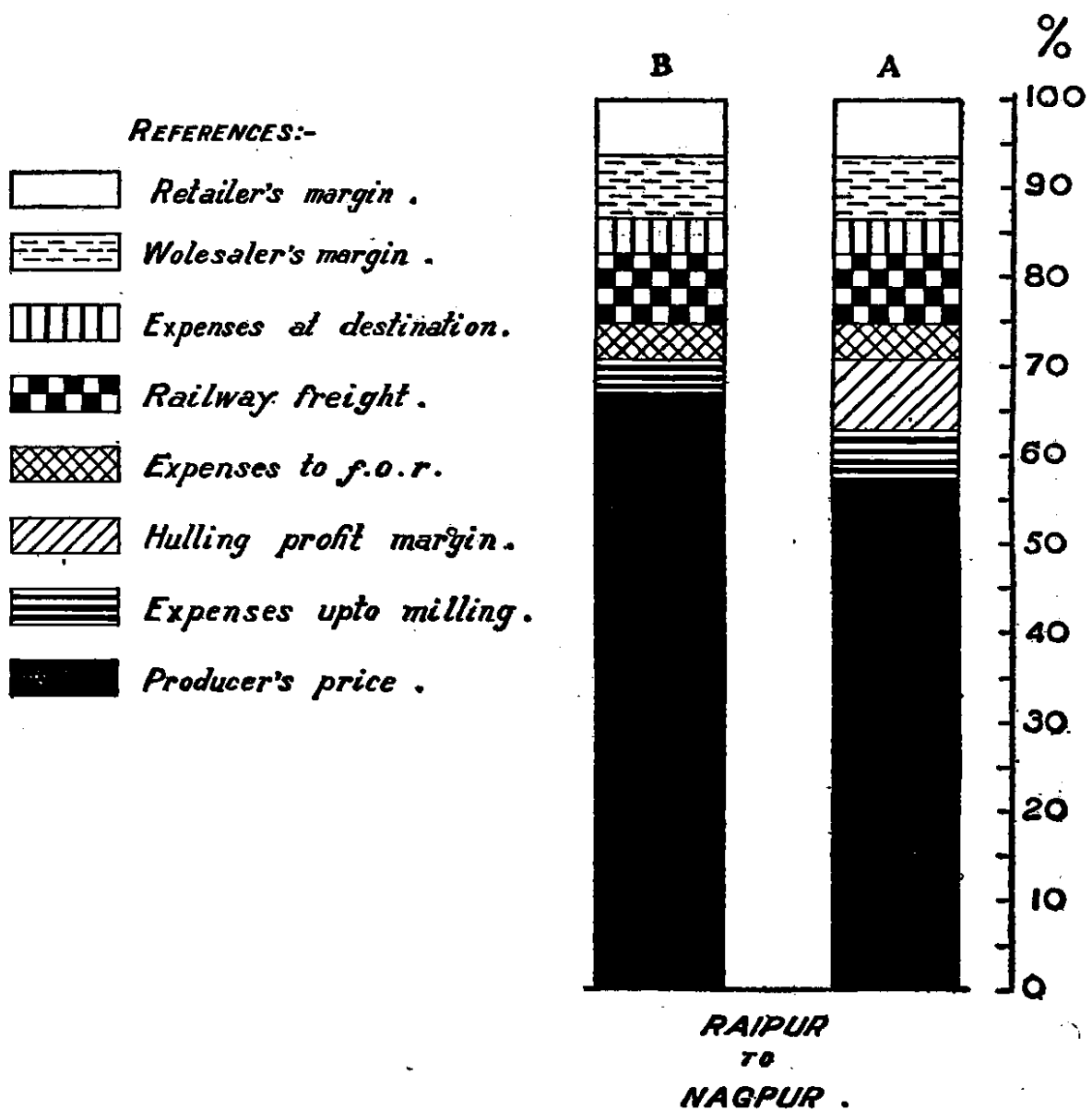
*Difference between the wholesale and retail price of rice in Hyderabad city.*

	Year.	Annual average wholesale price per maund.	Annual average retail price per maund.	Retail margin.	
				Actual.	Expressed as a percentage of the wholesale price.
		Rs. A. P.	Rs. A. P.	Rs. A. P.	
<i>Fine—</i>					
Punjab Dehra Dun Basmati No. 2 (imported from Amritsar).	1934	9 8 7	11 6 4	1 13 9	19.5
	1935	10 4 0	10 13 6	0 9 6	5.8
Pichodi (local) .. .. .	1934	5 14 11	7 12 0	1 13 1	30.6
	1935	6 1 4	7 10 0	1 8 8	25.3
<i>Medium—</i>					
G. E. B. 24 (imported from Madras province).	1934	4 5 0	4 15 11	0 10 11	15.8
	1935	4 15 2	4 14 4	..	..
Ramsagar (local) .. .. .	1934	3 10 7	4 3 10	0 9 3	15.8
	1935	4 2 11	4 4 0	0 1 1	1.6

## PRICE SPREADS BETWEEN SOME PRODUCING AND CONSUMING CENTRES.



**DIAGRAM SHOWING THE ENHANCED RETURN (B) OBTAINABLE BY A GROWER MARKETING HIS PRODUCE DIRECTLY .**



**A --- CULTIVATOR SELLING PADDY IN THE WHOLESALE MARKET .**  
**B --- [CULTIVATOR MILLING HIS PADDY ON HIRE AND SELLING RICE IN THE WHOLESALE MARKET .**

## (3) PRICE SPREAD FROM PRODUCER TO CONSUMER.

The question as to how much of the price paid by the consumer is actually received by the producer is much more difficult to answer in the case of the rice crop than in respect of most other primary products. This is not only on account of the difficulty of assessing the amount of deduction from the price by way of interest but also because the rice crop is marketed under a great diversity of conditions. For instance, the crop may be put on the market in the form of both hand-pounded and machine-milled rice, the former having been converted either in the grower's household or by the professional dehusker. Again, some of the machine-milled rice may be milled on hire by various assembling and distributing agencies including cultivators while in other cases the processing may be on account of the rice mills as the owners of the produce. Further a certain proportion of the crop is marketed in the form of raw rice and some as parboiled. The present survey has, therefore, revealed that the producer obtains different returns depending on the channels through which the produce eventually finds its way to the consumer. It is impossible to take into precise reckoning all these variable conditions when endeavouring to determine the share of the grower in the consumer's price.

Of the total marketable surplus it will be recalled that about 11 per cent is distributed directly in the villages and periodical markets by growers and other agencies leaving 89 per cent to be first assembled in the wholesale markets for subsequent distribution, near and distant. Of the latter quantity, roughly 6.4 million tons comprised machine-milled rice and about 3.14 million tons hand-pounded. Of the latter quantity, roughly 12 per cent may be estimated as being the share handled by professional dehuskers and 88 per cent by growers.

Taking milled rice first some instances of typical-price spreads from the producer to the consumer are given in Appendix LXXI (a) an abstract of which expressed in terms of percentages is quoted in the following table. These are further illustrated in the diagram opposite page 400.

*Analysis of the price spread between producer and consumer.*

[The item references are given in Appendix LXXXI (a)].

	Larkana (Sind) to Karachi. Kangni rice.	Saharan- pur (U. P.) to Cawnpore. Basmati rice (par- boiled).	Raipur (C. P.) to Nagpur. Hansa rice.		Cuttack local dis- tribution. Punch- kulia rice (mixture).	Bolepur (Bengal) to Delhi. Dudkalma rice (boiled.)	Tadepalli- gudam (W. Goda- vary) to Madras. Akkulu rice.	Warangal (Hydera- bad State) to Hyder- abad. Khichidi rice.	Kalyan (Bombay Presi- dency) to Bombay. Kolamba rice.
			A	B					
			Cultivator selling paddy to merchant and the latter hulling on hire.	Cultivator milling his paddy on hire and selling rice.					
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Cultivator's price* [item No. 1 (b)] ..	64.9	66.9	57.6	..	77.8	57.8	63.2	69.5	76.7
Expenses up to the completion of milling (items Nos. 2, 4, 5 and 6).	10.2	9.7	5.4	..	8.6	9.5	9.1	8.9	7.1
Profit margin on hulling (item No. 9) ..	3.2	2.7	7.9	..	4.3	7.7	3.3	2.2	3.4
Expenses to f. o. r. including bagging, cartage and market charges (if any), (item No. 11).	2.1	1.6	4.1	..	Disposed	2.5	4.4	2.9	2.4
Freight (item No. 12) .. .. .	8.9	6.2	7.9	..	of	13.2	10.0	4.8	1.5
Expenses at destination (item No. 13) ..	2.6	1.6	3.5	..	locally.	3.1	1.7	0.6	2.3
Wholesaler's margin (item No. 14) ..	1.8	2.3	7.3	..	2.9	2.5	3.3	2.0	3.4
Retail margin (item No. 16) .. .. .	6.3	9.0	6.3	..	6.4	3.7	5.0	9.1	4.2
Total value realised (item No. 19) .. ..	100	100	100	100†	100	100	100	100	100

\* Disregarding any deduction by way of interest on loans.

† Out of this cultivator's share was 68.

It will be readily seen that in the cases involving transportation by rail to consuming centres the share of the producer, provided he brings his produce to the assembling centre in his own cart, varies from 57·6 per cent to 75·7 per cent of the total value of the selected products yielded from his paddy. It is obvious that the share of the producer depends, among other things on the incidence of freight, the higher these are the lower the net return to the producer. The examples of price spreads under discussion have, therefore, been selected as representative of long, intermediate and short hauls. On these bases it might be not unreasonable to estimate the share of the producer at about 66 per cent.\*

As regards machine-milled rice distributed locally for milling centres or in the vicinity, some examples of price spreads given in Appendix LXXI (b) show that the producer may receive anything from 71·1 to 77·4 per cent of the total value realised by the saleable products of his paddy. A figure of, say, 74 per cent may be calculated as a rough average. As roughly half the quantity of machine-milled rice entering the wholesale trade is distributed to outside consuming centres, the average share of the producer in respect of machine-milled rice would work out to about 70 per cent.

With reference to hand-pounded rice marketed by professional dehuskers the following actual example of a professional dehusker buying paddy, dehusking it and distributing the rice direct to a consuming centre will enable some idea to be formed as to the share of the producer in respect of this class of trade.

Price spread relating a consignment of *Hansraj* rice (hand-pounded) received in Delhi from Tanda in Rampur State in the United Provinces situated at a distance of 15 miles from Dalpatpur station (E. I. Railway), the paddy having been obtained from Buxar, a producing centre in the Naini Tal district of the United Provinces. (24 miles distant from Tanda.)

	Rs.	A.	P.
Wholesale price for 125 maunds of paddy actually paid to the producers at Buxar @ Rs. 2-14-7 per maund ..	363	10	0
<i>Add—</i>			
Weighing charges at 12 annas per cart loading and cartage to Tanda @ 0-3-3 per maund ..	..	34	0 0
Dehusking charges including dressing and colouring with flour and turmeric @ 4 annas per maund (approximately) ..	..	25	0 0
<b>Total cost</b> ..	..	422	10 0

\*This figure is irrespective of very long distance distribution such as, for example, in the case of *Basmati* rice despatched from Amritsar in the Punjab to Hyderabad (Deccan), railway freight being Rs. 1-13-6 per maund.

**Outturn—**

Rice	50 maunds.
Large brokens	30 maunds.
Small brokens ..	5 maunds.
Bran husk	40 maunds.
Impurities and drirage.	

**Deduct sale proceeds of derivatives—**

Bran and husk were utilised by professional dehusker but brokens were disposed of locally for cash as follows.

	Rs.	A.	P.
Large brokens 30 maunds @ Rs. 4-8-0 per maund	135	0	0
Small brokens 5 maunds @ Rs. 2 per maund ..	10	0	0
	<u>145</u>	<u>0</u>	<u>0</u>

Net cost of rice .. .. . 277 10 0

**Add—**

Filling and sewing and twine on 50 maunds, rice packed in 20 bags @ 7½ pies per bag .. .. .	0	12	6
Cost of 40 gunny bags (20 new and 20 old) @ 4 annas and 2 annas per bag respectively .. .. .	7	8	0
Cartage to Dalpatpur railway station 15 miles @ 3 annas per bag .. .. .	3	12	6
Bridge toll on 5 carts @ 3 annas per cart .. .. .	0	15	0
Station expenses including payments to railway staff @ 7 pies per maund .. .. .	1	12	0
Railway freight to Delhi @ Rs. 0-3-3 per maund (51 maunds) .. .. .	10	5	0
Cartage at Delhi @ 6 pies per bag .. .. .	0	10	0
Octroi @ 6 pies per maund .. .. .	1	9	0
Market charges at Delhi including commission and godown rent @ 1 pie per maund .. .. .	2	8	0
	<u>307</u>	<u>6</u>	<u>2</u>

**Add—**

Professional dehuskers' margin @ Rs. 1-13-7 per maund	92	9	10
Wholesale price at Delhi @ Rs. 8 per maund .. .. .	400	0	0

**Add—**

Retailing cost and retailers' margin @ 8 annas per maund .. .. .	25	0	0
—Consumers' price @ Rs. 8-8-0 per maund .. .. .	425	0	0

**Add—**

Proceeds of saleable by-products .. .. .	145	0	0
	<u>570</u>	<u>0</u>	<u>0</u>



Of the total value of Rs. 570 paid by the consumer, the producer was paid Rs. 363-10-0 or 64 per cent. It is interesting to observe from the above example that the dehuskers' profit margin is a substantial one. This is due to the fact that the dehusker in question undertook the distribution of his product himself. As a general rule, however, hand-pounded rice is assembled by professional dehuskers and sold at assembling centres to wholesale merchants for eventual distribution by the latter. In such instances, the dehuskers' margin tends to be reduced sometimes quite appreciably.

As regards hand-pounded rice turned out by the grower himself enquiries in different tracts seem to indicate that the producer's share of the price paid by the consumer varies from 75 to 80 per cent. This proportion is fairly high as large quantities of this quality of rice are distributed within a circumscribed area and do not incur heavy transportation charges.

Having regard to the fact that professional dehuskers do not probably handle more than 12 per cent of the wholesale trade in hand-pounded rice the producer may be estimated to receive something in the neighbourhood of 74 per cent of the total value realised from the sale of the outturn of rice and derivatives from a given quantity of paddy.

Since the average share of the producer in the case of milled rice has been shown to work out over 70 per cent and the proportions of hand-pounded and milled rice put on the market is roughly in the ratio of 1 to 2, the producer's average return in the respect of the total quantity of rice which passes through the wholesale markets\* would appear to be between 71 and 72 per cent or 0-11-6 in the rupee—exclusive of interest charges. But this is not the ultimate figure. Reverting to the assembling stage it will be recalled that only 13·6 per cent of the marketable surplus is actually brought to market by the growers themselves. The figure of 71 or 72 per cent as representing the producer's return is based on the assumption that the grower himself is responsible for assembling his entire marketable surplus. This is far from being the case as in actual practice the cultivator disposes of something over 75 per cent of the surplus to the various assembling middlemen (see table on page 256) thereby losing on an average about nine rupees for every hundred rupees worth of produce sold in this manner (see page 258).

It must also be borne in mind that the goods may change hands more than once between the market and their eventual destination, with the result that the producer's share of the consumer's price would diminish with each transaction especially when both parties are principals in which case there should in theory be a difference between the buying and selling prices. Taking all these factors into consideration, the Indian rice grower obtains at a conservative estimate about 10 aīnas of the consumer's rupee for the greater part of his marketable surplus. Proportionately this would represent 62·5 per cent of that unit.

This should by no means be regarded as net return in as much as the grower has to pay out of it a considerable proportion on

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\*The produce distributed directly in the villages and periodical markets may fetch anything from 80 per cent to 100 per cent of the consumer's price.

account of interest charges on loans borrowed for raising the rice crop. Enquiries made in different rice growing areas indicate that at least 40 per cent of the marketable surplus of the rice crop is given away in lieu of such loans to the various creditors including village merchants, landlords, itinerant dealers and rice mills at the harvest time, the rate of interest on these loans averaging not less than 25 per cent. If this 25 per cent is spread over the 88·8 per cent of the marketable surplus in respect of which the return of 62·5 per cent shown above holds good, it will work out to a little over 11 per cent or about one anna and nine pies in the rupee. The actual share of the producer, therefore, may be put at eight annas and three pies or 51·5 per cent of every rupee paid by the consumer, which is very low indeed.

As a general rule, the grower obtains more cash for his produce if he gets his paddy milled on hire and markets the rice himself. The comparative returns to the cultivator by direct and indirect marketing are clearly shown in the two examples illustrated in the diagram facing page 401. In the former case (A) the grower is found to receive 58 per cent of the consumer's price and in the latter (B) 68 per cent. Every encouragement should, therefore, be given and the means provided whereby producers are enabled to market their rice themselves after having had the paddy hulled. It is obvious that where intermediaries acquire the crop in the form of paddy in the first place the price realised by the grower must be relatively low since the goods have to be processed before they can find their way into the channels of wholesale trade and with every stage in the manufacturing and distributive chain each participant must, in theory at any rate, cover himself against possible loss by keeping in hand as large a margin as circumstances permit. The extent of the loss to the grower which the existing conditions of assembling imply may be very roughly placed at between 3 and 4 crores of rupees. Similarly, if the cultivator could have his paddy milled for himself and then sell the rice directly to the wholesale trade, a further increase of income amounting possibly to 5 or 6 crores of rupees might, not unreasonably, be anticipated. Over and above this, something over 8½ crores of rupees is estimated to be paid by the producer to the money-lender on account of interest in connection with the rice crop finance. There is, therefore, a wide field which could be covered by co-operative effort with every prospect of profit.

## BURMA.

### A.—Agencies and methods.

Distribution of the rice consumed within Burma calls for no particular description. It finds its way from the mills into the hands of numerous local retailers, sometimes with and sometimes without the help of an intermediary wholesaler. It is sold by the retailers on a volume basis at bazar-stalls and shops in the same way as other household requirements.

The following is a brief examination of how trading in rice is carried on in Rangoon market. As these constitute so large a part of the total they may be taken as representative of the province as a whole.

Persons engaged in the wholesale distribution of rice comprise three main groups.

- (a) Millers.
- (b) Merchants.
- (c) Brokers.

Of these only the brokers are single-purpose operators, their business being simply to make contact between buyer and seller. Millers and merchants may and do encroach on each other's function as need or opportunity occurs.

The miller group may be subdivided into "big" and "small". The "big millers" consist of about half a dozen European firms operating large milling establishments, who between them handle probably about a third of the rice outturn of the country; the "small millers" who handle the rest from numerous small establishments may be Burmese, Indian or Chinese. Merchants, where these operate apart from milling, are also Burmese, Indian or Chinese.

For trade purposes the more prominent of the merchants and small millers have grouped themselves into a Rice Merchants Association to which until comparatively recently the "big mills" group did not belong.

The objects of the Rice Merchants Association as given in subparagraphs 2 (i) and 2 (ii) of their rules and regulations are "to protect and promote the interests of the rice trade and to encourage unity among rice merchants with a view to protect their business interests." The Association also determines the forms of contract to be used by its members and provides means for arbitration on disputes or difficulties arising amongst them.

Brokers functioning in Rangoon number about one hundred, of whom some 15 are separately grouped into a rice brokers association. Any broker, whether a member of the Rice Brokers Association or not, can negotiate business between members of the Burma Rice Merchants Association or with merchants and small millers outside, but for transactions between a member of the Burma Rice Merchants Association and a firm of the "big miller" group only brokers who are members of the Rice Brokers Association are employed. A further special function attaching to membership of the Rice Brokers Association is that of arbitrating on quality in contract disputes. They are also a recognized authority for the issue of survey certificates which are required in the case of all foreign shipments.

In the Rangoon rice market, trading is done both for immediate delivery or for delivery in one, two, three or even six months time.

The market ground for dealings in both "spot" and "futures" is the same and is located in the open in the southern half of Moghul Street. Most of the operators have their offices in buildings overlooking the street. The market opens at about 8 A.M. and usually is over by about 5 P.M., though in times of activity it may go on until 10 o'clock or 12 o'clock at night. During its progress the pavements are occupied by merchants, millers and brokers who move from group to group with occasional absences to their nearby offices.

All sales must be made through a broker. Regular operators are represented in the market by their own house brokers. These on getting quotations for the different grades record them on a prepared

form and acquaint their principals. If orders to buy or to sell are received they prepare contract forms, and after getting these signed by the contracting parties deliver the "Sale Note" to the buyer and the "Bought Note" to the seller. Brokerage is charged at the rate of three-eighths per cent (*i.e.*, six annas on each hundred rupees). This is paid by the buyer.

**B.—Price spread from producer to consumer.**

The following two representative examples illustrate the price spread between the paddy grower in Daik-u and Maubin, important producing areas and the consumer in Rangoon\*. The figures given in both the cases relate to Ngasein paddy converted into *Small Mills Specials* rice, the most popular trade description.

	Daik-u to Rangoon.		Maubin to Rangoon.	
	Rs.	A. P.	Rs.	A. P.
1. Producers' price actually received in the village for sufficient paddy to yield 1 maund of cleaned rice.	1	12 5	1	13 5
	Weight (a) 132 lb.		132 lb.	
	Value (b) (60.0%)		(60.5%)	
2. Assembling charges paid by seller .. .. .	0	0 5	0	0 6
3. Transportation charges from village to town assembling centres.	0	1 7	0	2 2
4. Charges at the assembling centre .. .. .	0	0 3	0	0 4
5. Merchants or middleman's margin .. .. .	0	1 0	0	1 5
6. Wholesale price (assembling market) .. .. .	1	15 8	2	1 9
7. Costs up to f.o. r. or f. o. b. incurred by buyer	0	0 4	0	0 6
8. Freight (rail) .. .. .	0	4 5	..	..
" (boat) .. .. .	..	..	0	3 3
9. Allowance for refraction difference .. .. .	0	0 3	0	0 4
10. Wholesale price at milling centre .. .. .	2	4 8	2	5 11
11. Handling charges, etc., at the mill .. .. .	0	0 6	0	0 6
12. Cost of procuring and miller's margin .. .. .	0	1 10	0	1 10
13. Millers' price .. .. .	2	7 0	2	8 3
14. Wholesalers' costs and margin at the consuming centre ..	0	0 6	0	0 6
15. Retailers wholesale price .. .. .	2	7 6	2	8 9
16. Retailing cost and retailers' margin .. .. .	0	3 10	0	3 10
17. Price paid by consumer for 1 maund of rice .. .. .	2	11 4	2	12 7
18. Sale proceeds of by-products .. .. .	0	4 0	0	4 0
19. Total value realised of the saleable products resulting from the conversion of the quantity of paddy stated opposite 1 (a).	2	15 4	3	0 7
		(100)		(100)

It will be apparent from the above accounts that the paddy grower in Burma while selling his produce in the village gets about 60 per cent of the consumers' price disregarding interest charges. This is equivalent to an average of nine annas and eight pies in the rupee, and tallies fairly closely with what is estimated to obtain generally in India. It may be observed that the Burma rice growers, if suitably organized, should be able to obtain much better returns through co-operative marketing or the lines of the Sittang Colonies Banking Union, relevant details of which are given in Appendix LXX.

\*Although Burma exports the bulk of her marketable surplus to foreign countries, price spreads relating to internal consumption only have been taken into account for the sake of comparison with India where about 98 per cent of the marketable surplus is absorbed in the internal trade.

[*Wholesale distribution.*

### INTER-CHAPTER NINE.

As shown earlier some 57 per cent of the marketable surplus of the rice crop is brought to the assembling centres in the form of paddy and about 32 per cent in the form of rice, mostly hand-pounded ; the remainder of nearly 11 per cent is distributed directly by growers and petty traders in villages and *hats*.

A small quantity of the paddy marketable surplus is manufactured into parched products, while the bulk—a little less than 6 million tons—is machine-milled, of which about 55 to 60 per cent is estimated to be converted by rice mills on their own account and the rest by mills for wholesale merchants on hire. The producers' share in the processing of paddy (by milling) and marketing the finished product (rice) is negligible.

All the rice converted by milling as well as the hand-pounded product assembled at wholesale trade centres is distributed mainly by wholesale merchants and rice mills. Growers play an insignificant part in the distribution.

Wholesale merchants and commission agents frequently operate as principals and sell, on their own account, the produce acquired locally from rice mills and the market or from the villages. The mills purchasing paddy and milling on their own account also distribute the rice directly or through local commission agents. Goods consigned to distant centres of consumption may be sold on commission basis, but purchases may be made outright by merchants in consuming centres on the basis of samples usually sent by post, the price being settled by correspondence. In the case of a few qualities sold under private brands of long established and proven reputation, orders may be placed

directly by buyers in distant markets without prior examination of samples. Such transactions, however, constitute a very small proportion of the rice trade in India, the bulk of the business being conducted on commission sale or on sample. This is primarily due to the fact that quality in rice is a highly variable factor and until quite recently when the AGMARK scheme was applied to certain varieties, there has been nothing in the nature of defined standards for rice.

The operations of several purchase and sale societies in India do not generally extend beyond the assembling stage. A few societies, however, have attained some measure of success in wholesale distribution. The best example of co-operative distribution is, perhaps, the Provincial Co-operative Marketing Society in Madras. The chief function of this body is to bring the Loan and Sale Societies in different districts into contact with the buyers and consumers, particularly the co-operative consumers' societies at various centres.

The imports and exports in the rice trade are dealt with by the wholesale merchants or commission agents who handle the distribution of Indian rices. Many importing firms participate in the trade in the indigenous product while a number of concerns not only import rice but are also interested in the relatively small export trade particularly from Calcutta.

The distribution of rice from assembling to the terminal markets or centres of consumption is mainly financed by wholesale merchants or commission agents. The actual provision of funds is effected through *shroffs* (indigenous bankers) and the modern joint stock banks. When goods are consigned for commission sale, advances are given to the extent of 70 to 80 per cent of the value of goods and interest is charged until the final settlement of the transaction. The *shroff* and the modern banks work along similar general lines but the

spread of modern banking facilities dates only from recent years and in this respect the *shroff* has the advantage of being in closer touch with his clients and better acquainted with their personal, domestic and business affairs. In consequence the *shroff* is often prepared to undertake risks which a bank could not possibly entertain. The former, therefore, remains the main factor in the financing of distribution. Co-operative finance of distribution is found to a small extent only in Madras Presidency.

The cost of wholesale distribution from assembling to consuming centres primarily depends on the distance involved and the freight. For instance, between Amritsar and Hyderabad (Deccan), the cost of wholesale distribution works out to 37.9 per cent of the prime cost, of which 74.6 per cent is on account of railway freight alone. Excluding cost of transportation which would differ according to distance, the cost of distribution is found to vary from about 4 per cent to 9.5 per cent of the cost at source in different cases.

While there are no trade associations concerned with rice in some provinces, the majority of those in others are small bodies of purely local influence and the only ones of any size and importance are the Calcutta Rice Merchants' Association and the Bombay Rice Merchants' Association. Under the auspices of the latter, a modified type of "futures" trading in imported (Burma) rice is carried on, and as far as could be ascertained disputes in regard to quality are rare and are almost always settled amicably. In addition to purely trade associations, there are also a few associations of rice mills in Bengal and Madras. It is observed that more than one association frequently operate in the same market. This seems to be unnecessary from many points of view and is an index of the lack of cohesion which is a characteristic of many trade interests in this country.

Coming to the retail side, a somewhat remarkable fact about retail margins in the rice trade is their extreme variability. Broadly speaking, it was found that costly rices carried relatively large margins while the cheap rices which have a rapid turnover were sold on a highly competitive basis with smaller margins and in some cases at an apparent loss. This seeming anomaly is readily explained by the fact that the confusing multiplicity of nomenclature and the outward similarity of a large number of varieties lend themselves to mixing or adulteration with cheaper varieties in the retail trade. This is quite openly practised, the reason given generally being that the rice is being "blended" to suit local taste. It is for this reason that a variety of rice alleged to belong to a certain trade description may actually be retailed at a price lower than that quoted in the wholesale market for the same description.

Retail prices are never marked on the articles offered for sale and the first price asked by a retailer is generally put forward only as a basis for discussion. It is also common experience that the appearance and status of the prospective buyer is an important factor in determining the price to be asked.

Any discussion on the advantages of consumers' co-operative societies in relation to agricultural marketing is unnecessary here, but it is suggested that co-operative stores could be made to play an important part in the distribution of products graded and marked under the provisions of the Agricultural Produce (Grading and Marking) Act, whose popularity with the consumer is now beyond question. The attainment of this object and its development is particularly to be desired in centres in which the ordinary trade shows opposition to graded produce or the AGMARK scheme. For example, in Bombay, the Gavti Rice Merchants'



Association, which is concerned with the trade in local rices, has consistently discouraged its members from handling graded AGMARK *Zinia* (*Kolamba*) rice in bags carrying the AGMARK label and seals. In such circumstances an alternative course open to the consumer for obtaining the genuine product is to do so direct from the packers, and this can be very well achieved through the co-operative store. Unfortunately, however, co-operative consumers' stores in India are few and far between.

The question as to how much of the price paid by the consumer is actually received by the producer is much more difficult to answer in the case of the rice crop than in respect of most other primary products. This is not only on account of the difficulty of assessing the amount of deduction from the price by way of interest but also because the producers' share varies considerably according to the conditions under which the crop is marketed. The produce marketed directly by the grower himself fetches a better return than that sold in the village to the assembling middleman. Secondly the growers' share in the consumers' price is comparatively high in respect of the quantities distributed locally (at assembling-milling centres) and low in the case of goods consigned to other centres, the latter varying according to the distance involved. Again, other things being similar, the cultivators' margin is high if he sells rice after converting his paddy and relatively low if the latter is marketed directly. Giving due consideration to all these factors, the rice growers' average net share in respect of the quantities which pass through the wholesale markets works out to eight annas three pies or 51·5 per cent of the rupee paid by the consumer. As this is an average figure, it is obvious that quite a considerable proportion of the marketable surplus fetches a much lower return to the producer.

Under present conditions, the Indian rice grower is a loser to the extent of about seventeen crores of rupees annually at a conservative estimate. Much of this vast sum could be returned to him by a proper system of financing and by a more direct participation in the marketing process by the grower himself.

The paddy grower in Burma while selling his produce in the village gets about 60 per cent of the consumer's price, which is equivalent to an average of nine annas and eight pies in the rupee disregarding interest charges. This tallies fairly closely with what is estimated to obtain generally in India. It may be observed that the Burma rice growers, if suitably organised, should be able to obtain much better returns through co-operative marketing on the lines of the Sittang Colonies Banking Union.

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## CHAPTER X.—MANUFACTURING AND DISTRIBUTION OF RICE PRODUCTS.

### INDIA.

#### A.—General.

The three principal rice products of any commercial importance in India are parched rice (*murmura*) beaten rice (*chura*) and parched paddy (*kheel*)\*. It will be recalled that on an average approximately 1.5 million tons of paddy, equivalent to about 1 million tons of rice, and an additional 350,000 tons of parboiled rice are estimated to be annually manufactured into these three products. The total quantity of rice thus utilised amounts, therefore, to about 1.35 million tons or some 4 per cent of the average total supplies† of rice available in this country.

Although this proportion is relatively small, the quantity of rice processed into the three products is fairly considerable and provides employment for a large community, known generally as *bharbhunjas*‡, as a cottage industry the extent of which may be gauged from the fact that the census of 1931 showed the number of persons engaged in this occupation as 100,872 males and 154,926 females making a total of 255,798. It should be noted that whereas a considerable proportion of the *bharbhunja* community is also interested in the parching of other cereals and pulses, the majority handle rice, particularly in those areas in which rice is the most important crop.

The total quantity of paddy (or rice) used in the manufacture of parched paddy, parched rice and beaten rice does not yield an equivalent quantity of products. Certain losses inevitably take place, as for example, in the natural moisture of the grain which is driven off by the parching process, a treatment in which great heat is applied. Some of the grains also fail to expand sufficiently and are winnowed out when the product is being finally dressed over before being put up for disposal.

Enquiries made at parching establishments in various parts of the country enable a very fair estimate to be arrived at regarding the actual recovery of parched products and beaten rice, from a given quantity of raw material. The proportions naturally vary according to the type of rice used, the treatment given and the amount of winnowing or dressing to which the finished product is subjected.

When parched rice is being made direct from parboiled rice (not from paddy), an outturn of between 85 and 90 per cent may be normally reckoned on. From areas as far apart as Bengal, Delhi and Baroda the percentage recovery was ascertained to be 87.5 per cent. Only in Sind it was as high as 92.3 per cent.

\*For synonyms see the note at the bottom of page 105.

† Production plus imports.

‡ *Bhar* = oven; *bhunja* = to parch.

When the parched rice is prepared from paddy the net recovery based on conditions in seven major provinces averages 58·5 per cent and may be expressed in round terms of 60 per cent. This tallies closely with the net recovery of parched rice prepared directly from parboiled rice, the outturn of the former calculated on the equivalent of paddy working out to roughly 59 per cent. Variations in the percentage recovery of parched rice from paddy range from 47·5 in the United Provinces to 73·7 per cent in Bombay. In the majority of instances 55 and 61 per cent are the normal limits.

The average recovery of parched paddy from paddy as shown by data collected in seven provinces and one State is 61 per cent, with a range of 50 in the United Provinces to 67·5 per cent in Bihar and Orissa.

Beaten rice shows an average outturn of 64·5 per cent in six provinces and three States. The outturn is least in Travancore, where it is given as 56·3 per cent, and greatest in Baroda where the proportion is 66·7 per cent.

Having regard to these various percentages of recovery, the weight of manufactured products from the 1·5 million tons of paddy and 350,000 tons of rice involved amounts to 1·25 million tons, of which about 554,000 tons consist of parched rice, 168,000 tons of parched paddy and 533,000 tons of beaten rice.

#### B.—Production.

The quantity of rice products estimated to be manufactured in the various provinces and States differs considerably and to a large extent reflects the demand, the character of which is highly variable and fairly localised. No data are available to show the volume of trade in parched rice, parched paddy and beaten rice but enquiries have established the fact that while this is not large—probably not more than 10 per cent of the total production—beaten rice occupies a more important position from the marketing viewpoint than either of the other two kinds of preparations. This is due to the ability of beaten rice to keep for several months without deterioration. The quantity of parched paddy manufactured is much smaller than that of parched rice and beaten rice and its consumption exhibits a distinct seasonality in the late autumn in Northern India generally and in Bengal owing to the religious festivals which occur during October and November.

An estimate of the total Indian production of parched products and beaten rice and the share of the major provinces and States given in Appendix XXXV shows that Bengal is the largest producer of both parched rice and parched paddy. Altogether some 674,000 tons of rice or 8 per cent of the average crop of Bengal is used for conversion into the various products. Moreover, this figure represents almost 50 per cent of the total quantity of rice converted into parched products and beaten rice in India. The next area in which the parching industry is of importance is the United Provinces, where some 12·5 per cent of the total crop, or some 246,000 tons of rice, are thus utilised. Ranking third are the provinces of Bihar and Orissa where 3 per cent jointly of the crop is estimated to be used for manufacturing these products. The quantity of rice involved is approximately 134,000 tons. In other provinces and States the parching

industry is not of much importance. Madras with the second largest production of rice in India uses about 34,000 tons of rice or only 0·7 per cent of the local crop to convert into rice products. In Bombay, the proportion is 2·6 per cent or some 22,000 tons of rice, made almost exclusively into parched and beaten rice, the production of parched paddy being negligible. The only other province in which rice products are of any importance quantitatively is the Central Provinces. The qualities most in demand here are parched and beaten rice and only some seventeen hundred tons of paddy are parched. Expressed in terms of rice about 15,000 tons are on an average processed into the various confections. It is interesting to observe that although Assam's rice crop is relatively large and the local inhabitants are predominantly rice eaters, only some 0·5 per cent or about 8,300 tons are used to convert into beaten rice, there being no manufacture of parched rice and parched paddy. A certain amount of the latter is imported from the adjacent province of Bengal where large quantities are made but no reliable estimates are available as to the extent of this trade which may, however, be taken as running into about 5,000 tons, annually, carried mostly by country craft.

Besides the three major parched products, the only other worth mentioning is rice flour prepared by grinding broken rice or bold course rices in hand or power driven *chakkis*. The total quantity of rice flour produced in India (see Chapter II, page 119) has been roughly estimated at 50,000 tons of which 20,000 tons or 40 per cent is manufactured in Sind, mostly for local consumption in that province.

### C.—Methods of manufacture.

As far as can be ascertained rice products are only prepared as a cottage industry. As a rule these confections are prepared by persons—generally Hindus—who specialise in this work and whose calling is more or less hereditary. As already noted, they are widely known as *bharbhunjas*.

#### (1) PARCHED RICE (MURMURA).

Although parched rice is produced in almost every tract in which rice is grown or consumed in any quantity, this product varies a good deal more in appearance and taste than parched paddy and beaten rice owing to the different methods of manufacture. In all cases, however, the kernel of the finished product is distended and crisp. Colour may vary from a greyish to a brilliant white and the product may either be salted or unsalted. Well distended grain and very white kernels are most appreciated and fetch the best values.

No useful purpose will be served by endeavouring to describe the numerous small variations in the methods of parching adopted. Parboiled rice is always used, experience having shown that this type gives the best results. There is, however, no standard criterion of quality, each parcher having his own ideas as to the kind of rice best suited for treatment. The parching operation of which the following is a brief description is a simple one in all essentials. Sand, which has previously been heated to a high temperature is poured

into an iron pan\* which is stood over a fire. Three or four handfuls of rice, or even more (depending on the size of the roasting utensil), are thrown into the pan and rapidly stirred into the hot sand with a long metal ladle. As soon as the rice begins to crackle and swell the contents of the pan are run off and the mixture of sand and parched rice passed through a sieve in order to separate them. The sand is again heated and the process repeated. The whole process may be clearly visualised from the plate facing this page.

Two or three variations in the above process are those adopted in Bengal, Bihar, Orissa and the Central Provinces. In Bengal, the rice is first fried in an iron pan with frequent sprinklings of salt water. It is then removed and parched in hot sand as already described. In Bihar and Orissa a kind of parched rice known as *bhunja* is made from unsalted parboiled rice in the same way as the parched rice of Bengal. The name *murhi*, however, is given in Bihar and Orissa to a product made from paddy by a different process. The paddy is soaked in water for two or three days. It is then boiled for one to two hours and is followed up by drying (in the sun), dehusking (by pestle and mortar), salting, frying and finally parching in hot sand in the usual way. In the Central Provinces, parched rice is made directly from rice which has been previously steeped for several hours in a dilute salt solution. It is dried and parched in hot sand.

#### (2) GROUND PARCHED RICE (SATTU).

After parched rice has been made it is winnowed or sieved and the small insufficiently expanded kernels which have no saleable value are set apart for grinding into flour by means of the hand *chakki*. This product is known in Northern India as *sattu*, and is in some demand especially in the hot summer months.

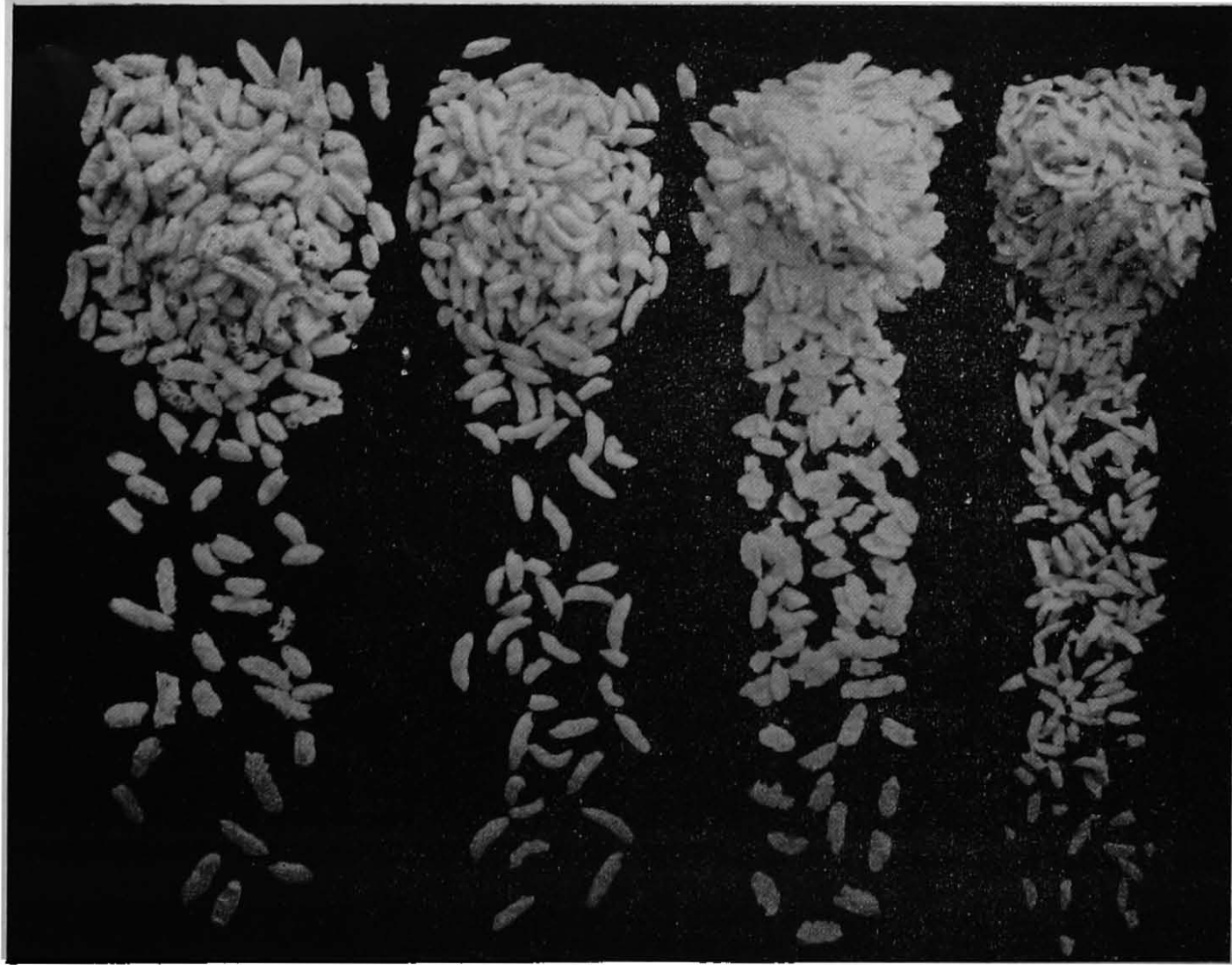
#### (3) PARCHED PADDY (KHEEL).

The following is a typical method of preparing parched paddy. The grain (paddy) is first dried in the sun for a period which varies according to the season. In winter, for instance, fully 5 to 12 hours may be necessary, but in the summer only 4 hours usually suffice. In the evening the dried paddy is filled into large earthen jars. Hot water is then poured into the jars and after two or three minutes the water is emptied out. These jars are now inverted and kept in that position throughout the night. In the morning the moist paddy is taken out and exposed to the sun for a short period. While it is still moist, it is kneaded and at the conclusion of this operation parching is carried on exactly as has already been described in the previous paragraph. During this process, a fair proportion of the kernels expand and burst and turn into soft white grains. After parching has been completed the sand and the grains are separated through a sieve and the product is subsequently winnowed in order to remove the husk. The resultant products of this treatment are (1) *kheel* (burst soft white kernels), (2) *thuddi* (unburst hard parched kernels) and (3) husk and foreign matter. *Thuddis* are manufactured into *murmuras* (parched rice of inferior quality).



PREPARING PARCHED RICE (MURMURA).

Hot sand is taken from the oven facing the operator and mixed with the rice which is seen being agitated in the iron receptacle kept heated over a flue leading from below the oven. The finished product is placed in the larger container on the operator's right.



PARCHED PADDY  
(KHEEL).

PARCHED RICE  
(MURMURA).

BEATEN RICE (CHURA).



## (4) BEATEN RICE (OHURA).

The most desirable quality characteristics of beaten rice are that it should be thin and papery and of white colour (the whiter the better). The flakes should also be as large and broad as possible and there should be minimum of small or broken flakes. The qualities of beaten rice are illustrated in the plate facing this page, the inferior being clearly distinguishable by the comparatively small size and narrowness of the flakes.

Beaten rice is, generally, prepared in the following manner from paddy and never directly from rice. The paddy is steeped in water for two or three days to soften the kernel. It is then boiled for a few minutes and taken off the fire. When the water in which the grain has been boiled has cooled, it is drained off. The paddy is now placed in a shallow concave earthenware vessel or iron pan and kept over a strong fire until the husk bursts open. The next operation consists of pounding the grain, generally by means of a wooden pestle. This flattens the rice kernel and removes the husk. The latter is finally separated by winnowing in the usual way in a tray (*supa*). The procedure adopted in the United Provinces is slightly different in that the paddy is directly fried after soaking and without having been boiled.

## D.—Cost of production.

The cost of production varies according to the wages paid, the amount and value of fuel used, the rent of premises and other incidental expenses. Enquiries made from a large number of parching establishments in 1939 show that costs are liable to considerable variations. Where parched rice is made directly from parboiled rice, as in Bengal for instance, the approximate cost per maund of product was found to be Re. 0-13-6. In Baroda and Delhi, it was 8 annas and in Sind as high as Rs. 2-3-0. Parched rice made from paddy costs an average of something like Re. 1 per maund. A few specimen costs are Rs. 1-1-0 in the Punjab, 12 annas per maund in Madras, Rs. 1-2-0 in Bombay, Re. 1 in the United Provinces, Rs. 1-0-3 in Hyderabad, Rs. 1-4-0 in Bihar and Orissa and 12 annas in Delhi. The incidence of the various items which go to make up the cost of production and their relation to the value of raw material used will be apparent from the following table based on a number of actual costs. —

	Value of material used	Wages	Fuel	Rent	Miscellaneous
	(Per cent)	(Per cent)	(Per cent)	(Per cent)	(Per cent)
Bengal .. .. .	85.8	8.0	4.7	1.5	1.5
Madras .. .. .	72.0	18.5	6.0	2.0	1.5
United Provinces .. .. .	74.0	22.6	1.6	1.6	..
Central Provinces .. .. .	81.4	6.8	10.0	1.8	..
Bombay .. .. .	75.5	14.4	8.2	0.6	3
Sind .. .. .	68.2	9.1	13.6	9.1	..
Punjab .. .. .	65.3	18.3	8.2	8.2	..
Delhi .. .. .	91.5	4.0	3.0	1.5	..
Hyderabad .. .. .	69.9	17.4	7.4	2.2	2.1
Baroda .. .. .	80.0	8.3	8.3	3.4	..

Parched paddy costs relatively less to manufacture, 12 annas per maund being a fair figure for India as a whole. Costs range from about 5 annas in Hyderabad to Rs. 1-4-0 in Travancore. In Bengal costs are Re. 0-13-6, in the United Provinces Re. 0-11-9 and in Madras Rs. 1-0-6.

The relative items constituting the cost of production of parched paddy in some provinces and States are approximately as follows.

	Value of raw material used.	Wages.	Fuel.	Rent.	Miscellaneous.
	(Per cent).	(Per cent).	(Per cent).	(Per cent).	(Per cent).
Bengal .. .. .	79.4	11.4	6.8	2.4	..
Madras .. .. .	74.6	15.8	9.6	..	..
Bihar (and Orissa) .. .. .	82.4	7.8	7.8	2.0	..
United Provinces .. .. .	78.0	18.4	1.8	1.8	..
Central Provinces .. .. .	81.8	3.4	13.6	1.2	..
Hyderabad .. .. .	90.3	4.7	2.3	1.5	1.2
Travancore .. .. .	60.7	26.0	11.7	1.6	..
Baroda .. .. .	66.6	18.6	14.8	..	..

Beaten rice manufacture costs Rs. 1-8-9 per maund of product in Madras, Rs. 1-15-3 in Bombay, Re. 1 in the United Provinces, 13 annas in Bihar, 15 annas in Hyderabad and as little as Re. 0-6-9 and Re. 0-5-6 in Baroda and the Central Provinces respectively.

A few examples of the extent of production costs are given in the table below :—

	Value of raw material.	Wages.	Fuel.	Rent.	Miscellaneous.
	(Per cent).	(Per cent).	(Per cent).	(Per cent).	(Per cent).
Bengal .. .. .	81.4	6.8	10.0	1.8	..
Madras .. .. .	65.3	26.4	8.3	..	..
Bihar (and Orissa) .. .. .	79.2	5.7	11.3	3.8	..
United Provinces .. .. .	74.0	22.8	1.6	1.6	..
Bombay .. .. .	55.8	40.0	3.5	0.7	..
Hyderabad .. .. .	79.1	12.5	4.0	3.2	1.2
Travancore .. .. .	60.0	26.7	11.7	1.6	..
Baroda .. .. .	75.0	12.5	10.0	..	2.6

The chief area in which rice flour is produced on a commercial scale is in Sind where a number of rice mills are fitted with stone *chakkis* for the purpose. Elsewhere as, for instance, in the Punjab and the United Provinces rice flour is produced in the home by hand *chakki* for domestic consumption. A fair idea may be obtained regarding the cost of rice flour produced by power driven *chakki* on a commercial basis. The figures quoted below were recently obtained from a rice mill in Hyderabad (Sind) :—

	Rs. A. P.
Value of 20 maunds of paddy ( <i>Ganja</i> variety) at Rs. 2-6-0 per maund	47 8 0
Cost of cleaning and husking (the above quantity of paddy yielded 14.5 maunds of rice)	1 4 0
Cost of grinding the rice at 2 annas per maund	1 13 0
Total	50 9 0

The cost of production per maund of rice flour is, therefore, approximately Rs. 3-8-0.

The wholesale price of the rice flour *ex-mill* at the particular time was Rs. 3-14-0 per maund thus giving a margin of 6 annas per maund to the miller.

#### E.—Manufacturers' returns.

The different varieties of paddy (and rice) used and the varying items of manufacturing costs are jointly responsible for fairly wide divergencies in the returns earned by makers of parched products and beaten rice. The returns to manufacturers and the average margins of profit earned are conveniently summarised in the following table compiled on the basis of actual costs obtained from various parching establishments in different parts of India.

	Cost of products (Per maund).	Wholesale price at manufacturer's premises. (Per maund).	Profit.	
			(Per maund).	(Per cent).
<i>Parched rice—</i>	Rs. A. P.	Rs. A. P.	Rs. A. P.	
Bengal .. .. .	6 13 0	7 6 0	0 9 0	8.3
Madras .. .. .	7 10 7	8 0 0	0 5 5	4.4
United Provinces .. .. .	6 14 6	7 8 0	0 9 6	8.6
Sind .. .. .	6 14 0	7 8 0	0 10 0	9.1
Delhi .. .. .	6 13 9	7 4 0	0 6 3	5.7

	Cost of product. (Per maund).	Wholesale price at manufacturer's premises. (Per maund).	Profit.	
			(Per maund).	(Per cent).
	Rs. A. P.	Rs. A. P.	Rs. A. P.	
<i>Parched rice—contd.</i>				
Hyderabad .. .. .	5 4 2	6 1 11	0 13 9	16.3
Baroda .. .. .	5 11 6	6 8 0	0 12 6	13.7
<i>Parched paddy—</i>				
Bengal .. .. .	6 8 9	7 8 0	0 15 3	14.6
Madras .. .. .	6 2 9	6 8 0	0 5 3	5.3
United Provinces .. .. .	5 10 9	6 8 0	0 13 3	14.6
Bihar (and Orissa) .. .. .	4 11 0	5 10 0	0 15 0	20.0
Delhi .. .. .	7 1 6	7 4 0	0 2 6	2.2
Hyderabad .. .. .	7 8 2	8 8 6	1 0 4	13.6
Travancore .. .. .	6 8 0	6 14 6	0 6 6	6.2
Baroda .. .. .	6 12 0	7 8 0	0 12 0	11.1
<i>Beaten rice—</i>				
Bengal .. .. .	2 13 5	5 0 0	2 2 7	76.1
Madras .. .. .	6 15 6	7 8 0	0 8 6	7.6
United Provinces .. .. .	6 4 0	7 4 0	1 0 0	16.0
Bihar (and Orissa) .. .. .	6 0 3	6 4 0	0 3 9	3.9
Hyderabad .. .. .	5 1 10	6 13 6	1 11 8	33.8
Travancore .. .. .	8 5 4	9 0 3	0 10 11	8.2
Baroda .. .. .	6 12 0	7 8 0	0 12 0	11.1

**F.—Relation between the prices of paddy and rice and their respective products.**

No records of the prices of the various rice products are maintained officially nor are series of quotations available from the great majority of those engaged in the manufacturing and distributing trades. In a few important centres only, such as Calcutta, Agra or Cawnpore, where a certain number of large wholesale merchants handle rice products on an appreciable scale, is it possible to obtain any price data, but these in any case are not available for long periods or in unbroken sequence. Unfortunately such data are of no significance owing to the total absence of standardised qualities and

the wide range of values which exists between the different grades, particularly in respect of beaten rice. For instance, at Delhi, beaten rice can be obtained at Rs. 9 per maund and also occasionally at Rs. 40 per maund. No useful purpose would, therefore, be served by quoting a long range series of prices for parched rice, parched paddy and beaten rice even were such quotations available. Another difficulty in arriving at any definite conclusions concerning the relation between the raw material and the finished product based on quotations over a period of years lie in the inaccuracy of official quotations for paddy and rice and the paucity of reliable information from commercial sources. The reasons for this unsatisfactory position has already been discussed in Chapter III and need not be referred to here.

Since it was found impossible to obtain a complete and accurate range of prices of the various rice products over a reasonably long period, special observations were made at a large number of markets all over the country once a week throughout the month of August 1939. The results of these observations justify the following general conclusions.

- (i) The prices of the raw material from which the various rice products are made vary considerably. For instance, in the same month (August 1939) paddy for making parched rice cost on average of Rs. 1-10-0 per maund in Sind and Rs. 3-4-0 in Bombay. In the former instance, the variety used was *Kangni* and in the latter *Kolamba*.
- (ii) Fine, medium and bold varieties of paddy (and rice) may be used indiscriminately. An example has just been quoted above in which the bold *Kangni* is used in Sind and the fine short grained *Kolamba* in Bombay.
- (iii) The relationship between the raw material and the finished product is highly variable as will be clearly seen from the following few examples.

*Average prices August 1939.*

(Per maund).

	Bengal.	Madras.	Bihar.	Bombay.	Punjab.
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
Paddy ... ..	2 15 0	3 0 0	2 11 0	3 4 0	3 3 0
Parched paddy .. ..	7 9 0	6 8 0	8 0 0	12 10 0	8 2 0

- (iv) The prices of rice products fluctuate less than those of the raw materials from which they are made and are more constant. In some cases they do not follow the same trend as the latter, nor do they necessarily move up or down in strict consonance with the cost of the

raw materials. The following few instances may suffice. In Bengal, *Kanakchur* paddy remained stationary at Rs. 2-14-0 per maund for the first three weeks of August 1939. Parched paddy rose from Rs. 7-6-0 to Rs. 7-12-0 in the same period. In the last week of August the paddy rose to Rs. 3-4-0 probably as a result of the earlier rise in the price of the product but there was no further change in the value of parched paddy. In Madras *Sirumani* paddy rose slightly between the first and last week of August but there was no corresponding change in the price of the parched product. Similar conditions were observed in Bihar where *Kalamdan* paddy rose from Rs. 2-10-6 to Rs. 2-13-0 per maund but the product remained unchanged at Rs. 7-4-0. In Bombay, *Kolamba* paddy fluctuated between Rs. 3-3-0 and Rs. 3-4-0 per maund during August while parched paddy remained constant at Rs. 12-10-0 with one week's exception when the latter declined to Rs. 12-4-0 at a time when there was no change in the price of the paddy. In Orissa, *Saruchina* paddy maintained a steady level of Rs. 1-12-0 per maund with its parched equivalent at Rs. 5. In the last week of August a four anna rise occurred but the value of the parched product increased by five times that amount.

### G.—Distribution.

#### (1) WHOLESALE.

The term wholesale as used in this section must be interpreted in a relative sense. The nature of the trade in rice products is such that really large quantities are not involved in single transactions. As a rough general guide it may be taken that 10 bags or about 15 maunds is probably the smallest quantity that may be regarded as a wholesale lot. Parcels up to 100 or 150 bags at a time may be consigned from producing to consuming areas but the volume of trade handled in lots of this size is very small indeed.

The wholesale distribution of rice products is not a very large factor in the channels through which rice products pass from manufacturer to consumer. The parching industry is primarily a cottage industry and the parchers themselves are, in the main, the chief agencies for the distribution of their products. There are, however, a number of large firms of merchants or *arhatiyas* in urban centres who buy directly from local parchers and then distribute their purchases in the neighbourhood or make consignments to distant consuming markets. These traders operate in the same way as their prototypes handling cereals, pulses, oilseeds and other agricultural produce. Some, in fact, market parched products as well as cereals etc.

A very small export trade exists in beaten rice from Bengal to Burma and Ceylon and as far as can be ascertained there are no other consignments whatever of rice products to foreign destinations.

The internal trade resulting from local and inter-provincial movements by rail, river and road is also relatively small and as has been mentioned earlier probably does not exceed 125,000 tons. The main directional movements seem to be from Bengal to the adjacent provinces of Bihar and Orissa and from the United Provinces to Delhi, the Punjab, parts of Central India and Rajputana. There is of course a good deal of local trade in the provinces mentioned as well as in the Central Provinces.

With the exception of parched paddy the demand seems to be fairly constant throughout the year. In Bengal, for example, where 25 per cent of the total production of parched rice in India is manufactured, this confection is eaten throughout the year particularly in the rural areas. Similar conditions prevail in Bihar and in Orissa but the demand for parched paddy and beaten rice is reported to be at its highest in January on account of an important local festival which falls in that month. In Assam, the only product in regular demand is beaten rice. Consumption is highest in the tea garden areas along the Brahmaputra Valley. Beaten rice is more popular in Madras than the other products and is consumed in the coffee houses of which there are large numbers in this province. In the Central Provinces, the Marathi speaking community are especially fond of beaten rice. The local demand for parched rice also appears to be consistent throughout the year but parched paddy is mainly consumed in October and November when the *Diwali* and *Dussehra* festivals occur. These conditions also obtain in the United Provinces. In the Punjab, however, the consumption of parched rice products, as is also the case with other parched grains, is greatest in the winter and the rainy season. Consumption in the hot dry months falls to low levels owing, it was said, to the fact that parched grains are generally seasoned with salt or other condiments and induce thirst. This is a natural consideration in a semi-arid region of small rainfall and great heat. In Bombay, the demand for parched and beaten rice seems to depend to a large extent on the number of persons flocking to the various places of pilgrimage. In Hyderabad, Mysore and Travancore, consumption appears to be fairly constant throughout the year with a tendency to rise during important religious festivals.

Rice products are consigned in the jute bags (generally referred to as "gunnies" or gunny bags) used by all sections of the trade handling agricultural produce. The most popular of these bags are the Heavy C and B twill measuring respectively 40" X 28" and 44" X 26½". While beaten rice is normally transported in these coverings parched paddy and parched rice which are relatively lighter and more voluminous are usually transported in larger sized bags specially prepared by the consignors by sewing together used gunny sacking preferably of the Heavy C type.

Some idea of the cost of distributing rice products wholesale may be gauged from the following figures quoted in respect of a consignment of 120 bags of parched rice weighing approximately 51 maunds despatched from a producing centre in the Bilaspur

district in the Central Provinces to Yatsaul in the Bundara district, a consuming centre in the same province, a distance of 460 miles.

	Rs.	A. P.	(Per cent).
Cost of bagging*	15	0 0	14.7
Expenses at source	10	6 0	10.2
Railway freight	72	2 0	70.7
Terminal tax	1	8 0	1.6
Cartage to importers' godowns	3	0 0	2.9
<b>Total expenditure</b>	<b>102</b>	<b>0 0</b>	<b>100.0</b>

The total expenses per maund, therefore, work out to Rs. 2 per maund of parched rice.

It will be observed that freight constitutes 70.7 per cent of the total expenses, the next important item being the cost of bagging at 14.7 per cent. The railway freight is high not only because of the considerable distance covered by this particular parcel, but also because of the fact that parched rice is included under Class 4 of the Indian Goods Tariff and is subjected to a higher rate of freight than rice or other food grains which are included in Class I.

The price of the parched rice in question at the despatching centre was Rs. 3-11-0 per maund and the consignment was actually sold at the consuming centre at a wholesale price of Rs. 6-9-0 per maund. The difference between the two prices is Rs. 2-14-0 per maund of which, as already shown, Rs. 2 is accounted for by freight and other incidental expenses. The balance of 14 annas, therefore, is the wholesalers' gross margin less such expenses as he had to incur, e.g., brokerage, etc., when disposing of the goods locally.

## (2) RETAIL.

Most of the retail distribution of parched products is carried out by the manufacturers (*bharbhunjas*) themselves. The shop generally contains the oven and other parching equipment, the whole being placed in a courtyard or frequently in a verandah or in a room in the parchers' house in such a position as to face a thoroughfare. Customers are served by the parcher himself or, if he is busy at the oven, by his wife or other members of his family. There is usually no bargaining as individual retail transactions are very small ranging from quantities worth anything between 1½ pies to 6 pies.

In large towns the distribution of rice products also takes place through retailers who purchase their supplies from parchers in wholesale lots. In addition to those retailers whose sole business lies in the sale of parched products a number of grocers handling various cereal and pulse products such as *ata* and *dal* as well as edible oils,

\*Net cost after deducting the value of used bags sold by the receivers at the consuming centre.



etc., also keep small quantities of parched grains including parched and beaten rice. A few provision shops in big cities retail high class beaten rice only for consumption by their well-to-do patrons.

Hawkers (*pheriwalas*) are an important factor in the retail distribution of parched products of all kinds. In regard to rice products this community has a special place in large urban centres where parchers establishments and the retail shops selling these products are not located in close proximity to thickly populated residential and shopping districts. The chief rice products handled by hawkers, especially during the hot season, are parched rice and ground parched rice (*sattu*) but small quantities of beaten rice and fried beaten rice (*bhuna hua chura*) are also hawked on the streets throughout the year. Altogether it is estimated that about 25 per cent of the total quantity of parched rice sold retail, passes through the hands of itinerant vendors some of whom, it may be noted, are themselves professional parchers and combine the two functions of manufacturing and distribution.

Enquiries have shown that on an average a hawker reckons to be able to dispose of about one rupee's worth of goods in a day. Rice products would normally constitute from four to six annas of this figure according to season.

The hawkers' wares are generally carried in small cloth bags bundled up in a large sheet. Sometimes, for instance, in the Punjab, the products are placed in two counter-poised baskets suspended from a pole six to seven feet long carried across the shoulder.

In small towns and rural areas there is little retailing of rice products by itinerant vendors although it is occasionally not unusual for some of the parchers themselves to hawk their products in localities situated at a distance from their establishments.

### (3) PRICE MARGINS.

The difference between the wholesale and retail prices of the various rice products has been found to vary enormously and depends mainly on three factors, namely, the type of product, the quality of the raw material used, i.e., whether fine, medium or bold rices, and the retailing agency.

Of the three main products, parched paddy generally carries the highest retail margins. This is due primarily to three reasons. In the first place the demand has a distinctly seasonal aspect; consumption rising in the months in which a number of religious festivals occur, such as for example, in October and November. Secondly, the commodity itself does not keep as well or as long as parched and beaten rice. Finally, the quantity manufactured is comparatively small and amounts to about 13 per cent of the total output of parched products and beaten rice. The relationship between the retail margins earned on parched paddy, parched rice and beaten rice, and the range thereof, on the basis of actual values ascertained in a number of provinces and States in August 1939 is as follows.

Parched paddy from 11.5 to 27.3 per cent.  
 Parched rice from 7.4 to 16.7 per cent.  
 Beaten rice from 5.6 to 16.2 per cent.

It has also been observed that the quality of the raw material used has a certain bearing on retail margins. Where medium or bold varieties of paddy or rice are used retail margins are generally lower than in the case of products deriving from fine costly rices. For example, the best quality of beaten rice obtainable at Delhi on a certain day in July 1940, cost Rs. 15 per maund wholesale and Rs. 20 per maund retail, thus showing a difference between retail and wholesale prices of 33·3 per cent. This quality was said to be made from fine *Hansraj* rice of the United Provinces. The second quality of beaten rice obtainable on the same day at Delhi was priced at Rs. 13 per maund wholesale and Rs. 15 retail, a difference of 15·3 per cent. This quality was reported to be made from an unspecified medium variety. The third quality of beaten rice made from a bold variety was marked at Rs. 9 per maund wholesale and Rs. 10 retail a difference of 11·1 per cent.

Retail margins also vary according to the retailing agency. Products can usually be bought more cheaply directly from the parchers establishments than from street hawkers. The latter sometimes retail their rice products at double the price at which they buy from their suppliers. For example, at Delhi, where street trading is apparently a flourishing occupation if the number of itinerant vendors is any criterion, several hawkers were found retailing parched rice at double the current wholesale price.

#### H.—Production and utilisation of secondary products.

These products may be regarded as consisting of paddy husk and rice bran. The quantity of rice flour derived by grinding whole or broken rice is comparatively insignificant from a marketing viewpoint and has already been touched on elsewhere.

The approximate annual output of paddy husk in India may be estimated at an average figure of about 10 million tons. A considerable proportion of this quantity is utilised as fuel for domestic cooking and for firing the boilers in large rice mills. A certain amount is consumed in admixture with rice bran by cattle, donkeys and ponies. A small quantity is also used in the villages for mixing with mud plaster as a "binder". Any surplus remaining after these requirements have been met is dumped into manure heaps for compost making, but this occurs only in areas of heavy production. The use of rice husk in the activated carbon process of *gur* manufacture appears to have some potentialities, particularly in those tracts where the *gur* making industry and rice cultivation exist. At present, however, the activated carbon process in the manufacture of *gur* is only in its early stages of development.

Paddy husk has, therefore, for the time being little or no value for commercial or industrial purposes. It would, however, be worth while investigating its possibilities in the preparation of furfural for use in the manufacture of synthetic resins and in fibre board, etc.

Rice bran, the average annual production of which is roughly estimated to be about 1·69 million tons should be of considerable

commercial importance on account of its high nutritive quality as cattle feed. But from the fact that it is only too frequently disposed of mixed with paddy husk it is clear that its full value is not everywhere realised. In Bihar and Orissa, for example, some rice mill-owners utilise the paddy husk and bran admixture as fuel, whereas others give away the two products for nothing or if there is a demand sell it for 2½ annas to 3 annas per maund. In the tracts bordering on the Himalayas in the United Provinces, as, for instance, in the Dehra Dun area, rice bran mixed with paddy husk sells at 6 annas to 10 annas per maund and is readily bought by owners of cattle and pack animals. In the areas of dense production in the Central Provinces the value of rice bran is recognised by the cultivators who, in spite of the increased milling hire charged from them, recover the bran from the mills when their paddy has been hulled. The self-contained type of mill being common in this province, the paddy husk is able to be completely separated from the other parts of the grains. On the other hand, itinerant merchants having their paddy hulled, leave the bran with the mills in consideration of a reduced hulling charge. The mills sell this bran at about 8 annas per maund to merchants who export it chiefly to Waltair (Vizagapatam) and the Guntur area. In Bombay, rice bran is highly regarded as cattle feed, particularly at places like Belgaum where there are large dairies. In the Punjab, where the huller type of plant is employed, rice bran and paddy husk mixed are sold by the mills at rates generally varying from 3 annas to 5 annas per maund. The mixture is laboriously separated by the buyers and the bran thus recovered sold at about 8 annas per maund. Bran prices obtaining in the States of Travancore and Mysore are remarkably high as compared to those in other parts of India. In Travancore, for instance, the wholesale and retail prices are reported to be Re. 1 and Rs. 1-4-0 per maund respectively, while in Mysore values normally range between Rs. 1-4-0 and Rs. 2-8-0 per maund during the summer months when the supply of green fodder is short. In conclusion, it may be observed that bran is most valued where the milling plant used is of the efficient self-contained type in which the various products can be separated.

## BURMA

### A.—Note on the trade in rice products.

The main product into which rice is processed, other than the normal products of rice milling, is *hmon-hin-ga*, a vermicelli like preparation. For this, rice, after being washed, has to be soaked in water for about 36 hours and is then pounded in a mortar. The powder is sifted and the sifted product is dissolved in water. The solution is next strained through a piece of fine muslin and the part that goes through is put into a bag of comparatively thick cotton which is suspended from the roof of the room or from poles. This is done to drain off all clear water, leaving only rice paste in the bag. The bag is then pressed by means of heavy stones to get rid of the remaining water. The resultant lump of paste is next boiled until it becomes soft to a depth of about one inch when it is pounded in a mortar, and the paste mixed with water, and kneaded. The thin paste thus obtained is put into a cloth bag with a perforated iron plate and squeezed through the small holes into a pan of boiling water. The vermicelli like product, which floats on the surface is then put into a basket. This product is consumed mixed with a gravy, which is generally made of minced fish powdered gram, onions and the cut portions of the tender banana stem. *Hmon-hin-ga* is greatly relished by the Burmese, and the quantity of rice in demand for its manufacture is estimated at about 20,000 tons a year.

Various kinds of Burmese cakes are also made with powdered rice and it is estimated that another 20,000 tons are thus utilised.

The production of parched products in Burma is totally insignificant in comparison with India, since only 200 tons of paddy equivalent to about 133 tons of rice are estimated to be manufactured into these products. It is, therefore, obvious that there is no rice parching industry in Burma worth mentioning. This is in consonance with the absence of any enumeration under the head "grain parchers" relating to Burma in the 1931 census.

About half the quantity of the rice used for making the products is converted into beaten rice, the remaining half being turned into parched rice and parched paddy in equal proportions.

All the three products appear to be made from cheap coarse varieties of paddy belonging to the Byat group, parched and beaten rice being prepared from Kaukkyi and parched paddy from Kaukhuyin.

*Paddy husk and rice bran.*—Of the two by-products of rice milling, i.e., husk and bran, the former is almost entirely consumed as fuel in the rice mills the great majority of which are steam driven. This product is, therefore, of the greatest utility to the rice milling industry although no actual commercial value can be placed thereon as it is nowhere disposed of by sale.

The importance of rice bran from the point of view of marketing can be gauged from the fact that Burma exports on an average (1934-35 to 1936-37) 265,000 tons of this product to foreign countries where it is utilised as a concentrate for feeding dairy cattle. This quantity represents probably between 80 and 90 per cent of the total amount of bran produced in Burma.

The estimated value of the exported bran, on the basis of average figures in 1931-32 to 1933-34 may be put at Rs. 63.7 lakhs which works out to Rs. 24-0-8 per ton or 14 annas per maund.

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*Manufacturing and distribution of rice products.]*

### INTER-CHAPTER TEN.

The three principal rice products of commercial importance in India are parched rice (*murmura*), beaten rice (*chura*) and parched paddy (*kheel*). On an average, approximately 1·5 million tons of paddy equivalent to about 1 million tons of rice and an additional 35,000 tons of parboiled rice are estimated to be converted into these three products every year. This represents about 4 per cent of the average total rice supplies including imports. The weight of the manufactured products amounts to some 1·25 million tons of which about 554,000 tons consist of parched rice, 533,000 tons of beaten rice, and only 168,000 tons of parched paddy. The total quantity, though relatively small provides employment to a large community known generally as *bharbhunjās*, as cottage industry workers.

As compared with parched rice and beaten rice, the consumption of parched paddy exhibits a distinct seasonality, being more common during late autumn in Northern India owing to the religious festivals which occur during October and November.

Bengal is the largest producer of the parched products, altogether some 674,000 tons of rice or 8 per cent of the average crop of the province being used for the purpose. This quantity represents nearly 50 per cent of the total quantity of rice converted into parched products in India. Next to Bengal, the industry is of importance in the United Provinces, where some 12·5 per cent of the total crop or some 246,000 tons of rice are utilised in this manner. Ranking third are the provinces of Bihar and Orissa. In other provinces and States this industry has not so far been developed to any appreciable extent.

Besides the three major parched products, the only other product worth mentioning is rice flour which is

prepared by grinding broken or coarse rice in hand or power driven *chakkis*. The total quantity of rice flour produced in India has been roughly estimated at 50,000 tons, of which 20,000 tons or 40 per cent is manufactured in Sind, mostly for local consumption in that province.

The cost of processing varies according to the type of product, the amount of wages involved, the cost of fuel used, and the rent of premises and other incidental expenses. The cost of manufacturing one maund of parched rice, excluding the value of the raw material, generally ranges between 12 annas and Rs. 1-4-0 in different parts, while that of beaten rice varies from Re. 1 to Rs. 1-8-0 except in extreme cases. Parched paddy costs relatively less to manufacture, 12 annas per maund being a fair average for India as a whole. The different varieties of paddy and rice used and the varying nature of manufacturing costs are jointly responsible for fairly wide divergencies in the profits made by makers of parched products.

No official records of the prices of the various rice products are maintained nor are any quotations available for a fairly long period from those engaged in their manufacture and distribution. Enquiries show, however, that the price relationship between the raw material and the finished product is highly variable. Also, the prices of rice products fluctuate less than those of the raw materials from which they are made and in some cases these follow different trends.

The nature of the trade in rice products is such that really large quantities are not involved in any single transaction. Parchers themselves are generally the chief agencies for the distribution of their products. There are, however, a number of merchant firms or *arhatiyas* in urban centres who buy direct from local parchers and distribute the goods either in the neighbourhood or in distant consuming markets. Railway freight forms a

proportionately higher charge in the distribution of parched rice than in rice or paddy. This is because parched rice is included under Class 4 of the Indian Goods Tariff and so is subject to a higher rate of freight than rice or other food grains which are included in Class 1. Of the three rice products, parched paddy generally carries the highest retail margin, varying from about 12 to 27 per cent, while those in the case of parched rice and beaten rice were found to vary from 7 to 17 per cent and 6 to 16 per cent respectively, in different provinces and States. Retail margins also seem to depend on the quality of product. This was observed to be the case especially in respect of beaten rice. For instance, at Delhi in July 1940 the differences between the day's retail and wholesale prices of the 1st, 2nd and 3rd qualities of this product were about 33, 15 and 11 per cent respectively.

Paddy husk and rice bran, which are by-products obtained in the process of rice hulling, are also of some commercial importance. The approximate annual output of paddy husk in India is estimated at an average figure of 9.88 million tons. A considerable proportion of this quantity is utilised as fuel in domestic cooking and for firing boilers in large rice mills, a certain amount being also consumed in admixture with rice bran by cattle and donkeys. The use of rice husk charcoal in the activated carbon process of *gur* manufacture appears to have some potentialities in providing a market. At present, however, the activated carbon process in the manufacture of *gur* is only in its early stages of development. It would be worth while investigating the possibilities of using these large quantities of rice husk available in the preparation of furfural for use in the manufacture of synthetic resins and in fibre board, etc. These possibilities need to be explored by industrial research.

Rice bran, the average annual production of which is roughly estimated to be about 1.69 million tons, should



be of considerable commercial importance on account of its high nutritive quality as cattle feed. But as it is frequently disposed of mixed with paddy husk, its full value is not everywhere realised. The price of rice bran in Southern India especially in Mysore is fairly high as compared with that in other parts of India. In Mysore, for instance, prices normally range from Rs. 1-4-0 to Rs. 2-8-0 per maund during the summer months when the supply of green fodder is short. It may be noted that where the milling plant used is of the self-contained type, the bran is recovered separately in a form in which its full value can be realised.

In Burma about 20,000 tons of rice are manufactured into *hmon-hin-ga* a vermicelli like preparation and a similar quantity is used for making various kinds of Burmese cakes. The production of parched products in this country is insignificant. Of the two products of rice milling, *e.g.*, husk and bran, the former is entirely consumed as fuel in the rice mills, the great majority of which are steam-driven. This product is, therefore, of great utility to the rice milling industry. From the point of view of marketing the importance of rice bran can be gauged from the fact that Burma exports on an average (1934-35 to 1936-37) 265,000 tons of this product to foreign countries, where it is utilised as a concentrate for feeding dairy cattle. This quantity represents about 80 to 90 per cent of the total amount of bran produced in Burma.

## CHAPTER XI.—SEED.

## INDIA.

## A.—Supplies.

## (1) QUANTITIES.

Seed is sown in the form of paddy or rice in the husk and the quantity used per acre varies enormously according to cultural practice. Where, for example, the seed is sown broadcast, instead of being put down in a seedling bed and subsequently transplanted in the field, the seed rate is always higher than when the latter system is practised owing to the fact that a relatively larger proportion of the seed broadcast fails to germinate. Thus the seed rate must be higher in order to compensate for the number of "casualties" which inevitably results under the broadcast method of sowing. The extent of the variation in the seed rate between transplanted and broadcast paddy will be seen from Appendix XXXIV which gives the average annual seed requirement in a number of important rice producing areas. In Mysore, for instance, 17 lb. of paddy are sufficient to cover one acre when transplantation is practised; whereas 78 lb. are needed for the same area when broadcast. This is perhaps an extreme case and the normal procedure in many large rice tracts seems to be to use double the quantity of paddy when sowing broadcast as compared with transplanting. A few typical instances are Madras, where the transplanted seed rate is 41 lb. per acre and the broadcast 81 lb., the United Provinces where the relative figures are 33 lb. and 62 lb., Assam with 31 lb. and 62 lb. respectively and the Punjab where 10 lb. of paddy are sown under transplanted conditions and 20 lb. under broadcast.

The only notable exception to the general rule occurs in Bihar (excluding the Chota Nagpur and Santhal Parganas areas) where the transplanted seed rate is given as 80 lb. of paddy and the broadcast 50 lb. This is reported to be due to the defective germinating power of a proportion of the seeds put down in the seed beds necessitating the rejection of a considerable number of young seedlings which show insufficient vitality for transplanting in the field. If this is indeed a fact, it would appear that the quality of the seed used in Bihar leaves much to be desired and would in large measure account for the poor yield reported from Bihar particularly since the seed rate over the two and a half million acres broadcast is at the comparatively low figure of 50 lb. The question, however, merits further examination.

The following abstract from Appendix XXXIV shows how much seed is required for sowing, as reported by different provinces and States.

	Average seed requirements of paddy.	Approximate equivalent in terms of rice.
	(Thousand tons).	(Thousand tons).
<i>British India—</i>		
Bengal .. .. .	538	376
Madras .. .. .	244	166

	Average seed requirements of paddy.	Approximate equivalent in terms of rice.
	(Thousand tons).	(Thousand tons).
<i>British India—contd.</i>		
<i>Bihar—</i>		
(a) Bihar proper .. .. .	199	125
(b) Chota Nagpur and Santhal Parganas ..	212	132
United Provinces .. .. .	148	99
Central Provinces .. .. .	270	180
Assam .. .. .	85	55
Orissa .. .. .	177	110
Bombay .. .. .	64	45
Sind .. .. .	35	25
Punjab .. .. .	6	4
Coorg .. .. .	3	2
<i>Indian States—</i>		
<i>Eastern States Agency—</i>		
(a) Orissa Fendatory States .. .. .	170	113
(b) Central Provinces States .. .. .	88	59
Hyderabad .. .. .	41	24
Madras States .. .. .	56	39
Mysore .. .. .	18	13
Kashmir .. .. .	8	5
Bombay States .. .. .	15	10
Baroda .. .. .	5	3.5
Others .. .. .	32	26.5
Total India .. .. .	2,414	1,612

Having regard to the respective areas under rice the average seed rate for India as a whole may be put at 70 lb. of paddy per acre. This entails the use of approximately 2.42 million tons of paddy or expressed in terms of rice some 1.61 million tons. The proportion of the total crop normally used for this purpose is, therefore, 6 per cent.

## (2) QUALITY.

Rice is rarely if ever sown with other crops such as, for example, wheat which is often sown together with barley or gram in the same field. The necessity for ridding the paddy of impurities or admixtures is, therefore, not so pressing but the amount of care taken by the cultivator to clean his seed varies considerably. It was observed that in some cases the paddy intended for sowing was winnowed, picked over or sieved, if somewhat perfunctorily, but in the majority of instances no special precautions appeared to be exercised.

Although the keeping quality of paddy, provided the produce has been properly dried, is of a high order owing to the protection afforded to the kernel by the hard tenacious outer husk, the grain intended for sowing is often stored in special or separate containers of the kind described in Chapter VII. There is no evidence to show that the germinating capacity of seed is ever tested before sowing and there is no official seed testing station to which such seed may be sent for examination and report as to purity or germination.

## (3) SOURCES OF SUPPLY.

The cultivator always endeavours to retain from his harvest sufficient paddy to meet all seed requirements. It has been found, for example, that in Bengal, Madras, Bihar, Assam and the Central Provinces, the great majority of growers keep their own seed in normal years and do not have recourse to outside agencies. In the west of the United Provinces producers of fine rices invariably conserve their own supplies of seed from their harvest but where medium, bold or coarse rices are also grown it is customary to purchase or borrow paddy from other cultivators in the locality. In the eastern part of the province, borrowing on the *sawai* or *deorhi* system (explained later) is quite common. In the Central Provinces the large landlords or *malguzars* and richer tenantry are the most important suppliers of seed and it is estimated that 30 per cent of the total seed supply in this tract is obtained from these agencies. In Hyderabad about half the number of growers preserve their own supply seed. Of the remainder the majority patronise the village merchant by whom the seed is generally advanced on the *nag* system and a few only borrow from their neighbours. The *nag* system is the same as the *barhi* system prevalent in the Central Provinces and which is referred to later. The debtor undertakes to return the original quantity borrowed *plus* 50 per cent extra at the time of harvest.

Whenever the grower is short of his own seed and has to turn to other agencies to procure his requirements at the time of sowing he obtains his supply in the great majority of instances not by buying it outright on cash payment but by borrowing it under the stipulation of returning the quantity originally taken *plus* an extra quantity of paddy to cover interest. There are two systems commonly in vogue. The first known as the *sawai* system and the second as the *deorhi*. In the first—the word *sawai* literally means one and one fourth—the borrower has to return to the lender the original quantity *plus* one fourth extra. Where *sawai* loans are incurred on a

cash repayment basis it was found that as in the case of wheat and most other crops such loans are often repaid in kind. This is usually to the advantage of the lender as he receives a larger quantity of paddy for the price fixed since rice is almost always cheaper at harvest time. The second or *deorhi* system is much less in vogue as it is extremely onerous owing to the fact that it entails the repayment at the time of harvest of the original quantity of seed borrowed *plus* half as much again. The *deorhi* system seems to exist mainly in parts of the United Provinces where local conditions are backward. A counterpart of this system is seen in the Central Provinces where borrowings of seed are repaid in kind with 50 per cent *barhi* or interest soon after harvest. In case of failure to repay the lender converts the debt into a cash debt by calculating the cash value of the grains advanced together with the *barhi* at the market rate prevailing at the time of conversion. The borrower thus has to execute a bond or promissory note in favour of the lender. Interest at 25 per cent per annum is charged on the total sum outstanding.

Seed can also be obtained from the departments of agriculture in different provinces and States through various agencies such as agricultural research stations, demonstration centres, government seed stores and certified seedsmen. Seed may also be procured through co-operative societies, and unions and growers associations. This is dealt with in more detail in the following section.

Although purity and reliability are the two characteristics of department seed it is remarkable that not even 10,000 tons of pedigreed seed appear to have been distributed in 1938-39 throughout the whole of India. According to the latest available administration reports of departments of agriculture in provinces and States, the actual amount of seed distributed is just under 9,500 tons or between one-third and one half of one per cent of the total Indian seed requirements which it will be recalled average 2.42 million tons. The largest supply of department seed is distributed in the Central Provinces, while Madras ranks second. The quantity distributed in the former province in 1938-39 was about 6,000 tons and in the latter 2,500 tons.

In addition to the crop produced directly from the pedigreed seed distributed each year, account must be taken of the effect of natural spreading which, it is very roughly estimated, has resulted to date in some four and a half million acres or about 6 per cent of the total acreage under rice in India being under improved varieties. This is a far from impressive figure when it is borne in mind that large scale rice research has been financed from the Centre by the Imperial Council of Agricultural Research for the past ten years—more money having been spent by the Council on rice research than on any other single commodity. If the fruits of research are to be given practical application and a number of high yielding types of rice have to be evolved—much greater efforts are necessary to ensure that larger quantities of improved seed are made available and that the multiplication and distribution of such seed is placed on a properly organised basis.

## (4) METHODS OF DISTRIBUTION AND CONTROL OF SUPPLY OF IMPROVED SEED.

(a) *By traders.*—The proportion of paddy distributed by traders is not large except possibly in the Deccan notably in Hyderabad, and to some extent in Central India. Elsewhere the grower continues to retain his own seed or where his requirements exceed the supply he borrows, to be repaid in kind, from other growers and from the *malguzar* or landlord. In times of crop failure, however, the cultivators are usually compelled to approach the trader or village *bania*. The terms under which seed is obtained from traders conform either to the *sawai* system, generally in kind, or the paddy may be bought outright for cash, which is very rare. It may also happen that the value of the seed paddy is fixed at a mutually agreed price and entered by the trader to the debit of the grower where the latter is a regular customer or has an outstanding account with him. The seed obtained from the *bania* is more often than not of non-descript type and in some instances may even be a mixture of different varieties. It will be obvious, therefore, that this agency contributes nothing to the improvement of rice culture.

(b) *By co-operative societies.*—The distribution of seed forms a negligible part of the activities of the co-operative departments in India. With the exception of a few societies distributing seed in Bengal, the Central Provinces and Madras, in no other province or State, it appears that seed paddy is distributed through co-operative societies.

In certain districts in Bengal, notably in Mymensingh, Rajshahi and Bogra, the system is in vogue by which the Co-operative Department financed by the Central Co-operative Bank and credit societies buys paddy for seed from government farms and distributes it to members under the stipulation that each recipient returns to the bank or society, at harvest, the quantity received *plus* an extra 25 per cent (*sawai* system). The seed thus recovered is stored and redistributed on similar terms the following year.

In Madras, there are some four multipurpose societies in the district of Salem distributing departmental seed to their member-growers. There are also, in various other districts, agricultural improvements and agricultural demonstration societies which, in the course of demonstrating improved methods of tillage, raise paddy for seed purposes on land owned by them. This seed is distributed among the members. During 1939, these societies supplied about 1,000 maunds of seed paddy.

In the Central Provinces distribution is effected by the village seed unions which are not dependent for finance on any outside agency such as a Co-operative Central Bank as is the case in Bengal. Under this system a group of growers combine to form a union and build up working capital from shares paid in kind by the members. This capital is converted into cash and with the sale proceeds pure seed is bought from a government farm and lent to the members on *barhi* or repayment in kind terms. At the end of the year cash dividends are paid to the members from the profits, if any.

As far as can be ascertained the total number of co-operative organisations in India engaged in the distribution of paddy for seed is probably less than fifty and the total quantity of seed handled is not more than the insignificant total of some 6,000 maunds or 220 tons. It may, therefore, be inferred that the rôle played by co-operative agencies in this important developmental sphere is quite negligible.

(c) *By agricultural and revenue departments.*—By far the largest distributing agencies of improved seed are the departments of agriculture in the various provinces and States, distribution being carried out through research stations, seed farms, Union Board farms, demonstration centres, Court of Wards and other estates, agricultural associations, private seedsmen, registered growers and growers' associations.

Generally speaking, the pedigree seeds of improved strains released by the various research stations in India are not issued directly to the growers for general sowing. They are, in most cases, distributed among the seed farms, registered seed growers, associations, etc., engaged in the growing of improved varieties under departmental supervision and patronage. On the other hand, in the provinces of Bihar and Orissa, where large scale multiplication of pedigree seed under controlled conditions is not widely practised at any stage before it reaches the grower for general cultivation, seed from research stations is issued direct to individual producers.

The methods adopted to distribute the seed raised in seed farms as well as in the fields of registered seed growers, private estates, etc., are fundamentally identical and differ only in detail.

For instance, under the seed farm system operating in Madras, each Deputy Director of an agricultural circle selects a number of reliable and progressive growers who are prepared to utilise a part of their land for the multiplication of certain strains evolved by the province's research stations. An agreement is entered into by the circle officer with each individual grower under which the latter agrees to prepare the land, grow the variety recommended, and finally rogue and thresh the crop in accordance with instructions and under departmental supervision. Further, he is required to return an amount of seed equal to that supplied originally, and to sell to the department a specified minimum proportion of the produce harvested at a price which is fixed rather higher than the prevailing market rate for ordinary paddy. In a number of instances, the agricultural department makes advances to such growers to enable them to meet the expenses of cultivation. These advances are adjusted when the produce is harvested and the stipulated quantities of paddy returned to the department. The seed acquired from these farms is stored in the agricultural depots and from there distributed among the cultivators for general sowing. There is also another system in vogue in Madras by which pedigree strains are supplied to approved seedsmen on condition that they distribute at least half of their produce for seed purposes to the neighbouring growers. The actual distribution in all such cases is done by the producers themselves and in such circumstances little control can be exercised by the department to prevent admixture. In 1938, there were about 6,000

acres under seed farms in Madras and the quantity of seed supplied was about 1,000 tons.

With a few exceptions each district of Bengal has a government farm to which the strains evolved and established at the main research stations are sent for varietal tests. The varieties found successful after such tests are multiplied on each farm and the improved strains of paddy thus raised are issued by the department to the various Union Board farms demonstration centres, private seedsmen, Court of Wards and other estates' farms and agricultural associations who grow them on a still larger scale and dispose of the paddy for seed purposes to the cultivators in general. In 1939, the total number of all seed growing agencies in Bengal was 572, of which 381 consisted of Union Boards and demonstration centres. The quantity distributed by the latter agencies was about 1,000 maunds.

Pedigree seed is produced on 19 government farms, including rice research stations, in the Central Provinces. These pure strains are sold partly direct to the individual growers but mostly to the selected holdings termed private seed farms, the owners or tenants of which bind themselves to sell the harvested crop for seed to the neighbouring cultivators. Pedigree seed is also distributed by the Agriculture Department to seed growers' associations, which in turn advance the seed to members on *barhi*. In 1939, the number of such farms and associations was about 4,000 and 240 respectively. Except for giving advice and encouragement to seed growers to keep the seed pure, the agricultural authorities do not exercise any other measures to control and maintain purity.

In the United Provinces, most of the pedigree seed released by the various departmental farms are issued to private farms which work in co-operation with the department in the multiplication of seed. A considerable proportion of the seed thus raised is purchased by the Government and stored at the departmental stores whence it is subsequently distributed for general cultivation under the usual *sawai* terms. A certain amount of seed is also kept stored at the private seed farms and sold to the farmers at a small premium over ordinary paddy.

In the Punjab, the seed raised at the research stations and Government farms is issued to large grantee estates on condition that the seed is multiplied under departmental supervision and sold back to the Government. For the purpose of distributing the seed, the department employs a number of licensed or registered agents on a commission basis. A surety bond for an appropriate amount is also taken from every agent. The price of the seed paddy is fixed by the department, generally at a few annas per maund higher than the prevailing market rate of ordinary paddy, and the agents are not permitted to sell at any price other than the one so fixed. The weakness of the system seems to lie in the fact that the agent is responsible to the Agriculture Department only for the value of the paddy handed over at the price fixed by authority and so long as the full value is recovered, no check appears to be made in regard to the manner in which the paddy is disposed of. The system, however, has much to be commended and it is possible that a tightening up of supervision might help in the wider and speedier extension of improved varieties.



**B.—Research.**

Although the cultivation of rice constitutes the largest single agricultural occupation in India, extensive research on this crop was not taken up until comparatively recent years. Primarily this was the concern of the provincial departments of agriculture, and as might be expected research was first initiated in the great rice producing provinces of Bengal and Madras in 1913, some seven or eight years after research on wheat had already been started at Pusa in Bihar. The pioneers of rice research were Messrs. G. P. Hector and F. R. Parnell, Directors of Agriculture in Bengal and Madras respectively, and the investigations undertaken by these officers ran along somewhat similar lines and dealt with pollination studies, colour inheritance and artificial crossing. In Madras, Parnell also studied the question of probable errors of field experiments—a subject which has since assumed considerable importance. Since 1932, rice research has been extensively developed in all the major rice growing areas under the auspices of the Imperial Council of Agricultural Research and seven research stations, financed by the Council, have at different times been set up in the provinces. There are at present eight stations operating under subventions from the Council. These are at Nagina in the United Provinces, Sabour in Bihar, Chinsurah and Bankura in Bengal, Habibganj in Assam, Berhampore and Jeypore in Orissa and Raipur in the Central Provinces. Three new schemes of research in Kashmir, Baroda and Travancore have recently been approved by the Council and the new centres will start operation in 1940. Another research station functions at Pusa under the direct control of the Imperial Agricultural Research Institute.

In addition to these research centres, the Imperial Council of Agricultural Research has also allocated funds to the Dacca University and the Royal Institute of Science, Bombay, for the purpose of carrying out investigations on the nutrition of the rice plant.

The programmes of work are elastic and provide for research not only on selection in breeding but also on manuring and cultural methods in general and on nutritional requirements. Annual reports from the research stations are considered by a Rice Sub-Committee appointed by the Imperial Council of Agricultural Research and the recommendations of the Sub-Committee are placed before the Advisory Board of the Council at one or other of its bi-annual meetings.

In his recent report on the work of the Imperial Council of Agricultural Research in applying science to crop production in India, Sir John Russell commented favourably on the work done by research workers in India on selection and cultivation and expressed the opinion that scope exists for further experimentation to determine the effect of fertilizers on the growth of rice. He has also pointed out that more attention might well be directed to the water requirements of the different varieties of paddy in different environmental conditions.

The following is a brief summary of the work being done at individual rice research centres.

**Pusa.**—At Pusa, now a sub-station of the Imperial Agricultural Research Institute, Delhi, investigations on the classification of the rices of Bihar and Orissa were commenced in 1928, and from a collection of 1,200 single plant samples obtained from the various districts of the two provinces, 123 pure lines were finally isolated. A detailed study was made of various plant characters and the value of each for classificatory purposes was examined. It was observed that little being known of the physiological characters, the qualitative characters and particularly the colour characters as being more constant, were better criteria for taxonomic purposes. A scheme of classification based on the chemical constitution of the rice kernel, presence or absence of clustering in spikelets, colour in glumes, etc., and finally on shape and size of grain, was proposed. It was shown that the inner glumes exhibit a range of easily distinguishable colours and thus provide a ready means of discrimination of types.

The growth and development of pigments present in the glumes and apicules have been closely studied and small but important varietal differences brought out.

Tillering in relation to yield and various types of chlorophyll deficiency have also been investigated.

Of the several types compared in yield trials, type Nos. 18 (early), 24, 31 and 52 (late) were found to be high yielding and worthy of recommendation for general distribution.

**Bengal.**—Research on rice in Bengal is carried out in the experimental farms at Dacca, Barisal, Chinsurah and Bankura and Suri as well as in the other district farms. The work at Chinsurah and Bankura farms is financed by the Imperial Council of Agricultural Research. Research in Bankura has been mainly directed to find rice types best adapted to the rainfed and terraced paddy lands of Western Bengal for which the varieties of the plains are not suitable. At Chinsurah, breeding methods are applied with special reference to yield as well as to quality suitable for export. The rice to which special attention has been given is the well known export *Patnai* variety. In Dacca, work has been concentrated in selecting and evolving early strains of *aus* (autumn) paddy to escape the vicissitudes of flood, which is a common feature in Eastern and Northern Bengal. In the Barisal farm, intra-varietal selection of *Ballam* and *Patnai* paddies have been made.

As a result of these investigations, a number of improved races of rice, besides those that are still under experiment, have been produced and introduced in the different districts. Of these, *Bankura No. 1* (*Badakalmakati*) *Chinsura Nos. 1* and *2* (*Nagra* and *Bhasmanik*), *Dacca Nos. 6, 14* and *18* are probably the most reputed on account of their combination of quality yield and commercial suitability.

**Madras.**—As already mentioned, rice research was commenced in Madras by the then Director of Agriculture, Mr. F. R. Parnell, who, during 1913-1920 worked out methods of cross-breeding and of

field experiment and made a full analysis of the inheritance of colour characters in paddy. The work thus begun was further extended in subsequent years so that, apart from the Central Research Station at Coimbatore there are at present four sub-stations in the province directing their investigations mainly to the selection of desirable strains, hybridisation and inheritance. From a number of local types about 200 varieties have been distinguished in pure line. In the single plant selections it has been found that most of the selected varieties yield 10 to 30 per cent more than the standard. A number of hybridised strains has also been evolved which combine the good qualities of high yield, vigour, resistance to diseases and early maturity. About 30 types which so far have been selected are being multiplied in the various seed farms in this province and are distributed among growers for general cultivation. The total area under improved strains of paddy in Madras is estimated to be about 1 million acres. The strain which has spread most is the popular and successful *G. E. B. 24 (Khichili Samba)*.

**Bihar.**—This province possesses two rice research stations, the central station being located at Sabour and the sub-station at Kanke (Ranchi). The main items of botanical research in these stations are isolation and establishment of pure lines and putting them to yield and soil trials. Selections have been made from a large number of established pure lines of South Bihar, the outstanding types among them being *115 BK* in the early, *88* and *16* in the medium and *76* and *36* in the late series. These are much appreciated by the cultivators for their superior grain quality and high yield which exceeds that of the ordinary varieties by as much as from 20 to 30 per cent.

**Orissa.**—In this area research work on rice is carried out at three major stations located at Cuttack, Berhampur and Jeypore. Experiments on flood-resistant, salt-resistant, and *dalua* (summer) paddies which require special environmental conditions are conducted at Kujang, Sandkud and Mangarajpur, respectively. Each of these stations, apart from general research on isolation and selection, investigates separately such botanical problems as are peculiar to the surrounding tracts. Thus the Cuttack and the other three co-ordinating stations conduct experiments on evolving different strains of paddy capable of being successfully grown in flooded tracts, submerged depressions, and in the saline soils along the coast. The research station at Berhampur concentrates on the evolution of strains with better yield, while that at Jeypore station works on the evolution of better types suitable for the hilly tracts of the Koraput district. Some of the well established selections which are distributed to the cultivators of the province for field trial are *Kujang No. 1*, *26 B*, *D 1*, and *Berhampur 9*, *40*, *4448* and *2652*. At Jeypore, some of the scented *pulao* rices from Northern India such as *Basmati*, *Hansraj* and *Mushkan* were grown experimentally with promising results and an average yield of 1,700 lb. of paddy per acre.

**Assam.**—There are three rice experimental stations in Assam; one located at Titabar (Sibsagar), another at Karimganj (Sylhet) and the third at Habiganj (Sylhet). The first two stations are

working on autumn and Sali (transplanted winter) paddies and have recommended 40 selected strains of bold, medium and fine types for general sowing. The station at Habiganj was opened in 1934 and is financed by the Imperial Council of Agricultural Research. The main item of research dealt with is the study of deep water or long stemmed winter paddy.

**United Provinces.**—Rice research in the United Provinces is centred at the Rice Research Station, Nagina. As a result of research a number of improved strains have been evolved of which mention may be made of *T-43* which is a heavy yielding early paddy of medium coarse grain well suited to the submontane or *terai* tracts where the depredations of wild pigs cause serious loss. *A-64* and *T-136* are two promising types which have been found suitable for the dry unirrigated areas in the eastern parts of the United Provinces. In addition, investigations have been specially directed towards the improvement of yield and quality in the early rices and for breeding *gundhi*-resistant hybrids which, it is expected, will save extensive areas of *Sathi* rice from the devastating attack of the rice bug.

**Central Provinces.**—Investigations on rice in the Central Provinces are carried out at the Lalbandi Farm near Raipur, in the heart of the main rice growing tract. The more important lines of research undertaken at this farm are the isolation of high yielding varieties, hybridisation and selections in fine and scented rices. In 1939, some of the improved strains were crossed with the *American Blue Rose* variety to evolve prolific strains with bold hard textured and translucent grain suitable for the export market. About 16 improved strains of high yielding quality of which eight are of the fine and scented varieties have also been evolved and their seed is being distributed to the rice growers. Probably the most important selection from the commercial viewpoint are *No. 6 Budhiabako* and *No. 17 Chinoor* with average yields of 2,501 and 2,200 lb. of paddy per acre respectively.

**Bombay.**—There are four farms in this province carrying out research work. The farm at Karjat at the foot of the ghats is probably the best known. Here investigations are carried out into the rices of the Kolaba and Thana districts. The farm at Mugad works on the rices of southern Maratha country and the two farms at Kumpta and Ratnagiri devote attention to the rice crops of the Konkan. About 20 to 30 improved strains have been evolved and are under distribution. The most successful strains are those evolved from *Kolamba*, *Pattani* and *Antrasal*, all well known commercial varieties. Trials of rices not indigenous to Bombay indicate that certain varieties may prove useful under particular environmental conditions, in local rice tracts.

**Sind.**—In this province, research on rice is conducted at the Research Station, Larkana, in upper Sind. This is an area of concentrated production. Efforts are being made to evolve heavy yielding and early maturing varieties for introduction in areas where the water supply is irregular and insufficient. *Kangni 27*, which is an improved strain of the popular trade description of *Kangni* of

Upper Sind has been found to yield 20 per cent more than the ordinary type.

**Punjab.**—The rice farms at Kala Shah Kaku and the Sub-Station at Karnal are the only stations in the Punjab conducting experiments on the improvement of the rice crop. Special attention is devoted to improving yields. The established selections which are at present being distributed among the growers for general cultivation are *Jhona No. 349*, *Basmati No. 370*, *Mushkan No. 7* and *Sathara No. 278*.

In regard to this rice research work in general it is observed that at each research station there are large numbers of varieties produced by selection or cross breeding. Many of these have certain desirable qualities, *e.g.*, high yield. In releasing these varieties, the necessity for maintaining in each tract the commercial characteristics in respect of conformation and cooking quality of the type of rice for which the tract is noted, should not be lost sight of.

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## BURMA.

### A.—Supply.

Roughly 95 per cent of the total area under rice in Burma is transplanted and the remainder sown broadcast. The average seed rate is just over 44 lb. of paddy per acre for transplanted and 54 lb. for broadcast. The total amount required to sow Burma's twelve and a half million acres of rice is, therefore, in the neighbourhood of 252,000 tons of paddy equivalent to some 185,000 tons of rice. This represents on an average about 4 per cent of the total crop.

As is the case in India the vast majority of the cultivators in Burma contrive to retain sufficient paddy from the harvest to meet their seed requirements. When supplies fall short resort is made to borrowing mostly from other growers on conditions very similar to those already described as prevailing in India.

The only other main distributing agency for seed is the government seed farms and the ancillary organisations, a brief description of which is given in the next section. The quantity of improved paddy seed distributed by farms controlled by the Agriculture Department amounted in 1934-35 to 344,000 baskets of 46 lb. each or the equivalent of rather more than 7,000 tons. In 1938-39, the figure had risen to nearly 400,000 baskets or 8,000 tons. It will at once be evident that the improved seed distributed in Burma at the present time not only exceeds the total quantity distributed by the various agriculture departments in the provinces and States of India but the proportion of the total seed requirements of Burma represented by improved seed distributed for general cultivation is more than 3 per cent as against India's one-third of one per cent.

In 1934-35, the estimated area under improved rices totalled 982,000 acres or roughly 8 per cent of Burma's total rice area and the yield of improved paddy amounted approximately to 600,000 tons or over 400,000 tons of rice. By 1938-39, some 1,300,000 acres or about 10 per cent of the total acreage under rice in that year are reckoned to have been under improved strains. This area yielded more than 700,000 tons of paddy or close on 500,000 tons of rice.

The reason for the comparatively greater success achieved in Burma in the work of improving the quality of rice and of translating the benefits of research to the producer on an ever increasing scale are in the main threefold. In the first instance, the Agriculture Department has developed a system under which the various rices of Burma have been grouped into five classes\* according to the physical characters of the grain—length, breadth and ratio of length to breadth. This has greatly facilitated crop improvement work. Secondly, rice milling in Burma is a large comparatively well organised and, in many cases, progressive industry equipped on the whole with modern machinery of the self-contained or "automatic" type. The methods of working are such as to enable a considerable degree of standardisation of quality to be achieved. This has helped the local agricultural authorities to obtain a clear perception of the quality requirements of millers. Finally close liaison has always been maintained between the rice research staff and the milling and export trades. No new strain is allowed to be put out for large scale multiplication until it has been first approved by the milling interests as suitable for certain of their markets.

#### B.—Control of supply of improved seed.

In connection with the work of supply, most of the experimental stations have small areas on which, when once the tests have been passed, preliminary multiplication of the paddy can be carried out. The seed is then distributed to government-owned seed-farms which are leased to tenants at local produce rents, but with conditions and concessions which include a rebate up to 20 per cent of the rent if the crop harvested is 99 per cent pure. Disposal of the rent part of the crop is made by district officers of the Agriculture Department direct to local cultivators, whilst the non-rent portion in the hands of the tenant is disposed of by him under instructions of the district officer.

The seed-farms are classed as "major" and "minor". Major seed-farms usually have storage accommodation provided by government and are the headquarters of the local agricultural assistant; on the minor seed-farms the storage accommodation is the responsibility of the tenant. Major seed-farms receive fresh supplies of seed each year from the multiplication area of the experiment stations; minor seed-farms in general take their yearly supplies from the major farms.

Working in conjunction with these government owned seed-farms are also private seed-farms. These are worked by *akyosaungs*

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\*These classes have already been described in Chapter I.

(voluntary helpers), who take seed from either the major or minor seed-farm, multiply it up and distribute it, maintaining at the same time for the information of the department records on a special form showing the quantity and destination of the seed distributed.

With these agencies at work it has been found possible to push out each year from the multiplication area of the central farms a quantity of seed which, in the succeeding years, spreads in ever-widening circles around the seed-farm distribution points.

### C.—Research.

No attempt at systematic improvement of the rice crop was made until 1907, by which time the paddy area was over 9 million acres and the export in terms of rice just over 2 million tons. In that year an experimental station for the crop was opened in the newly established Mandalay canal area, and this was followed seven years later by the opening of a further station at Hmawbi to deal primarily with problems of the Lower Burma rain-fed crop. With more staff available after the War of 1914-18, three more stations to deal with Lower Burma paddy problems were opened at Akyab, Myaungmya and Mudon, between 1922 and 1928.

At these stations, though manuring trials have been given their fair share of attention, the main work has been that of developing new strains of paddy suited to local conditions to replace the existing varieties and mixtures of varieties. The work done has included pure line selection within the indigenous varieties, the testing of likely exotics, and, in more recent years, hybridisation.

The numerous local paddies (it is reckoned that there are some thousands of named varieties, though many on examination have proved synonymous) have provided a wealth of material for pure line selection work. At the various stations fully 3,000 pure lines have been examined up to date. Throughout the growing season the morphological and physiological characters are studied in the field, and in the dry season there is a careful laboratory testing of the grain. Then follows a yield test on the farm, extending over two or three seasons, and sometimes supplemented by parallel testing in the areas for which the selection is designed. The outturn from these tests provides samples for hulling and evaluation, and later for a milling test. No paddies are released for distribution until these tests have been successfully passed.

Of exotic paddies, over a hundred have been tried. The subtropical ones, as represented by the rices from Japan, Spain, Italy and America, which are now so much in demand in Europe, have all proved precocious when grown under the tropical conditions of Burma, and have given yields barely half those of local selections. The purely tropical exotics studied have shown no superiority in quality or yield over pure lines isolated from indigenous types.

Hybridisation work done has included both the crossing of indigenous pure strains and the crossing of indigenous strains

with exotics. A large number of these hybrids are under study but it will necessarily be some years before the results come into view.

From the foregoing it will be seen that, whatever the future may hold, it is to the pure line selection work alone that the present supplies of improved seed are due.

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## INTER-CHAPTER ELEVEN.

Seed rate for transplanted paddy is lower than for broadcasting, the average seed rate for India as a whole being 70 lb. of paddy per acre. This entails the use of approximately 2·41 million tons of paddy representing about 5·7 per cent of the total crop.

The cultivator always endeavours to retain from his harvest sufficient paddy to meet his seed requirements. When short of his own seed, he generally obtains a supply by borrowing in kind from landlords, rich cultivators, or village merchants. Interest charges on these seed loans are invariably exorbitant. In the *sawai* (literally one and a quarter) system, the borrower has to return the lender the original quantity *plus* one-fourth extra. There is also another system in which the cultivator has to pay at the time of harvest the original quantity *plus* half as much again. This practice exists mainly in the backward tracts of the United Provinces, the Central Provinces and the State of Hyderabad. Seed can also be obtained from the departments of agriculture in different provinces and States through such agencies as agricultural research stations, demonstration centres, government seed farms and stores, registered growers and private seedsmen. The role played by co-operative agencies in this sphere is negligible.

Although purity and reliability are the two characteristics of departmental seed, it is remarkable that less than 10,000 tons of pedigreed seed appear to have been distributed in 1938-39 in the whole of India. The largest quantity of departmental seed is distributed in the Central Provinces, the next important area in this

respect being the Madras Presidency. In addition to the crop grown direct from the pedigreed seed distributed each year by government, account must be taken of the effect of natural spreading which it is claimed has resulted to date in some four and a half million acres or about 6 per cent of the total acreage under rice in India being under improved varieties. This is a far from impressive figure in view of the fact that large scale rice research has been financed by the Imperial Council of Agricultural Research for the last ten years, and more money spent by the Council on rice work than on any other single commodity. If the fruits of research are to reach the masses, efforts are necessary to ensure that large quantities of improved seed are made readily available and that the multiplication and distribution of such seed is properly organised.

Generally, the pedigreed seed of improved strains released by the various research stations in India are not issued direct to growers for general sowing. They are, in most cases, distributed among the seed farms, registered seed growers, etc., engaged in the growing of improved varieties under departmental supervision. Beyond giving advice and encouragement to seed growers to keep the seed pure, the agricultural authorities in India do not appear to be taking any steps to control and maintain purity.

Rice research stations in India have evolved a large number of varieties by selection or by cross-breeding. Many of these have certain desirable characteristics, e.g., high yield. This is all to the good but in releasing new varieties, two other important aspects should be kept in view, *viz.*, that it is necessary to maintain in each tract the commercial characteristics in respect of conformation and cooking quality of the type of rice for which the tract is noted and that from the marketing point of view, it is desirable that there should be a reduction rather than an increase in the number of varieties.

In Burma the total amount of seed required is in the neighbourhood of 252,000 tons of paddy representing on an average about 4 per cent of the total crop. As is the case in India, the vast majority of cultivators in Burma contrive to retain sufficient paddy from the harvest to meet their seed requirements.

The quantity of improved seed distributed by the Agriculture Department in Burma, amounted to 8,000 tons of paddy in 1938-39. In the same year, the area under improved strains had risen to 1,300,000 acres or 10 per cent of the total rice acreage. This compares favourably with conditions in India.

The reason for the relatively greater success achieved in Burma in the matter of transmitting the benefits of research to the producer lies mainly in the fact that close liaison has always been maintained between the rice research staff and the milling and export trade, with the result that the crop improvement has developed in consonance with the requirements of the trade, and as no new strain is allowed to be put up for large scale multiplication until it has been first tested and approved by the milling interests the commercial success of the improved strains is assured.

Further, the multiplication and distribution of seed is carried out by government owned seed farms in collaboration with private seed farms. The latter take seed from the former, multiply and distribute it, maintaining at the same time for the information of the department, records showing the quantity and destination of the seed distributed, and thus enabling an effective control of the distribution work to be maintained,

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## CHAPTER XII.—WEIGHTS AND MEASURES.

## INDIA.

## A.—Weights and measures in current use.

Sufficient has already been said in the other marketing survey reports already published to indicate the disabilities under which trade in agricultural commodities labours as a result of the astonishing diversity in the weights and measures in current use in India.

The wastefulness engendered by this lack of uniformity gives rise to additional trading risks which must be paid for, and this can only be done by adding to the profit margins on all transactions. Thus the tendency is for overhead charges for handling to become higher and the services of the middleman more expensive. For all this it is ultimately the cultivator who pays.

The absence of uniformity in weights (and measures) is also an obstacle to the introduction of more orderly methods of marketing. For example, during the negotiations which have taken place between the Central Marketing Staff and representatives of various grain trade associations in connection with the adoption of an All-India Standard Contract for wheat, the Grain Chamber, Muzaffarnagar, while approving the principle of the standard contract wished for the present to adhere to the local maund of 44 seers or 90·5142 lb. instead of the standard maund of 40 seers or 82·2857 lb. as it was felt that owing to the prevailing use of the local unit in the surrounding area the trade of Muzaffarnagar would be affected by diversion to other markets if the standard maund were adopted. The trading community of Muzaffarnagar felt that in this situation lay a strong case for the general standardisation of weights and measures.

## (1) WEIGHTS.

The only unit of weight which may to some extent be regarded as fairly common to the whole of India is the so-called railway maund of 82  $\frac{2}{7}$  lb. (more precisely 82·2857 lb.) based on the tola which is equivalent to the weight of a rupee, i.e., 180 grains or ·4114 oz. This maund and its other sub-multiples, the seer and the *chhatank*\* are used throughout by the railway administrations in India and in Burma, and are also adopted by other transport agencies. In most of the larger assembling and distributing centres and terminal markets in India, the same maund is in vogue. It may also frequently be referred to as the Bengal maund and, occasionally, as the Imperial maund.

Outside the larger centres of trade and throughout the rural areas the weights used are known almost without exception as *kachcha* or non-standard weights. These are based on a variable number of seers per maund, tolas per seer or grains per tola. Although a number of such variations have already been quoted in other reports some may usefully be repeated with a few additional examples,

* 1 Tola	= 180 Grains (the weight of a rupee) (·4114 oz.).
5 Tolas	= 1 <i>Chhatank</i> .
16 <i>Chhatanks</i>	= 1 Seer (2·057 lb.).
40 Seers	= 1 Maund (82·2857 lb.).

typical of conditions in some of the main rice areas. These will give some idea as to the chaos prevailing in weights and measures.

In Bihar, for example, the *kachcha* seer for rice may have a range of anything between 44 and 105 tolas. Further, the weights in a large area in Bihar were also found to be based on a small copper coin worth 3 pies or one-fourth of an anna, individual samples of which were found to vary in weight by over 100 per cent.

In Assam, the unit of weight for paddy in the Surma Valley is generally a maund of 40 seers of 82.625 tolas each, instead of the normal 80 tolas which make the standard seer. In Sylhet, on the other hand, while the local maund is composed of the same number of seers, the weight of each seer is 84.875 tolas. In order to weigh one maund a standard weight is actually used, *viz.*, the maund of 82  $\frac{2}{7}$  lb. and an additional weight of produce is added to make the quantity up to the local maund. A maund of paddy equivalent to 40 seers of 82.625 tolas each, would, when converted to the standard weight, be equivalent to 1 maund, 1 seer, 5 *chhatanks* so that 1 seer 5 *chhatanks* would have to be added to each standard maund to bring it to the level of the local maund. In large transactions the goods change hands usually on weight basis but in all the *hats* where the quantities involved are generally small a volumetric basis is prevalent.

In Madras, weights are not in general use for rice except by the rice mills with export connections and by certain sections of the wholesale trade, mainly in the northern districts of the Godavari Delta. The standard maund of 82  $\frac{2}{7}$  lb. is the normal unit in such cases. Selling by volume is in fact the only practice in the southern districts of the presidency and along the Malabar Coast.

In the Central Provinces, the primary unit of weight for rice is the standard seer of 80 tolas.

In Bengal, both weights and measures are used for wholesale transactions, but the standard maund based on the seer of 80 tolas is adopted only in the districts of Bankura, Midnapore, Burdwan, Howrah and 24 Parganas. In the Rangpur district, the local seer varies from 60 to 90 tolas, in Dinajpur from 60 to 96 tolas and in Malda from 60 to 100 tolas. These are but a few of the numerous instances in which lack of uniformity prevails.

In the United Provinces, paddy and rice are bought from cultivators on the basis of measures but wholesale transactions in the markets as between merchants are governed by weights. Conditions are as chaotic in this province as elsewhere.

In the Bombay Presidency prior to the introduction of the Bombay Weights and Measures Act, 1932, in August 1935 a highly variable range of weights and measures existed. For example, the Bombay seer was originally of 28 tolas, while the Poona seer was 76 tolas and the seer at Dharwar 20 tolas.

In addition to the almost innumerable variations in the weight of the maund it was found that in certain markets there were a number of maunds each meaning something quite different when

applied to various commodities. In Cawnpore, for example, a maund of rice is the equivalent of  $41\frac{1}{2}$  seers while the maund used in the tobacco and sugar trades is taken as  $48\frac{1}{2}$  seers and the maund for groundnuts 50 seers.

Weights are ordinarily made of cast iron. The heavier units are usually in the shape of truncated cones and the lighter, *e.g.*, the widely used 5 seer weight or *panseri*, rectangular. In the rural areas and even in many markets the employment of bricks, stones and even pieces of wood has been found to be quite common.

## (2) MEASURES.

Measures are even more multitudinous in character than weights and are probably used to a greater extent in the rice trade than in other staple commodities. Throughout South India, for instance, weights are only used by certain sections of the wholesale trade. In the great majority of the large rice-growing Indian States in the eastern parts of the country, and in particular in the Feudatory States in Orissa and the Central Provinces States, paddy and rice are sold by volume and not by weight. In the Deccan and over the greater part of the Bombay Presidency, measures are also far more commonly used than weights especially in the rural areas and for all retail transactions. Similar conditions obtain in varying degrees in Northern and Central India but are a particular feature of Bihar, Orissa and Assam. It should be noted, however, that measures are not current in the wholesale rice trade in large centres such as Calcutta and Bombay or in any of the important assembling and distributing markets of Northern India. The use of measures in the retail trade which as already stated is universal in South India gradually ceases to be the customary practice progressively northwards until it practically disappears in the Punjab and the North-West Frontier Province.

Where the use of measures is customary, the interpretation as to what constitutes a full measure is by no means uniform. The "struck" measure which is normal in Europe and America is fairly common only in the Central Provinces. Elsewhere in India and particularly in the south the heaped measure is in most common use. When the Weights and Measures Act was brought into force in Bombay, the original regulations provided for a "struck" measure but the innovation aroused such strong opposition that the rules had eventually to be amended to permit the heaped measure system to continue.

Some idea of the variations in the capacities of the different units of measures used in India may be gathered from the following examples, it being understood that whenever the equivalents in terms of standard weights are given, only approximations are implied as obviously no measure will hold exactly the same weight of grain.

In Bengal, each district has a different unit. In the 24-Parganas the greater and lesser *don* are two common units. The former, used at Hasnabad, contains rather more than 7 seers of rice, and the latter used at Basirhat about 3 seers of rice and  $3\frac{1}{2}$  of paddy.

In Bankura, the *pai* and *sol* are common measures, 20 *pais* being equal to 1 *sol* and 8 *sol* one *map*. As one local *pai* of paddy is ordinarily equal to about 14 *chhatanks* (1.8 lb.) of paddy by weight, a maund of paddy is regarded as the equivalent of between 42 and 46 *pais* depending on the plumpness of the grain, while a maund of rice is taken to be 30 to 31 *pais*. In another part of Bankura, the *pai* is quite different as 56 to 57 measures of paddy and some 40 of these measures of rice go to make up a maund. At Chittagong, the *ari* is equal to about 16 seers at Nila and 78 seers at Cox's Bazar. In the Bogra district, the *katha* is the customary unit and holds about 2½ seers of 50 tolas. In Pabna, its equivalent is 2½ seers of 60 tolas.

In Madras, one of the commonest units is the so called Madras Measure which contains on an average 2.6 lb. of paddy and 3.1 lb. of rice. The *kalam* is the measure of the Tanjore area but great variations attach to this measure in different tracts. Thus a *kalam* which is equivalent to 24 Madras measures at Tanjore equals 48 Madras measures in parts of Trichinopoly and 96 Madras measures at Chingleput. There are also other units at Trichinopoly called *marakkals* of varying sizes to hold 2, 3 1/8, 3 1/3 and 3 7/12 Madras measures. Further north, in Ganjam, the unit of measure for paddy is a *garce* of 3,000 lb. and a *patti* of 100 lb. but in the West Godavari district, however, the *patti* is of 140 lb. In Nellore, the *patti* (also known as *khandi*) holds about 1,860 lb. of paddy. In South Kanara, a *moora* of 25 Madras measures is the common unit while in Tinnevely a *kottai* of 112 Madras measures is employed for paddy.

In the Central Provinces, the primary unit of measure is the *paili* known also as *pai* in Hoshangabad, *chouthiya* in Saugor, *barhaya* in Jubbulpore and *kungan* in Khandwa. The integral measure of the *paili* is the *kuro* or *katha* equivalent to 8 or 4 *pailis* respectively. A *paili* of rice may weigh 100 standard tolas in the Nagpur, Raipur, Chhindwara, Damoh and Saugor districts and 80 tolas in Jubbulpore and Khandwa, while in Akola and Buldana its equivalent is 320 and 160 tolas respectively. The *katha* of rice which is equivalent to 4 *pailis* weighs 5 seers at Raipur but only 4 seers 5 *chhatanks* in the Drug and Rajnandgaon markets. The actual measures used in the physical handling of the produce in this province are the *katha*, *kuro*, *kangan* and *paili*. Their higher multiples which are not measures in the true sense of the word are the *khandi* (candy), *mani*, *chauki* and maund. The *mani* is used in the Saugor, Betul and Hoshangabad districts, the *chauki* in the Khandwa district, the maund in the districts of Berar and the *khandi* in the rest of the province. While the *khandi* is equivalent to 20 *kuros* or *kathas* the *mani* may be 24 *kuros* as in Betul or Hoshangabad, 32 in the Narsinghpur and Gadarwara tehsil or even 48 in Seoni-Malwa and Harda.

In the United Provinces, measures are mainly used in the rural parts of some of the northern and central districts and in practically all the eastern and south and south western tracts. Formerly the use of measures made of baked earthenware was general for the

purpose of arriving at an estimate of the crop harvested, but not necessarily for transacting business. It appears to be the general practice all along the submontane tracts of the United Provinces to use measures when purchasing from the cultivators of those parts. In the Naugarh area, the common measure is called the *sai*. The village *sai* varies from place to place and differs from the market *sai*. In one instance the village *sai* was found to be equal to 1 seer  $2\frac{1}{5}$  *chhatanks* of rice by weight and from 13 to  $13\frac{1}{2}$  *chhatanks* of paddy whereas the market *sai* weighed  $5\frac{2}{5}$  *chhatanks* more for rice and 4 to  $5\frac{1}{2}$  *chhatanks* in excess for paddy. In a group of villages the *sai* of a particular *zamindar* or family is generally considered to be the standard and is requisitioned for the purpose of resolving serious disputes as to measures. The market of Haldwani uses a measure called the *nali* which is made of wood and has a capacity of 2 seers 6 *chhatanks* of rice and 1 seer 10 *chhatanks* of paddy. The *parli* and *mani* are, however, the measures most frequently encountered and their capacities are quite as variable as their counterparts in other provinces.

In the districts of Chota Nagpur and the Santhal Parganas of Bihar, measures called *pailas* are in vogue. These are made of wood or iron in a variety of sizes having a reputed capacity from 1 seer down to one *chhatank*. A number of these measures were checked during the course of this survey and most were found to be very inaccurate. In some of the remoter parts of Orissa the ordinary 4 gallons kerosene oil tin is sometimes used to measure out paddy.

In Assam, the terms *sher* or *kathi* is used in the Surma Valley for a small measure used by retail traders. A larger measure which is used in wholesale transactions is called the *purai*. Four *shers* or *kathis* make a *purai*. In the Assam Valley the small measure is called the *kotha* and the large one the *don*. Five *kothas* are generally reckoned to make a *don* and 5 *dons* a maund. The capacities of the various *shers* in use in different parts of the Surma Valley vary from  $1\frac{1}{2}$  seers of rice at Brahmamayee Bazar to  $6\frac{1}{2}$  seers at Kanaighat.

In Bombay, the local dry measures have now been standardised and are as follows.

1 <i>Chhatank</i> ..	= $\frac{1}{16}$ seer (standard).
1 <i>Adapao</i> ..	= $\frac{1}{8}$ seer.
1 <i>Paoseer</i> ..	= $\frac{1}{4}$ seer.
1 <i>Adholi</i> ..	= 2 seers.
1 <i>Parli</i> ..	= 4 seers.
1 Maund ..	= 16 <i>Parlis</i> .
1 <i>Map</i> ..	= 2 Maunds.

Measures may be made of many different kinds of material. There are the iron, brass or copper measures commonly used throughout Peninsular and Central India and in many large markets in other parts of India. Some of these measures in the Central Provinces are fitted with a "striker" as, for example, at Raipur. The



“striker” is a flat strip of metal hinged on a pin on the lip of the measure. In Assam, on the other hand, measures used are made of plaited bamboo strips plastered over with cow-dung. Measures made out of wood and earthenware are frequently encountered in the more remote rural areas.

Measures—particularly of the smaller type—are generally cylindrical in shape but in Southern India and in Bombay and Hyderabad it is customary to employ measures which are “waisted” or tapered inwards about the middle for the greater convenience of the measurer as this shape affords a better grip. For similar reasons measures may be slightly cone shaped, *i.e.*, narrower at the mouth than at the bottom. Measures of this type are quite common in Central India and in many other places.

With the exception of Bombay where the local legislation make the periodical checking of weights and measures obligatory, no systematic steps appear to have been taken in this matter by any of the other administrations in India and the model bye-laws which have been framed by a number of local governments and adopted by municipalities are, in practice, a dead letter.

#### B.—Scales employed.

The typical hand scale conveniently handles up to 5 seers or about 10 lb. and the 5 seer weight (*panseri*) is probably the most frequently used unit. The two pans of the hand scale may be made either of leather, iron or basket-work and are hung from the ends of the balance shaft by means of twine or thin cord.

The beam scale, suspended from a wooden tripod, is universally used to handle heavy units such as a bag of rice or wheat or a bale of cotton. The popularity of this type of scale is due mainly to its low cost and the fact that there are no hidden mechanical parts which the conservatism of the average Indian trader still holds in some suspicion an attitude which, however, seems to be gradually dying out. For these reasons and also because they are rather expensive, platform scales in their various forms are only used by a limited section of the trading community although they are employed by all the railway administrations and in the shipping docks.

Steel yards are only occasionally used in India mainly for checking purposes, but in Burma, the steel yard is quite common.

#### C.—Units of sale.

##### (1) FOR PRICE QUOTATIONS.

It is customary to quote wholesale rates in terms of price per unit of weight or measure while in the retail trade, the system of quoting a weight or measure per unit of value, *e.g.*, seers per rupee, is so common as to be almost general. From the examples given of the wide divergencies between weights, and particularly measures, it will be seen that the units of sale for paddy and rice are subject to even greater variations than is the case with most other staples.

In Madras, for instance, wholesale rates are quoted per bag of 166 lb. gross in the majority of the large markets, while in the

southern districts of the presidency, the Madras measure is the standard for quotation.

In the villages of Bengal, prices are quoted on the basis of the innumerable local measures and sometimes by weight, *e.g.*, seers per rupee. In the large towns and cities, the maund is the normal basis for quotation.

In the Central Provinces, the system of quoting a weight or measure per unit of value—generally so many seers or *kathas* per rupee—is prevalent in Chhattisgarh and the surrounding area, in the Jubbulpore, Saugor and Chhindwara districts and in the States of Kawardha, Kanker, Chhinkadan, Rajnandgaon and Khairagarh. In the markets of Nagpur and the neighbouring districts, in the district of Mandla and in the remaining Indian States excluding Bastar, prices are quoted per unit of weight (the *khandi*). In the State of Bastar, however, prices are quoted per *palla* (160 seers). In all the consuming centres and large towns of this province imported rice is quoted per standard maund of 40 seers (82  $\frac{2}{7}$  lb.).

Throughout Bombay the rates for rice imported from outside the province are quoted in terms of rupees per bag. The packings, however, vary according to source. Rice received from Northern India is filled 2½ maunds per bag net while Burma rices may be sold in units of 164 lb. net, as in the State of Baroda, or 1½ cwt. as on the Bombay c. i. f. market (Chapter VIII). Rice received from the Madras area is also variously packed. In Bombay city, the local rices are quoted per *khandi* of 728 lb. in the wholesale trade, while in retail transactions the basis is per *pali* of about 5 lb. each. In the Karnatak and in the Deccan, quotations are commonly given in terms of volume per unit of value, usually the rupee while in the latter area the *pali* of 4 seers or about 8 lb. is customary. In the Konkan, the *adholi* of 2 seers or 4 lb. is the ordinary unit for quotation in the retail trade.

In the United Provinces, the unit for quotation follows the general rule inasmuch as the wholesale trade uses the price per unit of weight system and the retail trade the number of units of weight or measures per rupee.

In Assam, on the other hand, where wholesale transactions are often based on measures the price is quoted on basis of weight per unit of value employing the *sher* or *kathi* measures which are common in the Surma Valley.

## (2) FOR TRANSACTING DELIVERY.

In the wholesale rice trade the unit of delivery is generally the bag but its packing varies to a remarkable extent in the different parts of the country. For example, in Madras, a bag of rice may range from anything between 166 lb. to 246 lb. according to the custom of the trade in different centres. The standard for all imported rices even for Northern India is 166 lb. gross (164 lb. net), but for the local produce merchants adopt varying packings to suit the requirements of consuming markets. To Bangalore, for instance, it is customary to despatch rice in bags of 225, 230, 233, 235 and 240 lb. In Ganjam, a packing of 224 lb. is used for coarse rice and 188 lb. for the finer qualities. Despatches of rice from Nellore to Madras consist of bags containing 40 Madras measures or about 122 lb.

while to Salem the packing is 156 lb. and to Madura 148 lb. and 150 lb.

In the Bombay Presidency, paddy and rice are sold and delivered by a large variety of units too numerous to mention in detail. At Karjat, the basis for delivery for paddy is the *khandi*, a measure equivalent to about  $18\frac{1}{2}$  standard maunds of  $82\frac{2}{7}$  lb. each. In the same market a *khandi* of rather more than  $9\frac{1}{2}$  maunds is used for rice. At Bhiwandi, the *mooda* equal to about  $67\frac{1}{2}$  maunds is the unit for paddy while the bag of  $2\frac{1}{3}$  maunds is the unit for rice. In Nadiat, the *kalsi* of 8 maunds is the unit both for paddy and rice. In Karwar, the measure for paddy is the *khandi* of about  $1\frac{3}{5}$  maunds. A bag of about  $1\frac{3}{5}$  maunds is the unit for paddy at Sirsi while at Alur, the bag is calculated at nearly  $2\frac{1}{2}$  maunds.

In the Central Provinces, the unit for transacting wholesale delivery is a bag which usually weighs  $2\frac{1}{2}$  maunds. In the United Provinces, on the other hand, the unit of delivery is a bag of  $2\frac{1}{2}$  maunds.

In Bengal, wholesale delivery is principally given in maunds. In Assam, the *pura* or *don* is the main unit for transacting deliveries of local rices.

In the Delhi area and in the Punjab the normal unit for delivery is the bag of  $2\frac{1}{2}$  maunds but there is a small but gradually increasing trade in certain qualities of rice deriving from Amritsar, Gujranwala and a few other important distributing centres in bags specially packed to carry 1 maund each.

A new development, of which mention must also be made, is the sale of rice graded under the provisions of the Agricultural Produce (Grading and Marking) Act, 1937, in small cloth bags of varying capacities ranging from 1 to 10 seers (roughly 2 to 20 lb.). The qualities put up in this type of packing are usually high grade fine rices, and particularly the scented varieties such as *Basmati*, for which there is a specialised demand. The containers are sealed at the time of packing—by the authorised packers—by means of a special lead seal through which the ends of the twine or cord used to stitch the mouth of the bag are passed and then clamped or pressed. Apart from this innovation there appears to be no retail trade in rice put up in small ready-made packages. Owing largely to the absence of any kind of standardisation of quality, consumers prefer to examine the rice in bulk. The selection having been made and the bargain clinched, the retailer measures out (or weighs) the rice into a coarse paper bag—often made of newspaper—or the customer brings a piece of cloth into which the rice is placed and then bundled up.

The widespread use of measures in the rice trade and their immense diversity presents a problem of some difficulty. Moreover, no measure will hold the same weight of different kinds of grain or the same kinds of grain grown in different parts of the country. The quantity contained in a measure differs accordingly as it is "heaped" or "struck" and depends also on whether it is shaken or not. In so far, however, as the universal container in India is the ordinary kerosene oil tin of four Imperial gallons capacity, the adoption of this measure by the wholesale trade—where it is customary

to use measures—seems worth consideration. A few trials have shown that five “struck” full tins of fine rice weigh on an average about 2 maunds 11 seers 4 *chhatanks* (187 lb.) and the same number of tins of bold rice weigh 2 maunds 18 seers and 2 *chhatanks* (201·8 lb.). Under present conditions a typical full bag of rice averages 2 maunds 20 seers (205·7 lb.) (heavy C and double warp)—although other weights are also current in different parts of the country. It appears, therefore, that the kerosene oil tin would not be entirely unsuitable as a standard of dry measure as a round number of full tins, in this case five approximately, fill to normal capacity the standard bags used in the wholesale rice trade. Oil tin alone when full approximates half a standard maund of rice. Dry measures can never be otherwise than approximate in terms of weight but the Imperial gallon if adopted would so far as rice is concerned fit in very well with the *panseri* (5 seers unit of weight) which is in common use in many parts of the country.

#### D.—Standards of Weight Act, 1939.

This measure was passed into law in March, 1939, and specified the following standard weights.

- (a) the standard tola equivalent to 180 standard grains\*.
- (b) the standard seer equivalent to 80 standard tolas (14,400 standard grains),
- (c) the standard maund equivalent to 40 standard seers, also,
- (d) the standard pound equivalent to 7,000 standard grains.
- (e) the standard ounce equivalent to 1/16 of a standard pound,
- (f) the standard hundredweight equivalent to 112 standard pounds.
- (g) the standard ton equivalent to 2,240 standard pounds.

The Act provides for a set of standard weights to be deposited in such custody as the Central Government may think fit and for the preparation of duplicate sets of weights to be supplied free of charge to each provincial government and, to the government of any Indian State or foreign settlement in India provided an application for a set of standard weights is made and the price to be fixed by the Central Government paid. The Act also repeals the Indian Weights and Measures of Capacity Act, 1871, in so far as it relates to the establishment of standards of weight.

The circumstances leading up to the passing of the Standards of Weight Act, 1939, are described in the Statement of Objects and Reasons which accompanied the Bill and which may be quoted here.

“The question of prescribing a scale of standard weights and measures throughout British India has been under the consideration of the Government of India from time to time. In 1871, the Indian Weights and Measures of Capacity

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\* The unit of weight is the standard grain, i.e., that weights when multiplied by 1799·84585 is the weight *in vacuo* of the iridio-platinum cylinder in the custody of the Mint Master, Bombay, certified by the Standards Department of the British Board of Trade as having a weight of 1799·84585 grains *in vacuo*.

Act XXXI of 1871, was passed, section 8 of which empowered the Governor General in Council to introduce a system of weights and measures, consistent with the statutory units prescribed by section 3 thereof. This Act, however, remained inoperative since no notification prescribed thereunder was issued as it was hoped that weights and measures based on the statutory units would be gradually and generally adopted without further intervention on the part of Government.

2. In 1913, the Government of India appointed the Weights and Measures Committee to investigate the feasibility of introducing uniform weights and measures throughout the country. The Committee's recommendations were examined in consultation with the Local Governments and Administrations and in 1922, the Government of India issued a resolution containing the decisions arrived at. As 'weights and measures' became a Provincial transferred subject under the Government of India Act, 1919, subject to legislation by the Indian Legislature as regards standards, it was left to the Provincial Governments to undertake the necessary legislation with the previous consultation with the Government of India as to the form which such legislation should take and the previous sanction of the Governor General required under that Act. Accordingly three Provinces, *vis.*, the Central Provinces in 1928, Coorg in 1931 and Bombay in 1932, passed such legislation.

3. The constitutional position now is that according to item 51 in the Federal Legislative List in the Seventh Schedule to the Government of India Act of 1935, the Central Government is responsible for the establishment of standards of weights, while Provincial Governments are concerned with 'weights and measures', *vide* item 30 in the Provincial Legislative List. So far as concerns weights, therefore, it is for the Central Government to prescribe the standards. The enforcement of the use of weights based on these standards is a matter for the Provincial Governments.

4. The desirability of establishing standards of weight has lately been constantly pressed upon the Government of India and some Provinces are reported to have their Weights and Measures Bill ready for introduction as soon as a Central Act establishing standards of weight is passed. A Bill has accordingly been prepared prescribing the units of weight commonly used by the Railways and in commerce, *vis.*, the tola, the seer and the maund and also the pound, the ounce, the hundredweight and the ton."

In exercise of the powers conferred by Section 4 of the Standards of Weight Act, 1939, it has been decided that sets of standard weights of the following denominations should be prepared :—

*Tola-seer series :—*

$\frac{1}{2}$  maund,  $\frac{1}{4}$  maund, 5 seers, 4 seers, 2 seers,  
1 seer,  $\frac{1}{2}$  seer,  $\frac{1}{4}$  seer, 10 tolas, 5 tolas,  
4 tolas, 2 tolas, 1 tola,  $\frac{1}{2}$  tola,  $\frac{1}{4}$  tola,  
 $\frac{1}{8}$  tola,  $\frac{1}{16}$  tola and  $\frac{1}{32}$  tola.

*Avoirdupois series :—*

56 lb., 28 lb., 14 lb., 7 lb., 4 lb., 2 lb., 1 lb.,  
8 oz., 4 oz., 2 oz., 1 oz.,  $\frac{1}{2}$  oz.,  $\frac{1}{4}$  oz.,  $\frac{1}{8}$  oz.,  
 $\frac{1}{16}$  oz. and  $\frac{1}{32}$  oz.

The Mint Master, Bombay, has undertaken the preparation of the necessary number of sets of the above-mentioned weights for the use of Central and Provincial Governments. He has also been authorised to order from the United Kingdom the requisite number of grain sets (ranging from .01 grain to 100 grains) which are also considered necessary to enable weights of any given number of grains to be verified. Further, the preparation of the rules to be framed under the Act to carry out its purposes is under consideration in the Commerce Department. The Act will be brought into force as soon as the rules and the sets of weight are ready.

## BURMA.

## A.—Weights and measures in current use.

In the wholesale trade paddy and rice are invariably sold by the 100 baskets. The mills, however, employ a weight-cum-volume system whereby purchases are made by measurement but a basic weight is fixed per basket over or below which a scale of mutual allowances is brought into play. The government standard basket is one of 9 Imperial gallons capacity, but baskets used in paddy transactions in the jungle villages (and not infrequently in the town) show an infinite range in variation from this standard. It has indeed been said that everyone uses what baskets he pleases, the capacity of the baskets used, even by a single individual varying according to whether the transaction is one of delivering the grain or receiving it. In this way, the landlord when levying rent on his tenant will frequently insist on his dues being measured in baskets much above the normal, whilst the cultivator in paying out wages in kind to his labourers will use the smallest sized basket to which he can get them to submit.

Despite these variations, however, there has grown up in individual village tracts an understanding as to what constitutes a reasonable basket for that tract. This in turn is usually linked up with the distance of that tract from a market or point of assembly, having regard to the transport difficulties in reaching the destination. In general, the remoter the tract, the larger the selling basket to offset transport costs. By this artifice the villager is permitted the comforting delusion that although the basket used for selling may be rather large, the rate per 100 baskets at which he is paid is similar to the rate ruling in the neighbouring town.

The government standard basket is as stated of 9 gallons capacity and is divided into 16 *pyis*, each of which is equivalent to 8 *nozibus* which is the name given to the condensed milk tin of the 14 oz. size "Milkmaid" brand which curiously enough is about the one common standard of measure used in Burma.\* The village baskets in general use, normally show a variation within limits of 6 or 8 *nozibus* on either side though capacities below 120 *nozibus* and above 150 *nozibus* are not unknown. A basket of the latter capacity used by a landlord in collecting the produce rents due to him, has been described as locally bearing the name of "the cart-breaker". Similar terms of rueful appreciation are not uncommon.

Enquiries do not suggest that there is any particular trickery in the use of these baskets. The basket will usually be shown to the

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\* So far as can be ascertained, the use of the condensed milk tin was fairly general in Burma over 40 years ago. It seems to have been taken up originally by bazar sellers who discovered that it contained the equivalent of the local measure known as "La-me", of which 128 make a Burmese basket. As condensed milk has long been a favourite foodstuff in Burma, empty tins are always readily available and being of a standard size and equivalent to a known Burmese measure soon became very popular as a standard of measure.

In some parts of Lower Burma preserved lichee (*Nephelium litchi*) tins are also used. These are double the size of the *nozibu* or condensed milk tin.

tenant before he enters on his tenancy, or to the labourer before he contracts for his produce wages for the season's work. In either case if the terms, as expressed in these baskets, are unacceptable he can go elsewhere. Similarly, in selling produce, the size of the basket to be used in measuring is agreed upon between buyer and seller before the bargain is struck and is allowed for when fixing the price. The capacity of the basket is, therefore, not of paramount importance so long as it is known and so long as both contracting parties are equally able to convert the quantities of the agreed basket into terms of baskets which are market-quoted. In complying with this latter condition, it is not unreasonable to presume that the buyer of paddy and the landlord, with their large turnovers, must have some advantage over the seller and the tenant. It is here that abuses from the use of non-standard baskets tend to creep in.

The baskets in general use are made of plaited bamboo with a rim of twisted wire or cane to act as a binder. Apart from variation in the size of the baskets, the shape is not uniform, and certain of the pyramidal types may be made to take a greater or less quantity of paddy according to the way in which they are filled. The relative flexibility of the material used and the opportunity given for expelling air so as to admit a larger volume of paddy are also points to which attention may be drawn. The extent to which such non-standard baskets lend themselves to fraud will be obvious.

It must not be assumed that trickery invariably takes place, but the fact that the opportunity for it is always present does much to shake the mutual confidence which should exist between buyer and seller. It is precisely this fear that he may be cheated which prompts the Burmese cultivator to mix light grain which has been blown aside at the winnowing, or even paddy husk, with the grain which he delivers as rent or in payment of debt. The landlord or creditor naturally seeks to protect himself by increasing the capacity of the measuring basket used.

It was thought at one time that a change over from sales by measure to sales by weight would do something to remedy matters, and in some districts this was tried, but falsification of the weights, or fear of it, led cultivators to adopt such practices as damping their paddy just before delivery, or making it heavier by the addition of impurities such as small stones, etc.

The mills purchase paddy by measurement but a basic weight of 46 lb. is fixed per 9 gallon basket. Any paddy weighing over 46 lb. to the basket is given an approximate premium and conversely a deduction is made if it weighs less. This system, which may be described as the volume-*cum*-weight system has some of the effect of grading as heavy paddy is paid for not only for its greater weight and size but also at a higher rate. By imposing a dual check, this has contributed to some extent towards limiting the wasteful practices described earlier.

If 46 lb. be taken as the weight of a basket of paddy, the weight of a similar basket of cargo rice (*Loonzein*) may be put at 67 lb. of white (raw) milled rice at 75 lb. of brokens at 72 lb. and of rice meal at 45 lb. Three baskets constitute a bag.

Shipments of rice mill products are usually made in terms of weight and quotations for Burma rice as also for the Indian qualities in the United Kingdom markets are in hundredweights (112 lb). For the local market, however, the rates quoted are per 100 baskets. Actually, in giving delivery from the mill, even for the local market, the milled product is rarely measured, and a hundred basket represents simply a weighed quantity which is one hundred times that of the conventional basket weight. In forward delivery and futures transactions the unit for quotations is 100 baskets. In retail sales, transactions revert to a volume basis as is also largely the practice in India, and the basket, the *pyi* and the *nozibu*, again become the trading units.

In the mills, the steelyard and the platform scale are both in common use for weighing paddy, but for weighing the milled products, e.g., rice, brokens, etc., only the platform scale is used. The general procedure is to place the sacks on the weighing machine which is placed with the weights suitably adjusted under the discharging hoppers and to close the hoppers as the required weights are attained. In some instances, this is done by automatic machinery. Thus, time is saved in handling the bags and greater accuracy in weighing is assured.

Weighings are carried out by the mill staff and so far as out-goings are concerned seldom give cause for complaint. In the case of paddy deliveries into the mill the question of satisfactory weighing and measuring depends largely on the personal relationship existing between the paddy seller or broker, and the weighing and measuring staff. Usually this is good.

In regard to retail selling in shops and in the bazárs, where transactions both for paddy and for the milled products are by volume, this is subject to the same abuses as have been noted in connection with the buying of paddy. Most municipal and district councils have powers under which their rulings can be implemented by inspection and prosecution, but, as in India, it is very rare for a municipal or district council to make anything other than the most perfunctory attempt in the use of its powers.

#### B.—Standardisation of weights and measures.

Although it is acknowledged that there is considerable need for grading of rice in Burma, it is considered by the local authorities that the preliminary necessity lies in the standardising of quantities. The steps so far taken, may be briefly described as follows.

In the approach to improvement in weighing and measuring practice, use is being made of the principal feature of grading and marking legislation, namely, the adoption of a "mark" to distinguish goods produced under conditions or in accordance with specifications laid down by a central authority and the authorising of the use of the central authority's "mark" by local agencies working under specific control conditions. Burma as a separate country cannot use the AGMARK or grade designation mark prescribed under the provisions of the Agricultural Produce (Grading and Marking)



Act, 1937. It has, therefore, been necessary to devise a mark of its own. This has taken the form of a representation of the old Burmese "Shwehinthi" weight closed in a hexagon, which again is contained within a triangle, the space between the hexagon and the triangle being occupied by the Burmese characters (*Thamadi*) indicating "trust" or "fair dealing".

The first use to be made of the mark has been to make available to the public a tested 9 gallon basket and sets of tested weights. These, stamped with the Markets Section *Thamadi* mark, provide the first approach in Burma to a standard weight and a standard measure bearing the official mark of a government authority.

Supply from the centre, however, is only a part of the scheme. Enquiries have shown that for discrepancies in weighing and measuring the fault lies initially in the villages. Safety for the selling cultivator lies only in anchoring himself to a standard unit of weight or measurement. Since, there is no standard in the village, the first step lies in the introduction of standard weights and measures in the primary markets.

An area is selected, and meetings held with villagers and traders to explain the objects of standardisation. After the necessary propaganda has been carried on and the ground thoroughly prepared in advance, societies are established to represent the claims respectively of buyers and sellers and, as a further step, representatives from these communities are associated in a True Weights and Measures Committee operating at the assembling centre of the area in question. Each committee tests all weights and measures brought to it and stamps those which pass the test. Registers are kept of all buyers who have submitted their weights and measures for check to the Committee, and who have agreed to use, under supervision by the Committee, only the weighing and measuring apparatus approved by it. To these buyers the Committee may issue registration certificates. The committees maintain at each market a set of standard weights and measures which are always available on application for check against any weights and measures in use in the market. The committees thus formed, are the forerunners, on a voluntary basis, of those committees which it is contemplated are later to be set up under a Regulated Markets Act.

*Weights and measures.]*

## INTER-CHAPTER TWELVE.

The astonishing diversity in the weights and measures in current use in the trade of agricultural commodities in India is well-known. The wastefulness engendered by this lack of uniformity gives rise to additional trading risks which must be covered by adding to the profit margins on all transactions, with the result that the services of the middleman become more expensive. For all this it is ultimately the cultivator who pays.

Outside the larger centres of trade and throughout the rural areas, the weights used in most cases are non-standard weights. These are based on a variable number of seers per maund and tolas per seer, even the tola being non-standard in some parts. It is not necessary to quote the numerous examples of the variations of weights from the standard recorded in this survey. Suffice it to say that the seers and maunds are different not only in different provinces and States, but also in different districts of the same province or State and even in the same district.

With the object of securing uniformity in weights, the Standards of Weight Act, 1939, was passed into law in March, 1939 and specified the following standard weights.

- (a) the standard tola equivalent to 180 standard grains,
- (b) the standard seer equivalent to 80 standard tolas (14,400 standard grains),
- (c) the standard maund equivalent to 40 standard seers.

- (d) the standard pound equivalent to 7,000 standard grains,
- (e) the standard ounce equivalent to 1/16 of a standard pound,
- (f) the standard hundredweight equivalent to 112 standard pounds,
- (g) the standard ton equivalent to 2,240 standard pounds.

The Act provides for a set of standard weights to be deposited in such custody as the Central Government may think fit and for the preparation of duplicate sets of weights to be supplied to local governments, and will be brought into force as soon as the rules and the sets of weight are ready.

Measures are even more multitudinous in character than weights and are probably used to a greater extent in the rice trade than in other staple commodities. Excepting in important assembling and distributing markets of Northern India, in large trade centres like Calcutta and Bombay and to a very limited extent in South India, where the wholesale trade in rice is conducted on the basis of weights, measures are used to a very large extent in paddy and rice transactions especially in rural areas. In the retail trade the use of measures is universal in South India but gradually ceases to be the customary practice progressively northwards until it practically disappears in the Punjab and North-West Frontier Province.

The widespread use of measures in the rice trade and their immense diversity presents a problem of some difficulty. Moreover, no measure will hold the same weight of different kinds of grain or the same kinds of grain grown in different parts of the country. The quantity contained in a measure differs accordingly as

it is "heaped" or "struck" (the "struck" measure which is normal in Europe and America, is in fairly common use only in the Central Provinces), and depends also on whether it is shaken or not. The adoption of some suitable standard of measure, at least in the wholesale trade to begin with, therefore, appears very desirable.

There is no reason why the use of the Imperial gallon as a basic standard of dry measure in the paddy and rice trade—common in Burma—should not be practicable in India. In so far as the universal container in India is the ordinary kerosene oil tin of four Imperial gallons capacity, the adoption of this measure by the wholesale trade—where it is customary to use measures—seems worth consideration.

With the exception of Bombay where the local legislation make the periodical checking of weights and measures obligatory, no systematic steps appear to have been taken in this matter by any of the other administrations in India and the model bye-laws which have been framed by a number of local governments and adopted by municipalities are, in practice, a dead letter.

In Burma while the export trade is carried on the basis of weight, the quotations being in terms of hundredweights (112 lb.), practically the entire trade in rice and paddy at home is conducted by measure. The government standard basket is of 9 gallons capacity and the mills purchase paddy by this standard fixing a basic weight of 46 lb. per basket. In fact, the mills observe a volume-*cum*-weight system whereby paddy weighing more than 46 lb. per basket gets a commensurate premium, while the lighter grain is subjected to a discount.

The baskets used in paddy transactions in the jungle villages, however, show an infinite range of variation

from the standard basket (9 gallons) both in size and shape. The use of non-standard baskets in these transactions is an evil in that it may not infrequently result in loss to the cultivator by way of greater quantity of paddy being taken from him than is due by the landlord, the creditor and other agencies. The first step, therefore, lies in the introduction of the standard basket in the villages.

If 46 lb. be taken as the weight of a basket of paddy, the weight of a similar basket of cargo rice (*Loonzein*) may be put at 67 lb., of white (raw) milled rice at 75 lb., of broken at 72 lb., and of rice meal at 45 lb. Three baskets constitute a bag.

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## CONCLUSIONS AND RECOMMENDATIONS.

**MORE COMPLETE CROP FORECASTS NECESSARY.**—The rice crop forecasts issued by the Department of Commercial Intelligence and Statistics do not take account of several important rice growing areas and omit something over six and a half million acres actually seeded with rice. Arrangements should be made to include in these forecasts figures in respect of the remaining important rice growing tracts. (Page 5.)

**INACCURACIES IN THE STATISTICS OF ACREAGE AND PRODUCTION.**—Indian statistics of area and production are also seriously affected by local inaccuracies arising from the defective collection of primary data in the permanently settled areas of Bengal and Bihar. Something on the lines of those being attempted in respect of jute acreage statistics by the Bengal Government in collaboration with the Indian Central Jute Committee might also be done for rice. (Page 13.)

The accuracy of the majority of standard yields as given in official publications is questionable. It is, therefore, desirable to improve the present system of conducting crop cutting experiments so as to enable reliable statistics to be framed. (Pages 13 and 14.)

The conventional ratios adopted by different provinces and States for converting paddy figures into terms of rice are in most cases too low with the result that the all-India production figures are subject to an underestimate of about 10 per cent annually. In order to eliminate or reduce this big error, it is essential to adopt more rational conversion ratios. (Pages 14 and 15.)

**LOW YIELD PER ACRE.**—The yield per acre in India does not compare unfavourably on the whole with those of certain other countries in South-east Asia, but falls far short of the yield in the Mediterranean countries, the United States and Japan. The yield per acre is greatly increased by transplanting instead of broadcasting the seed. (Page 22.)

**IMPORT FROM ABROAD AND POSSIBILITIES OF INCREASING HOME SUPPLIES.**—India is the second largest rice producing country in the world, but also imports a large quantity of rice, valued at about 14 crores of rupees annually—the corresponding value of exports being only about 2½ crores of rupees. To attain self-sufficiency, the acreage or yield per acre, or both, would have to be increased. It would not be unreasonable to look to an increase in supplies through increased yield per acre by means of better cultural practices and improved seed. This is the work of the agriculture departments. (Page 62.)

**DEPRESSION IN HARVEST PRICES.**—The supplies of paddy and rice put on the market show a considerable fluctuation in the course of the season, the arrivals of paddy being much heavier than those of rice soon after the harvest. This, as expected, results in a particularly marked depression in paddy prices at the harvest time. (Page 154.)

**INDUCEMENT FOR GROWERS TO CO-OPERATE FOR STORING.**—The chief conclusion arrived at from a comparison between the price differences of seasonal lows and highs in different areas and the calculated costs of storage over the respective periods is that there is room for growers to co-operate for storing paddy with a view to bringing about a more even flow of supplies to the markets and minimise harvest depression. There is also scope for earning extra profit by storing

fine rices for maturity. This is a matter requiring the attention of provincial and State co-operative departments and also of banks. (Pages 341 and 342.)

**PADDY KEEPS BETTER THAN RICE.**—In view of the comparatively lower costs of storage and reduced losses involved in carrying stocks in the form of paddy, it would be useful to investigate the optimum period of storage of paddy compatible with good milling results particularly in respect of fine rices which are stored often for a year or more, in those areas where rice storage in the form of rice is the prevailing practice. (Pages 338 and 339.)

**THE BEST TYPE OF GRANARY.**—Probably the best type of storage for bulk storage of paddy is the ferro-concrete underground bin. Silos of timber on the Kashmir model are also recommended in suitable areas. (Page 339.)

**RESEARCH ON HARVESTING TECHNIQUE NEEDED.**—The technique of handling the crop between reaping and threshing and the danger of spoiling the hulling quality of the paddy are not fully appreciated by growers. More research is necessary to determine how far existing methods of handling the crop prior to threshing can be improved so as to diminish the high proportion of broken grains in Indian rice as this at present detracts seriously from its value in the market. (Pages 213, 214 and 215.)

**CHEAP MECHANICAL THRESHERS ADVOCATED.**—There is room for development of cheap mechanical rotary threshers of the type used in Japan. (Page 218.)

**PARBOILING MAY BE IMPROVED.**—There is ample scope and considerable need for improving and



standardising the parboiling processes as practised at present in different parts of India. (Pages 220 and 221.)

**SELF-CONTAINED TYPE OF MILLING PLANT BETTER.**—Although the initial cost of the self-contained rice milling plant is relatively high it is economical on account of its high efficiency in the way of smaller breakage of grain and recovery of bran without wastage, in comparison with the huller system. (Pages 222, 223, 224 and 225.)

**MARKET INTELLIGENCE.**—If growers are to obtain better prices for the fruits of their labour, the speedy dissemination of reliable market news in an intelligible form is a fundamental necessity. Steps should be taken to keep the cultivator in touch with the latest information about prices. (Pages 182 to 187.)

**REGULATED MARKETS.**—In view of the disproportionate market charges, unfair deductions and malpractices prevailing in the paddy and rice trade, regulation of markets with a view to reducing market charges, standardising market practices and checking unfair dealing is an urgent necessity. Local administrations should take early action in the matter of regulating markets for paddy and rice. (Pages 262 and 263.)

**MUNICIPAL TOLLS.**—The question of municipal tolls should be examined by some suitable commission or committee of financial experts with a view to reducing or abolishing the burden of these taxes on the agriculturist. (Pages 271 and 272.)

**FINANCE OF ASSEMBLING.**—In financing the cultivation of the rice crop, the grower, besides having to pay an excessively high rate of interest, has to part

with a considerable proportion of his produce soon after the harvest at very low values. There is favourable scope for co-operative endeavour in this direction. (Pages 273 to 275 and 276.)

In view of the comparative immunity of paddy from deterioration in storage and the customary normal seasonal rise in price, banks might well consider the provision of more extensive facilities for making advances on the crop at harvest time. (Page 276.)

**GRADING AND STANDARDISATION.**—Rice varieties and trade descriptions in India are almost innumerable. No standard scales of allowances or deductions for the various impurities or defects in paddy or rice are recognised in any part of India. Grading by millers and merchants—almost wholly in respect of more expensive rices—has been done on individualistic lines and there are no fixed standards of quality. Adulteration with inferior types or broken grains and the sale of one type under the name of another similar but more expensive rice is not uncommon. Admixture with inferior types may frequently occur in the field itself. In short the position in regard to quality in the rice trade is chaotic. (Pages 289, 294, 295 and 297.)

Standardised classification and grading of rice will not only facilitate dissemination of market information and assist the machinery of distribution at all stages, but should also eventually lead to greater uniformity of production types and reduction of the heterogeneous number of varieties and trade descriptions. (Page 294.)

Grading of rice under the Agricultural Produce (Grading and Marking) Act, 1937, has definitely proved its efficacy and usefulness to the producer, the trade and the consumer. Efforts should be made by all interests concerned to promote the expansion of this work. (Pages 301 to 305.)

**RAILWAY FREIGHT RATES.**—At present the traffic receives the benefit of the telescopic scale of rates only on the local distance of each railway line over which the goods move, and not on the total distance. This question should be examined with a view to readjustment. There is also scope for granting special rates on a wider scale than is done at present. Details should be examined by local marketing staffs in consultation with the local railway authorities. (Pages 362 and 364.)

**RICE BY-PRODUCTS.**—Where the milling plant used is of the self-contained type rice bran—a rich cattle feed—is recovered separately in a form in which its full value can be realised which is not always the case with huller system in which the bran gets mixed with the husk. (Page 429.)

It would be worth while investigating the possibilities of using rice husk, which is available in large quantities, in the preparation of furfural for use in the manufacture of synthetic resins and fibre board. These possibilities need to be explored by industrial research. (Page 428.)

**IMPROVED SEED.**—It is estimated that only about 6 per cent of the total acreage under rice in India is under improved varieties. Efforts are necessary to ensure that larger quantities of improved seed are made readily available and that the multiplication of such seed is properly organised. Agricultural departments should also see to the control and maintenance of purity of the improved strains. (Pages 439 and 440.)

**NEW VARIETIES.**—From a marketing point of view, it is desirable that there should be a reduction rather than an increase in the number of varieties and greater uniformity in the type of rice in each tract. It is also necessary to maintain in each tract the commer-

cial characteristics in respect of conformation and cooking quality of the type of rice for which the tract is noted. (Page 447.)

India has something to learn from Burma in connection with the breeding of new varieties and distribution of seed. (Pages 448 and 449.)

**WEIGHTS AND MEASURES.**—Lack of uniformity in weights and measures makes it impossible to arrive at any conclusion concerning the relationship of prices in different markets and give rise to increased profit margins of the middleman which ultimately reduces the cultivator's price. (Page 454.) With the object of securing uniformity the Standards of Weights Act, 1939, was passed into law in March, 1939. Provincial and State governments should, however, take administrative measures under the Act as early as possible. (Pages 462 and 463.)

The adoption of some suitable standard measures, at least in the wholesale rice and paddy trade to begin with, appears very desirable. In this connection the Imperial gallon should be made the basis and use of the ordinary kerosene oil tin of four Imperial gallons capacity is worth consideration as a standard measure. (Pages 461 and 462.)

**PRODUCER'S RETURNS.**—The rice grower's average net share in respect of the quantities which pass through the wholesale markets works out to eight annas and three pies or 51.5 per cent of the rupee paid by the consumer. On account of having to pay high interest charges, and to dispose of the bulk his marketable surplus in the village to the various assembling middlemen, and having a negligible share in the processing of paddy (by milling) and marketing of the finished product (rice), the cultivator is losing about seventeen crores of

rupees annually at a conservative estimate. Much of this sum could be returned to him by a proper system of financing and a more direct participation in the marketing process by the grower himself. (Pages 401 to 406.)

This would be over and above the benefits accruing from regulation of markets, standardisation and grading of produce, storage facilities (mainly financial), standardisation of weights and measures, etc., the value of which is difficult to assess at the present stage. It is, however, quite certain that there is vast scope of improvement in the marketing of the rice crop in India. It should be particularly emphasised that a good deal might be achieved through co-operative organisations of growers for financing, storing, and perhaps also for milling.

Burma.—In Burma the rice milling industry has been able to achieve some degree of standardisation of general commercial types of rice. But the depression in paddy prices at the harvest time in Burma is even greater than in India. Besides, several middlemen intervene between the producer and the mill and malpractices in the village transactions are common, with the result that the Burmese rice grower is no better off than his confrère in India. The extension of co-operative marketing on the lines of the Sittang Colonies and Banking Union seems desirable. Action might also be taken to extend the use of the standard measuring basket in the villages.

The Rangoon rice "futures" market should be organised on proper lines failing which it would be desirable to abolish it, as its operations at present instead of being a stabilising factor only tend to accentuate the harvest time depression in prices.

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**APPENDICES.**

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APPENDIX 1.

*Area and production of rice in certain important countries of the world.*

	Area (million acres).						Production (million tons).					
	1909-13.	1926-30.	1931-35.	1936.	1937.	1938.	1909-13.	1926-30.	1931-35.	1936.	1937.	1938.
India .. .. .	59.82*	74.20†	76.74	77.12	79.16	79.19	25.00*	28.50†	29.58	25.74	30.92	29.53
Burma .. .. .	8.71*	12.67†	12.78	12.50	12.63	12.94	3.70*	4.93†	4.80	5.00	4.72	4.59
Siam .. .. .	4.52	6.20	7.14	7.34	5.50	7.20	1.86	2.87	3.10	3.08	2.22	3.08
Indo-China .. .. .	8.55	13.26	13.50	13.49	13.94	N	3.52	3.94	3.78	3.96	4.14	N
China .. .. .	N	N	44.14‡	45.96	44.85	N	N	N	29.52‡	31.52	31.50	N
Formosa .. .. .	1.18	1.41	1.61	1.68	1.69	1.63	0.54	0.78	0.99	1.11	1.17	1.13
Korea .. .. .	2.91	3.88	4.11	4.15	3.90	4.02	1.21	1.77	2.10	2.18	2.36	3.20
Japan .. .. .	7.30	7.79	7.89	7.85	7.86	7.82	4.96	7.05	7.43	7.00	8.20	8.07
Java and Madura .. .. .	7.44	8.49	9.14	9.35	9.55	N	3.12	3.39	3.61	3.93	3.79	N
Philippines .. .. .	2.75	4.42	4.64	5.06	N	N	0.54	2.10	1.41	1.22	1.47	1.30
Ceylon .. .. .	0.70	0.82	0.83	0.84	0.84	N	0.15	0.17	N	N	N	N
Italy .. .. .	0.36	0.35	0.34	0.34	0.36	0.36	0.31	0.43	0.44	0.48	0.48	0.48
Spain .. .. .	0.09	0.12	0.12	0.12	N	N	0.13	0.20	0.19	0.19	N	N
Egypt .. .. .	0.26	0.28	0.35	0.49	0.49	0.27	0.25	0.23	0.36	0.47	0.45	0.25
United States of America .. .. .	0.72	0.95	0.88	0.82	0.97	1.09	0.32	0.55	0.56	0.52	0.65	0.71
Brazil .. .. .	N	1.11	2.15	2.15	2.21	N	0.03	0.57	0.79	0.77	0.82	N
Other countries .. .. .	15.30	6.95	6.46	7.75	12.81	38.49	4.73	2.71	2.30	2.75	2.98	11.58
World total (excluding China) ..	120.61	142.90	148.68	151.05	151.91	153.01	50.37	60.19	61.44	58.40	64.37	63.92

Adapted from International Year Book of Agriculture.

\*Average of 1910-11/1913-14.

†Average of 1927-28/1929-30.

‡Average of 1931-32/1934-35.

N=Not available.

NOTE.—The statistics of production given in this table refer to "cleaned rice" i.e., rice from which the husk has been removed. Wherever rice in the husk is referred in this report, the term "paddy" is always used.



APPENDIX II.

World trade—imports and exports of rice (including rice in the husk) relating to certain important countries of the world.  
(Thousand tons).

Countries.	Imports.						Exports.						Remarks.
	1909-13.	1926-30.	1931-35.	1936.	1937.	1938.	1909-13.	1926-30.	1931-35.	1936.	1937.	1938.	
India* .. ..	492	1,082	1,758	1,561	1,234	1,366	639	281	218	235	228	284	
Ceylon .. ..	380	488	483	531	521	532	..	..	..	..	..	..	
China .. ..	299	990	1,057	305	340	400	..	..	..	..	..	..	
Java and Madura .. ..	276	235	140	9	8	20	..	..	..	..	..	..	
British Malaya .. ..	694	802	635	721	718	833	515	280	175	154	140	204	
Japan .. ..	467	1,451	1,798	1,913	1,746	1,817	..	..	..	..	..	..	
Germany .. ..	411	322	311	170	217	271	177	119	41	25	27	22	
France.. ..	255	253	458	814	705	591	..	..	..	..	..	..	
Netherlands .. ..	346	171	160	197	229	170	194	82	87	109	134	92	
United Kingdom .. ..	252	121	120	111	116	135	..	..	..	..	..	..	
Burma.. ..	..	..	..	..	..	..	2,408	2,880	3,194	2,852	2,843	3,128	
Siam .. ..	..	..	..	..	..	..	779	1,167	1,478	1,394	937	1,439	
Indo-China .. ..	..	..	..	..	..	..	882	1,398	1,238	1,616	1,392	997	
Korea .. ..	..	..	..	..	..	..	92	809	1,160	1,189	1,044	1,204	
Formosa .. ..	..	..	..	..	..	..	118	333	556	677	677	647	
Italy .. ..	..	..	..	..	..	..	67	201	158	140	156	156	
United States .. ..	..	..	..	..	..	..	11	132	84	11	91	144	
Egypt .. ..	..	..	..	..	..	..	24	53	62	137	149	64	
Other countries .. ..	1,957	2,940	2,577	2,545	2,649	2,603	506	1,014	1,096	747	824	856	
World total .. ..	5,829	8,855	9,497	8,877	8,483	8,738	6,412	8,729	9,547	9,286	8,642	9,237	

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Adapted from the International Year Book of Agriculture.

\*British Indian ports only, excluding ports in the Indian States of Kathiawar and Travancore and foreign possessions in India.

APPEN  
*Acreege under rice in the*  
 (Million)

		British India.							
		Total.	Bengal.	Madras.	Bihar.	United Provinces.	Central Provinces and Berar.	Assam.	Orissa. (a)
1927-28	.. ..	64.22	18.68	10.93	10.16	7.30	5.41	4.21	3.32
1928-29	.. ..	68.38	21.40	11.02	10.96	7.06	5.44	4.98	3.39
1929-30	.. ..	66.52	20.22	11.26	10.88	6.85	5.48	4.23	3.35
1930-31	.. ..	67.60	20.58	11.68	10.53	6.84	5.54	4.65	3.40
1931-32	.. ..	68.74	22.13	11.54	10.74	6.68	5.53	4.70	3.35
1932-33	.. ..	67.24	21.77	11.53	9.56	6.26	5.60	4.87	3.51
1933-34	.. ..	67.50	21.67	11.70	9.95	6.10	5.64	4.86	3.28
1934-35	.. ..	66.83	20.74	11.06	10.21	6.56	5.63	4.86	3.52
1935-36	.. ..	67.39	21.09	9.80	9.67	6.75	5.59	5.29	5.01
1936-37	.. ..	69.04	21.99	9.89	9.95	6.76	5.68	5.44	5.15
Average	.. ..	67.35	21.03	11.04	10.26	6.72	5.55	4.81	3.73
Percentage of All-India total.		88	28	14	13	9	7	6	5
1937-38	.. ..	69.45	22.20	10.14	9.51	7.15	5.76	5.06	5.15
1938-39	.. ..	..	21.99	9.84	9.58	7.79	5.84	5.33	5.14
1939-40	.. ..	..	22.29	9.61	9.58	7.67	5.81	5.04	5.03

(a) Figures prior to 1935-36 exclude those for Ganjam and Koraput districts.

(b) Important areas included are Bombay, Sind and the Punjab.

(c) Compiled from "Estimates of Area and Yield of Principal Crops in India".

(d) Important areas included are Bombay States (estimated figures), Kashmir and Baroda.

(e) Represents previous years' figures.

## DIX III.

main producing areas.  
acres).

Others. (b)	Indian States.							Grand total (India).	Burma.
	Total.	Eastern States Agencies.		Madras States.	Hydera- bad.	Mysore.	Others. (d)		
		Orissa Feuda- tory States (former- ly).	Central Provin- ces States (former- ly). (c)						
4-21	7-93	3-20	0-64	1-02	0-93	0-70	1-44	72-15	12-38
4-13	8-22	3-22	0-75	1-05	1-00	0-71	1-49	76-60	12-73
4-25	7-33	3-25	0-37	1-08	0-49	0-72	1-42	73-85	12-89
4-38	8-61	3-26	1-25	1-08	0-74	0-74	1-54	76-21	13-05
4-07	9-30	3-29	1-49	1-15	1-10	0-73	1-54	78-04	12-54
4-14	9-28	3-38	1-46	1-17	1-00	0-77	1-50	76-52	12-73
4-30	9-43	3-34	1-51	1-13	1-31	0-77	1-37	76-93	12-92
4-25	9-17	3-26	1-49	1-03	1-18	0-68	1-53	76-00	12-69
4-19	9-73	3-40	1-94	1-07	1-06	0-74	1-52	77-12	12-50
4-18	10-12	3-71	2-00	1-03	1-13	0-73	1-52 (e)	79-16	12-63
4-21	8-91	3-33	1-29	1-08	0-99	0-73	1-49	76-26	12-71
6	12	5	2	1	1	1	2	100	..
4-48(f)	9-74	3-53	2-03	1-02	0-96	0-71	1-49(g)	79-19	12-94
(h)	..	(h)	2-03	(h)	0-95	0-74	(h)	(i)73-38	12-84
(h)	..	(h)	2-13	(h)	0-64	0-74	(h)	72-34 (i)	12-85

(f) Includes final forecast figure for Sind.

(g) Represents preceding 10 years' average.

(h) Information not available.

(i) According to "Final General Memorandum on the Rice Crop of 1939-40". The figure however, is incomplete and does not represent the entire rice area in India.

APPEN  
Irrigated and unirrigated acreage  
(Million)

	Assam.		Bengal.		Bihar.		Orissa.		United Provinces.		Punjab.	
	Irrigated.	Unirrigated.	Irrigated.	Unirrigated.	Irrigated.	Unirrigated.	Irrigated.	Unirrigated.	Irrigated.	Unirrigated.	Irrigated.	Unirrigated.
1927-28	.6	3.6	1.2	17.5	2.9	7.3	.5	2.8	.5	6.8	.7	.2
1928-29	.5	4.4	1.3	20.1	2.8	8.2	.5	2.9	.8	6.3	.7	.2
1929-30	.6	3.7	1.3	18.9	3.0	7.9	.5	2.8	.8	6.0	.8	.2
1930-31	.6	4.1	1.5	19.1	3.1	7.5	.5	2.9	.7	6.1	.8	.2
1931-32	.6	4.1	1.5	20.6	3.0	7.7	.5	2.9	.5	6.2	.7	.1
1932-33	.6	4.2	1.7	20.1	3.0	6.6	.5	3.0	.6	5.7	.7	.2
1933-34	.6	4.3	1.6	20.0	3.0	6.9	.5	2.8	.6	5.5	.8	.3
1934-35	.6	4.2	1.6	19.2	3.0	7.2	.5	3.0	.5	6.1	.7	.2
1935-36	.6	4.7	1.5	19.6	2.9	6.8	.5	3.0	.6	6.0	.7	.3
1936-37	.6	4.8	1.7	20.3	2.9	7.0	1.0†	4.3†	.4	6.3	.8	.2
Average	.6	4.2	1.5	19.6	3.0	7.3	.6	3.0	.6	6.1	.7	.2
1937-38	.6	4.4	1.8	20.4	2.8	6.7	1.24	3.9	.6	6.6	.9	.2

NOTE.—The Feudatory States are excluded as

\*Including Indian

†Includes the newly constituted districts of Ganjam and

†Totals would be incomplete in the

Source.—Agricultural Statistics

## DIX. IV.

under rice in India and Burma.  
(acres).

Sind.		Bombay.		Central Provinces and Berar.		Madras.		Total India.*			Burma.	
Irrigated.	Unirrigated.	Irrigated.	Unirrigated.	Irrigated.	Unirrigated.	Irrigated.	Unirrigated.	Irrigated.	Unirrigated.	Percentage of irrigated area to total area.	Irrigated.	Unirrigated.
1-14	..	19	1-8	1-0	4-4	7-6	3-3	18-5	49-4	27-3	1-4	11-0
1-18	..	20	1-7	9	4-5	7-7	3-3	18-9	53-4	26-1	1-5	11-3
1-24	..	19	1-7	9	4-6	8-0	3-2	19-3	50-6	27-7	1-4	11-5
1-27	..	20	1-8	1-0	4-6	8-5	3-2	20-3	51-0	28-5	1-4	11-6
1-18	..	23	1-7	8	4-7	8-2	3-3	19-5	53-3	26-8	1-3	11-1
1-11	..	22	1-8	1-0	4-6	8-2	3-3	20-0	51-2	28-1	1-3	11-4
1-12	..	22	1-8	9	4-7	8-4	3-3	20-8	51-0	29-0	1-5	11-5
1-13	..	19	1-8	9	4-8	8-0	3-1	19-7	51-1	27-8	1-4	11-3
1-12	..	17	1-8	1-1	4-6	7-8	2-6	20-3	52-0	28-1	1-4	11-1
1-18	..	14	1-7	9	4-8	7-7	2-2	20-10	52-4	27-7	1-4	11-3
1-17	..	20	1-8	9	4-6	8-0	3-1	19-7	51-5	27-7	1-4	11-3
1-24	..	20	1-8	1-1	4-7	7-9	2-2	‡	‡	‡	..	..

statistics of irrigated area are not available.  
States.

Visagapatam comprising territory taken over from Madras.  
absence of data from the Indian States.

(India Volumes I and II.

Comparison between the official estimates of production of rice in India and the probable outturn based  
(Thousand)

	Production of rice (less seed) based on official estimates. Average 1934-35/1936-37.	Official conversion factors (ratio of rice to paddy).	Equivalent in terms of paddy (rice in the husk).	Proportions of hand-pounded and milled.				Con-	
				Hand-pounded.		Machine-milled.		- Hand.	
				Per cent.	Quantity.	Per cent.	Quantity.	Per cent.	(a) Quantity.
Benga .. ..	8,053	65.5	12,295	84	10,328	16	1,967	73	7,539
Madras .. ..	4,673	66.6	7,017	38	2,666	62	4,351	71.5	1,906
Bihar and Orissa .. ..	4,097	63.0	6,503	90	5,853	10	650	72	4,214
Central Provinces .. ..	1,489	62.0	2,402	70	1,681	30	721	73	1,227
Assam .. ..	1,610	62.5	2,576	97	2,499	3	77	72	1,799
Sind .. ..	361	66.6	542	10	54	90	488	72.5	39
Bombay .. ..	787	70.0	1,124	45	506	55	618	71	359
Hyderabad .. ..	349	60.0	582	38	221	62	361	70	155
Mysore .. ..	195	69.5	281	26	73	74	208	69.5	51
Travancore .. ..	315	60.0	525	77	404	23	121	75	303
<b>Total .. ..</b>	<b>21,929</b>	<b>65</b>	<b>33,847</b>	<b>72</b>	<b>24,285</b>	<b>28</b>	<b>9,562</b>	<b>72</b>	<b>17,592</b>

Grand total of production of rice (including seed) in India as officially estimated (Appendix XXIII) ..

Probable production (including seed) in India as calculated *pro rata* on the basis of the relationship between the probable outturn and the official estimates concerning the 11 major rice growing provinces and States quoted above .. ..

Difference .. ..

Representing an understatement of .. ..

\*Adapted from conversion ratios and information supplied by provincial and State agricultural departmental experiments and observations.

†In husk resulting from hand-pounding paddy may include roughly  $\frac{1}{2}$  to 1 per cent of material losses

## DIX V.

on actual experiments and observations relating to the conversion of paddy (rice in the husk) into rice, tons).

version of paddy into rice and by-products.*												
pounded.				Machine-milled.						Probable outturn of rice (hand-pounded and machine-milled) including edible broken (a) + (d).	Production of bran (b) + (e).	Production of husk (c) + (f).
Bran, including some of the germ and very small fragments or particles of the rice kernel.		Husk. †		Rice including edible broken.		Bran, including some of the germ and very small fragments or particles of the rice kernel.		Husk.				
Per cent.	(b) Quantity.	Per cent.	(c) Quantity.	Per cent.	(d) Quantity.	Per cent.	(e) Quantity.	Per cent.	(f) Quantity.			
2	207	25	2,582	70	1,377	6	118	24	472	8,916	325	3,054
3.5	93	25	667	67	2,915	9	392	24	1,044	4,821	485	1,711
3	176	25	1,463	67	436	9	58	24	156	4,650	234	1,619
3	51	24	403	68	490	9	65	23	166	1,717	116	569
3	75	25	625	68	52	8	6	24	19	1,851	81	644
3	2	24.5	13	70	342	6	29	24	117	381	31	130
4	20	25	127	68	420	8	50	24	148	779	70	275
5	11	25	55	67	242	8	29	25	90	397	40	145
5.5	4	25	18	67	139	8	17	25	52	190	21	70
2	8	23	93	70	85	7	8	23	28	388	16	121
3	647	25	6,046	68	6,498	8	772	24	2,292	24,090	1,419	8,338

.. .. 28,377,000 tons.

.. .. 31,186,323 tons.

.. .. 2,800,323 tons.

.. .. 9.9 % as compared with the estimates published by the Department of Commercial Intelligence and Statistics.

ments and marketing staffs. The data given by these agencies are largely based on the results of

ing some nutritive value, e.g., bran and some particles of crushed rice.

## APPEN

Production of rice in the  
(Million)

		British India.							
		Total.	Bengal.	Madras.	Bihar.	United Provinces.	Central Provinces and Berar.	Assam.	Orissa. (a)
1927-28	.. ..	22.87	6.49	5.08	3.30	2.19	1.56	1.32	1.08
1928-29	.. ..	26.70	9.68	5.20	4.26	1.12	1.47	1.68	1.33
1929-30	.. ..	25.98	8.20	5.26	4.59	1.53	1.79	1.35	1.42
1930-31	.. ..	26.69	9.21	5.38	4.24	1.74	1.40	1.37	1.38
1931-32	.. ..	27.92	9.49	5.39	4.37	2.03	1.77	1.59	1.37
1932-33	.. ..	25.54	9.36	5.41	3.07	1.35	1.66	1.68	1.13
1933-34	.. ..	25.07	8.68	5.31	3.23	1.77	1.66	1.42	1.06
1934-35	.. ..	24.98	8.27	4.98	3.49	1.97	1.76	1.48	1.20
1935-36	.. ..	22.52	7.21	4.74	2.45	1.99	1.47	1.61	1.29
1936-37	.. ..	26.87	9.81	4.79	3.36	1.95	1.78	1.90	1.60
Average	.. ..	25.51	8.64	5.15	3.64	1.76	1.63	1.54	1.29
Percentage of All-India total	.. ..	88	30	18	13	6	6	5	4
1937-38	.. ..	25.81	9.03	4.85	3.14	2.06	1.55	1.75	1.57
1938-39	.. ..	..	7.57	4.10	2.65	2.06	(g) 2.26	1.69	1.41
1939-40	.. ..	..	8.48	4.46	3.18	2.41	1.92 (g)	1.65	1.38

(a) Figures prior to 1935-36 exclude those for Ganjam and Koraput districts.

(b) Important areas included are Bombay, Sind and the Punjab.

(c) Important areas included are Bombay States, Kashmir and Baroda.

(d) Includes figures for Orissa Feudatory States (now Eastern States Agency).

(e) Represents average for 9 years.

(f) Represents average for preceding 10 years.



## DIX VI

main producing areas.  
tons).

Others (b)	Indian States.							Grand total (India)	Burma.
	Total.	Eastern States Agencies.		Madras States.	Hydera- bad.	Mysore.	Others. (c)		
		Orissa Fonda- tory States (for- merly).	Central Pro- vinces States (for- merly).						
1-85	3-19	..	0-19	0-48	0-33	0-19	2-00 (d)	26-06	4-50
1-96	3-58	1-64	0-18	0-49	0-41	0-20	0-66	30-26	4-91
1-94	3-19	1-63	0-12	0-50	0-14	0-21	0-59	29-17	4-99
1-97	3-37	1-51	0-28	0-50	0-19	0-23	0-66	30-06	5-15
1-91	3-74	1-45	0-45	0-54	0-39	0-21	0-70	31-66	4-21
1-88	3-53	1-43	0-35	0-55	0-29	0-24	0-67	29-07	4-92
1-94	3-58	1-46	0-40	0-51	0-36	0-23	0-62	28-65	5-17
1-83	3-49	1-38	0-41	0-46	0-36	0-18	0-70	28-47	4-53
1-76	3-22	1-10	0-40	0-51	0-34	0-22	0-65	25-74	5-00
1-68	4-05	1-67	0-58	0-50	0-42	0-23	0-65	30-92	4-72
1-86	3-49	(e) 1-47	0-34	0-50	0-32	0-21	(e)0-65	29-00	4-85
6	12	5	1	2	1	1	2	100	..
(f) 1-86	3-72	1-50	0-48	(f) 0-50	0-37	0-22	0-65(f)	29-53	4-59
(A)	..	(A)	(i)	(A)	0-35	0-20	(A)	(j)23-92	5-38
(A)	..	(A)	(i)	(A)	0-20	0-22	(A)	25-26 (j)	4-68

(g) Includes figures for Central Provinces States (now Eastern States Agency).

(A) Information not available.

(i) Included in figures for Central Provinces and Berar.

(f) According to the "Final General Memorandum on the Rice Crop of 1939-40." The figure, however, is incomplete and does not represent the entire production of India.

APPENDIX VII.

*Approximate retention, utilisation and marketable surplus of the rice crops of India and Burma.*

(Basis: average production of 1934-35/1936-37).

Provinces and States.	Domestic consumption.		Used for barter.		Used for payments in kind for services rendered in connection with the rice and other crops.		Seed.		Total retention.		Total production.		Balance representing marketable surplus.	
	Per cent.	Thou- sand tons.	Per cent.	Thou- sand tons.	Per cent.	Thou- sand tons.	Per cent.	Thou- sand tons.	Per cent.	Thou- sand tons.	Per cent.	Thou- sand tons.	Per cent.	Thou- sand tons.
Bengal .. ..	46.5	3,923	3.0	253	..	..	4.5	376	54	4,552	100	8,429	46	3,877
Madras .. ..	17.0	826	..	..	14.5	702	3.5	166	35	1,694	100	4,839	65	3,145
Bihar and Orissa ..	48.0	2,133	1.0	44	13.0	581	8.0	367	70	3,125	100	4,464	30	1,339
United Provinces ..	26.0	512	10.0	197	23.0	453	5.0	99	64	1,261	100	1,970	36	709
Central Provinces and Berar.	32.5	542	2.0	33	21.0	347	10.5	180	66	1,102	100	1,669	34	567
Assam .. ..	90.5	1,510	..	..	..	..	3.5	55	94	1,565	100	1,665	6	100
Bombay .. ..	52.0	434	2.0	17	7.0	53	5.0	45	66	549	100	832	34	283
Sind .. ..	17.0	69	2.0	8	7.0	28	6.0	25	32	130	100	406	68	276
Punjab .. ..	27.0	87	..	..	12.0	38	1.0	4	40	129	100	323	60	194
Other Provinces ..	32.0	61	..	..	15.0	29	5.0	10	52	100	100	193	48	93
<b>Total, British India</b>	<b>40.7</b>	<b>10,097</b>	<b>2.2</b>	<b>552</b>	<b>9.0</b>	<b>2,231</b>	<b>5.4</b>	<b>1,327</b>	<b>57.3</b>	<b>14,207</b>	<b>100</b>	<b>24,790</b>	<b>42.7</b>	<b>10,583</b>
Hyderabad .. ..	27.5	102	..	..	13.0	48	6.5	24	47	174	100	373	53	199
Mysore .. ..	24.0	50	3.0	6	7.0	15	6.0	13	40	84	100	208	60	124
Travancore .. ..	50.5	170	0.5	3	32.5	110	7.5	26	91	309	100	341	9	32
Baroda .. ..	12.0	6	..	..	2.0	1	6.0	3	20	10	100	49	80	39
Other States .. ..	57.0	1,483	..	..	15.0	392	8.0	219	80	2,094	100	2,616	20	522
<b>Total, Indian States</b>	<b>50.5</b>	<b>1,811</b>	<b>0.3</b>	<b>9</b>	<b>15.8</b>	<b>566</b>	<b>7.9</b>	<b>285</b>	<b>74.5</b>	<b>2,671</b>	<b>100</b>	<b>3,587</b>	<b>25.5</b>	<b>916</b>
<b>Grand total, India</b>	<b>42.0</b>	<b>11,908</b>	<b>2.0</b>	<b>561</b>	<b>9.8</b>	<b>2,797</b>	<b>5.7</b>	<b>1,612</b>	<b>59.5</b>	<b>16,878</b>	<b>100</b>	<b>28,377</b>	<b>40.5</b>	<b>11,499</b>
Burma .. ..	11.0	536	..	..	2.0	107	4.0	185	17.0	828	100	4,750	83.0	3,922

APPENDIX VIII.

Monthly marketings of paddy (rice in the husk) and rice in certain important centres expressed as a proportion of annual receipts.

	Bengal.		Bihar.	Orissa.	Madras.		United Provinces.	Central Provinces.	Bombay.	Sind.	Punjab.	Hyderabad.	All-India (rail and river-borne traffic) average 1936 to 1938.						
	Calcutta.		Chittagong.	Patna.	Cuttack and Balasore.		Average of four markets*.	Average of two markets for rice†.	Poona.	Karachi.	Din-nagar.	Average of four markets for paddy and two for rice‡.							
	Paddy.	Rice.	Rice.	Rice.	Paddy.	Rice.	Paddy.	Rice.	Rice.	Paddy.†.	Rice.	Paddy.		Rice.	Rice.	Paddy.	Paddy.	Rice.	Paddy.
January ..	15	11	4	8	7	7	8	7	10	13	20	15	9	10	7	12	14	10	11
February ..	13	13	9	14	11	10	13	7	12	7	18	10	9	9	4	12	11	11	10
March ..	13	15	11	13	13	7	14	8	11	9	14	8	8	11	2	14	9	15	10
April ..	9	11	10	11	13	5	13	10	9	12	10	2	7	12	2	11	9	11	9
May ..	9	9	9	10	8	8	9	9	9	15	6	2	6	8	1	9	7	10	8
June ..	6	8	15	7	12	11	7	11	5	10	4	2	8	6	1	6	7	8	8
July ..	3	6	14	7	10	15	6	9	5	2	1	3	7	5	..	5	5	5	8
August ..	2	6	8	5	8	10	4	8	6	2	2	2	9	7	..	5	6	5	7
September ..	5	5	5	5	3	11	6	7	6	2	2	9	9	7	34	3	7	6	6
October ..	8	5	6	5	5	2	12	9	9	5	3	20	10	9	27	6	7	7	7
November ..	8	5	6	8	6	7	5	8	9	10	6	19	11	8	11	8	7	5	7
December ..	9	6	3	7	4	7	3	7	9	13	12	13	9	8	11	9	11	7	9
Total ..	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

\*Madras—Saltotara, Bellary, Bezwada and Coimbatore.

†United Provinces—Meerut, Bareilly, Benares and Jhansi.

‡Central Provinces—Drug and Raipur.

§Rajnandgaon.

||Hyderabad—

Rice.—Sadaseopet and Nizamabad.

Paddy.—Mahboobnagar, Jungaon, Padapalli and Warangal.

APPENDIX IX.

Monthly exports (rail and river-borne) of rice and paddy (rice in the husk).  
(Thousand tons).

Months.	Rice.					Paddy (rice in the husk).				
	1936-37.	1937-38.	1938-39.	Average.	Percentage.	1936-37.	1937-38.	1938-39.	Average.	Percentage
April .. ..	143	160	135	146	9.2	35	26	24	28	11.4
May .. ..	131	133	134	133	8.4	35	20	21	25	10.2
June .. ..	131	125	108	121	7.6	27	15	21	21	8.5
July .. ..	132	132	113	126	7.9	17	9	12	13	5.3
August .. ..	117	110	113	113	7.1	13	8	14	12	4.9
September .. ..	93	91	106	96	6.1	12	14	18	15	6.1
October .. ..	95	99	120	105	6.6	15	14	20	16	6.5
November .. ..	107	118	120	115	7.3	11	12	14	12	4.9
December .. ..	129	135	155	140	8.8	14	13	26	18	7.3
January .. ..	178	153	175	169	10.7	22	21	27	24	9.8
February .. ..	157	140	178	158	10.0	25	25	29	26	10.5
March .. ..	166	147	178	164	10.3	36	28	45	36	14.6
Grand total ..	1,579	1,543	1,635	1,586	100	262	205	271	246	100

APPENDIX X.

Physical characteristics of important commercial varieties of rice grown in Assam.

Trade description.	Raw or parboiled.	Foreign matter other than rice.	Broken grains including small fragments.	Red grains.	Other rices.	Immature grains.	Weevilled grains.	Natural test weight per bushel.	1,000 kernel weight.	Average length.	Average breadth.	Ratio of length to breadth.
	1	2	3	4	5	6	7	8	9	10	11	12
		(Per cent.)	(Per cent.)	(Per cent.)	(Per cent.)	(Per cent.)	(Per cent.)	(lb.)	(Grammes).	(Milli-metres).	(Milli-metres).	
<i>Kersail</i> .. ..	R	0.28	32.0	..	..	0.5	..	64.7	16.18	6.96	2.32	2.55
<i>Hatisail</i> .. ..	R	0.22	30.0	..	..	1.0	..	64.7	19.73	5.41	2.58	2.09
<i>Mayamati</i> .. ..	R	0.21	41.0	All	..	4.0	..	64.3	14.13	5.23	2.22	2.35
<i>Raomirali</i> .. ..	R	0.35	38.0	All	..	4.0	..	64.7	16.83	4.92	2.59	1.94
<i>Badal (Sylhet)</i> .. ..	R	0.21	46.92	3.2	..	3.92	..	63.1	16.57	5.53	2.87	2.33
<i>Laki</i> .. ..	R	0.14	63.34	All	..	1.0	..	63.6	16.57	6.65	2.22	2.98
<i>Moynabassa</i> .. ..	R	0.65	28.0	3.0	..	3.0	..	62.6	15.3	5.35	2.22	2.41
<i>Bora</i> .. ..	R	0.14	26.5	All	..	2.0	..	63.6	13.16	4.77	2.4	1.99
<i>Tupa Bora</i> .. ..	R	0.55	12.5	5.5	..	2.0	..	63.6	13.95	4.49	2.48	1.81
<i>Nekirdhan</i> .. ..	P	0.87	27.0	1.0	..	4.0	..	62.6	21.11	6.73	2.23	3.0
<i>Phulpakri</i> .. ..	P	0.59	12.67	5.0	..	2.0	..	61.3	10.87	5.07	1.89	2.68
<i>Malsira</i> .. ..	P	0.75	13.0	10.0	..	6.0	..	62.5	14.08	5.5	2.17	2.53
<i>Badal</i> .. ..	P	0.68	45.5	All	..	1.8	..	63.5	20.5	5.83	2.54	2.22
<i>Laisail</i> .. ..	P	0.67	18.5	3.5	..	1.5	..	63.2	15.66	5.52	2.29	2.41

P = Parboiled.  
R = Raw.

NOTE.—All percentages are reckoned on the basis of the total weight of the sample.

APPENDIX XI.

*Physical characteristics of important commercial varieties of rice grown in the Bombay Presidency.*

Trade description.	Raw or parboiled.	Foreign matter other than rice.	Broken grains including small fragments.	Red grains.	Other rices.	Immature grains.	Weevilled grains.	Natural test weight per bushel.	1,000 kernel weight.	Average length.	Average breadth.	Ratio of length to breadth.
	1	2	3	4	5	6	7	8	9	10	11	12
		(Per cent).	(Per cent).	(Per cent).	(Per cent).	(Per cent).	(Per cent).	(lb.)	(Grammes).	(Milli-metres).	(Milli-metres).	
<i>Ambemohar</i> .. ..	R	0.21	11.60	0.76	..	0.03	0.4	62.9	10.04	4.42	2.23	1.98
<i>Kamod</i> .. ..	R	0.13	13.33	1.63	..	..	3.29	59.3	10.99	5.50	1.96	2.80
<i>Pattani</i> .. ..	R	0.25	43.07	2.51	..	0.84	.48	61.1	16.18	5.63	2.55	2.22
<i>Kusuma</i> .. ..	R	0.22	20.83	1.69	..	0.02	0.08	62.0	17.17	5.88	2.42	2.43
<i>Barik</i> .. ..	R	0.18	19.83	1.39	..	0.07	0.07	60.65	13.96	5.93	2.10	2.83
<i>Kolamba</i> .. ..	R	0.11	21.00	1.38	..	0.52	0.30	61.0	9.59	5.13	1.93	2.65
<i>Jirasa</i> .. ..	R	0.24	12.3	.99	..	1.39	..	60.4	10.77	5.06	2.11	2.40
<i>Sutarsal</i> .. ..	R	0.09	36.91	5.71	..	1.28	0.04	62.35	13.47	5.7	2.1	2.73
<i>Tambasal</i> .. ..	R	0.05	23.22	1.21	..	..	..	59.9	10.85	6.05	1.9	3.18
<i>Kolpi</i> .. ..	R	0.35	20.09	2.24	0.03	..	0.16	61.05	10.32	5.33	2.00	2.66
<i>Doddakki No. 1</i> .. ..	R	0.12	36.18	2.68	..	0.06	..	61.65	20.28	6.75	2.57	2.63

R = Raw.

NOTE.—All percentages are reckoned on the basis of the total weight of the sample.

APPENDIX XII.

Physical characteristics of important commercial varieties of rice grown in Bengal.

LJAIQAR

Trade description.	Raw or parboiled.	Foreign matter other than rice.	Broken grains including small fragments.	Red grains.	Other rices.	Immature grains.	Weevilled grains.	Natural test weight per bushel.	1,000 kernel weight.	Average length.	Average breadth.	Ratio of length to breadth.
	1	2	3	4	5	6	7	8	9	10	11	12
		(Per cent).	(Per cent).	(Per cent).	(Per cent).	(Per cent).	(Per cent).	(lb.)	(Grammes).	(Milli-metres).	(Milli-metres).	
Chinisakkar .. ..	R	0.19	30.4	..	..	..	0.02	66.3	8.07	5.16	2.17	2.37
Patnai .. ..	P	0.13	36.4	0.12	..	1.58	..	69.0	18.97	6.96	1.23	3.19
Banltulsi .. ..	P	0.16	32.5	..	..	0.53	..	67.0	15.88	6.03	2.03	2.96
Nagra .. ..	P	0.32	26.0	1.10	..	0.75	0.03	66.7	14.93	6.12	2.15	2.85
Sitasal .. ..	P	0.19	29.1	0.11	..	0.22	..	62.1	12.0	5.96	1.85	3.23
Balam .. ..	P	0.91	43.5	..	..	0.40	0.39	65.7	15.87	6.20	2.19	2.82
Karla .. ..	P	0.22	40.8	0.32	..	0.78	..	65.2	21.96	5.53	2.47	2.26
Dadkhani .. ..	P	0.27	32.65	..	..	0.34	0.18	63.0	12.12	5.89	2.18	2.70
Kalamkatti .. ..	P	0.58	32.17	0.92	..	0.59	0.88	64.3	15.31	7.07	1.97	3.62
Indrasail .. ..	P	0.21	30.50	..	..	0.54	0.29	65.3	15.00	5.88	2.39	2.46
Jhingasal .. ..	P	0.24	20.35	0.12	..	0.53	..	66.7	17.17	7.28	2.15	3.16
Bora .. ..	P	0.56	29.24	..	..	0.41	..	68.5	14.88	5.35	2.56	2.19
Bansphul .. ..	P	0.17	31.81	..	..	0.30	..	67.2	10.43	5.43	2.52	2.15
Joshwa .. ..	P	0.23	30.37	..	..	0.32	0.26	67.4	14.79	5.97	2.27	2.62

P = Parboiled.  
R = Raw.

NOTE.—All percentages are reckoned on the basis of the total weight of the sample

APPENDIX XIII.

*Physical characteristics of important commercial varieties of rice grown in Bihar and Orissa.*

Trade description.	Raw or parboiled.	Foreign matter other than rice.	Broken grains including small fragments.	Red grains.	Other rices.	Immature grains.	Weevilled grains.	Natural test weight per bushel.	1,000 kernel weight.	Average length.	Average breadth.	Ratio of length to breadth.
	1	2	3	4	5	6	7	8	9	10	11	12
		(Per cent).	(Per cent).	(Per cent).	(Per cent).	(Per cent).	(Per cent).	(lb.)	(Grammes).	(Milli-metres).	(Milli-metres).	
<i>Kalamdan</i> .. ..	P	..	32.0	6.25	5.5	4.0	0.25	64.6	16.7	6.62	1.86	3.43
<i>Joshwa</i> .. ..	P	..	26.3	2.0	1.6	17.3	..	66.6	15.3	5.38	2.02	2.68
<i>Mota</i> .. ..	P	0.4	36.3	11.8	Very mixed.	4.3	6.9	65.9	16.8	5.57	2.31	2.41
<i>Kalamkatti</i> .. ..	P	6.5	33.0	6.0	Do.	7.5	0.5	65.7	17.65	6.9	2.15	3.04
<i>Ramsali</i> .. ..	P	5.0	23.0	2.5	Do.	3.0	3.5	65.2	11.85	5.7	1.7	2.36
<i>Dudhraj</i> .. ..	P	..	24.33	3.33	..	4.33	..	67.8	17.0	5.47	2.35	2.50
<i>Dudhkhani</i> .. ..	P	0.5	32.5	5.0	Very mixed.	2.5	1.0	64.3	11.5	5.62	1.71	2.78
<i>Tulsiphul</i> .. ..	P	..	30.0	2.0	..	4.0	..	64.7	11.5	5.24	1.74	3.01
<i>Bhadia</i> .. ..	P	..	50.0	1.0	..	1.0	..	66.8	14.0	5.4	1.9	2.85
<i>Basbrani</i> .. ..	P	1.0	37.0	6.5	Very mixed.	1.0	..	67.7	17.7	5.80	2.25	2.57

P = Parboiled.

NOTE.—All percentages are reckoned on the basis of the total weight of the sample.



APPENDIX XIV.

Physical characteristics of important commercial varieties of rice grown in the Central Provinces.

Trade description.	Raw or parboiled.	Foreign matter other than rice.	Broken grains including small fragments.	Red grains.	Other rices.	Immature grains.	Weevilled grains.	Natural test weight per bushel.	1,000 kernel weight.	Average length.	Average breadth.	Ratio of length to breadth
	1	2	3	4	5	6	7	8	9	10	11	12
		(Per cent).	(Per cent).	(Per cent).	(Per cent).	(Per cent).	(Per cent).	(lb.)	(Grammes).	(Milli-metres).	(Milli-metres).	
<i>Kalikamod</i> .. ..	R	0.12	23.83	1.39	..	0.11	0.42	66.7	12.10	5.35	1.98	2.72
<i>Motichur</i> .. ..	R	..	9.0	0.24	..	1.5	0.3	67.8	14.15	5.69	2.16	2.65
<i>Chinoor</i> .. ..	R	0.22	11.22	0.61	..	0.75	0.80	66.4	12.55	5.58	1.91	2.92
<i>Dilbuxa</i> .. ..	R	0.36	23.17	2.83	..	0.28	0.59	67.8	11.28	4.66	2.12	2.20
<i>Chhatri</i> .. ..	R	0.07	29.05	0.68	..	0.4	0.10	67.7	13.95	5.81	2.07	2.82
<i>Kubrimohar</i> .. ..	R	0.1	12.7	3.04	..	..	..	66.6	11.60	5.31	2.03	2.63
<i>Baspatri</i> .. ..	R	0.16	16.40	0.84	..	0.28	0.20	66.2	8.45	4.16	1.90	2.19
<i>Bhagmuch</i> .. ..	R	0.28	23.8	1.0	..	..	0.3	63.9	8.88	5.09	1.72	2.96
<i>Jhini</i> .. ..	R	0.18	34.82	2.1	0.30	..	0.34	66.1	11.12	5.67	1.84	3.08
<i>Samundrasok</i> .. ..	R	0.13	22.67	2.79	..	0.88	0.62	66.0	16.12	6.19	2.06	3.03
<i>Luchai</i> .. ..	R	0.23	28.6	0.8	..	0.53	0.34	66.7	13.17	5.36	2.11	2.56
<i>Hansa*</i> .. ..	R	0.18	28.16	2.59	..	1.32	0.26	62.8	14.93	5.81	2.20	2.67
<i>Lella</i> .. ..	R	0.23	31.81	10.57	..	1.13	0.13	65.0	11.66	5.34	2.06	2.61
<i>Mota†</i> .. ..	R	0.77	29.80	5.84	..	1.42	2.39	66.2	19.28	5.85	2.44	2.42
<i>Gurmatia</i> .. ..	R	0.18	30.1	3.26	..	0.66	0.23	68.6	16.44	5.69	2.36	2.41
<i>Sela</i> .. ..	R	0.29	46.4	4.82	..	0.36	1.38	65.3	16.66	5.92	2.30	2.59
<i>Gaorani</i> .. ..	R	0.86	37.15	13.50	..	0.50	1.01	64.5	19.11	6.70	2.36	2.85
<i>Bagdi</i> .. ..	R	0.2	55.9	8.81	..	1.2	0.04	69.1	18.28	5.81	2.42	2.41

R = Raw.

\* Including *Luchai*, *Budhiabako* and *Tedisal* in Chattisgarh division.

† Including *Uraibuta Pisso*, *Rhandu*, *Parewa*, *Dhor*, *Nunga*, *Lungi*, *Rani Kajal* and *Kharjana*.

NOTE.—All percentages are reckoned on the basis of the total weight of the sample.

APPENDIX XV.

*Physical characteristics of important commercial varieties of rice grown in Hyderabad (Deccan).*

Trade description.	Raw or parboiled.	Foreign matter other than rice.	Broken grains including small fragments.	Red grains.	Other rices.	Immature grains.	Weevilled grains.	Natural test weight per bushel.	1,000 kernel weight.	Average length.	Average breadth.	Ratio of length to breadth.
	1	2	3	4	5	6	7	8	9	10	11	12
		(Per cent).	(Per cent).	(Per cent).	(Per cent).	(Per cent).	(Per cent).	(lb.)	(Grammes).	(Milli-metres).	(Milli-metres).	
<i>Pichodi</i> .. .. .	R	0.16	2.44	1.22	..	..	..	60.7	15.63	..	..	3.94
<i>Khichidi Nanakram, etc.</i> ..	R	0.72	34.84	1.13	..	..	..	64.7	14.83	..	..	2.93
<i>Kusuma Daka, etc.</i> ..	R	0.35	35.15	4.33	..	..	..	62.6	16.95	..	..	2.72
<i>Gaorani</i> .. .. .	R	0.92	58.0	3.32	..	..	..	67.6	20.56	..	..	3.15
<i>Multansal</i> .. .. .	R	0.30	30.35	4.07	..	..	..	65.1	19.25	..	..	3.0
<i>Palasannal</i> .. .. .	R	0.35	35.43	0.62	..	..	..	67.0	17.86	..	..	2.12

R = Raw.

NOTE.—All percentages are reckoned on the basis of the total weight of the sample.

APPENDIX XVI.

Physical characteristics of important commercial varieties of rice grown in the Madras Presidency.

Trade description.	Raw or parboiled.	Foreign matter other than rice.	Broken grains including small fragments.	Red grains.	Other rices.	Immature grains.	Weevilled grains.	Natural test weight per bushel.	1,000 kernel weight.	Average length.	Average breadth.	Ratio of length to breadth.
	1	2	3	4	5	6	7	8	9	10	11	12
		(Per cent).	(Per cent).	(Per cent).	(Per cent).	(Per cent).	(Per cent).	(lb.)	(Grammes).	(Milli-metres).	(Milli-metres).	
<i>Khichili Samba</i> .. ..	R	0.07	10.94	..	..	0.12	..	65.7	12.55	5.00	2.00	2.60
<i>Khichili Samba No. 1</i> .. ..	R	.20	8.58	..	..	..	..	62.7	13.48	5.40	2.14	2.59
<i>Sirumani (old)</i> .. ..	R	0.29	39.59	..	..	.19	..	66.0	13.11	4.36	2.36	1.84
<i>Sirumani White (new)</i> .. ..	P	0.32	15.78	..	..	0.5	..	66.5	14.06	4.60	2.32	2.00
<i>Sirumani Red</i> .. ..	R	.01	13.83	..	..	.78	.02	65.1	15.16	4.4	2.60	1.70
<i>Nellore (old) Samba</i> .. ..	R	..	39.80	..	..	.11	..	66.4	15.8	5.2	2.9	2.28
<i>Krishnakatukulu</i> .. ..	R	.21	12.53	..	..	.11	..	63.7	15.00	5.37	2.10	2.57
<i>Bontha Krishnakatukulu</i> .. ..	R	.18	12.86	..	..	.17	..	64.8	14.04	5.3	2.10	2.60
<i>Sanna</i> .. ..	R	..	15.3	..	..	..	..	63.9	14.52	5.5	2.1	2.6
<i>Krishnakatukulu</i> .. ..	R	..	15.3	..	..	..	..	63.9	14.52	5.5	2.1	2.6
<i>Kairalu Krishnakatukulu</i> .. ..	R	.28	18.88	..	..	..	..	62.3	14.08	5.5	2.1	2.6
<i>Chinna Samba</i> .. ..	P	.38	24.56	5.46	..	.17	..	65.5	14.40	5.1	2.2	2.4
<i>Nellore Molagolukulu</i> .. ..	R	.07	20.46	..	..	.19	..	64.4	15.77	5.2	2.4	2.2
<i>Akkulu (old)</i> .. ..	R	.42	21.57	..	..	.08	..	64.3	15.65	5.57	2.25	2.48
<i>Akkulu (new)</i> .. ..	R	..	..	..	..	..	..	..	..	..	..	..
<i>Panasa Akkulu</i> .. ..	R	.44	17.74	..	..	..	..	62.8	17.39	5.6	2.3	2.40
<i>Venkasannaku (old)</i> .. ..	R	.24	17.29	..	..	..	..	62.5	14.52	5.7	2.0	2.90
<i>Sodai Samba</i> .. ..	R	.66	15.37	..	..	.08	..	64.0	14.9	5.25	2.2	2.28
<i>Red Kurwai</i> .. ..	P	0.03	5.88	..	..	1.05	..	64.4	16.78	5.2	2.4	2.21
<i>Kurwai</i> .. ..	P	0.29	16.98	..	..	0.11	..	63.6	17.21	5.3	2.5	2.10
<i>Vellai Samba</i> .. ..	R	..	25.97	..	..	0.06	0.07	65.3	14.63	5.1	2.3	2.2
<i>Garikasannavi</i> .. ..	R	0.13	13.30	..	..	0.13	..	64.7	16.46	5.39	2.34	2.26
<i>Mypali</i> .. ..	R	..	26.30	..	..	..	0.76	66.9	19.38	16.0	2.50	2.4
<i>Basangi</i> .. ..	P	..	5.84	..	..	0.90	..	67.7	16.40	5.4	2.2	2.5
<i>Rama Sagan</i> .. ..	R	0.72	27.50	..	..	..	..	64.1	17.03	5.6	2.2	2.6
<i>Attragada</i> .. ..	R	0.23	17.26	..	..	0.04	..	64.2	17.56	5.69	2.33	2.45
<i>Konamani</i> .. ..	R	0.79	19.58	..	..	..	..	63.4	17.80	5.6	2.3	2.5
<i>Kattai Sambali</i> .. ..	R	0.01	14.95	..	..	0.60	0.01	64.9	16.84	4.9	2.4	2.01
<i>Vella</i> .. ..	P	0.08	6.75	..	..	..	..	64.3	14.44	5.1	2.2	2.4
<i>Kusuma</i> .. ..	R	0.46	19.84	..	..	..	..	63.5	18.56	5.7	2.3	2.5
<i>Bayahunda</i> .. ..	R	0.15	13.96	6.03	..	0.45	..	65.8	14.54	5.7	2.2	2.63
<i>Kodai</i> .. ..	R	0.26	29.28	..	..	0.28	..	63.7	16.53	5.2	2.4	2.20

P = Parboiled.  
R = Raw.

NOTE.—All percentages are reckoned on the basis of the total weight of the sample.

APPENDIX XVII.

*Physical characteristics of important commercial varieties of rice grown in the Punjab.*

Trade description	Raw or parboiled.	Foreign matter other than rice.	Broken grains including small fragments.	Red grains.	Other rices.	Immature grains.	Weevilid grains.	Natural test weight per bushel.	1,000 kernel weight.	Average length.	Average breadth.	Ratio of length to breadth.
	1	2	3	4	5	6	7	8	9	10	11	12
		(Per cent).	(Per cent).	(Per cent).	(Per cent).	(Per cent).	(Per cent).	(lb.)	(Grammes).	(Milli-metres).	(Milli-metres).	
<i>Basmati</i> .. .. .	R	0.04	13.08	1.96	1.25	0.34	0.01	68.3	15.07	6.51	1.9	3.43
<i>Other Basmati</i> .. .. .	R	0.04	2.03	1.17	0.75	0.27	..	67.2	14.76	6.6	1.82	3.64
<i>Dehra Dun type Basmati</i> .. .. .	R	0.02	3.03	1.08	3.22	0.41	0.04	67.1	14.76	6.68	1.86	3.58
<i>Muskan</i> .. .. .	R	0.08	8.77	1.52	3.84	0.39	0.9	68.3	15.19	6.45	1.91	3.4
<i>Hanaraj</i> .. .. .	R	0.01	4.5	0.65	1.71	0.33	..	67.5	15.91	6.76	1.93	3.5
<i>Parnal</i> .. .. .	R	0.06	5.12	2.03	8.91	0.48	0.02	67.0	13.05	6.55	1.78	3.71
<i>Sona</i> .. .. .	R	0.26	4.53	3.04	2.13	0.35	..	69.4	11.57	5.48	1.99	2.76
<i>Regani</i> .. .. .	R	0.46	18.31	4.04	1.2	0.55	..	69.4	18.25	6.46	2.22	2.92
<i>Banjara</i> .. .. .	R	0.01	14.21	4.32	7.13	1.79	..	66.6	14.14	6.73	1.79	3.77
<i>Ziri</i> .. .. .	R	0.18	29.95	3.57	1.31	0.27	..	69.1	13.68	5.94	1.90	3.14
<i>Ratna</i> .. .. .	R	0.7	24.04	8.66	3.9	0.32	..	69.6	10.5	5.41	1.91	2.83
<i>Jhona Chhara</i> .. .. .	R	..	0.96	1.37	0.13	0.43	..	69.4	17.63	6.52	2.17	2.99
<i>Jhona</i> .. .. .	R	0.13	18.17	2.86	1.71	0.97	0.1	70.4	17.23	6.23	2.15	2.97
<i>Rasmanja</i> .. .. .	P	0.01	14.21	4.32	7.13	1.79	..	66.6	14.14	6.73	1.79	3.77
<i>Sela</i> .. .. .	P	0.05	4.18	5.23	1.35	0.7	..	67.7	15.1	6.52	1.84	3.62
<i>Chhara</i> .. .. .	P	0.01	11.62	0.75	0.87	1.19	0.02	68.6	16.15	6.49	2.29	3.27
<i>Sathri Pili Shali</i> .. .. .	P	0.05	4.30	6.18	0.66	0.85	..	70.0	14.64	5.99	2.07	2.89
<i>Jatu</i> .. .. .	R	..	29.4	100.0	1.14	..	..	69.3	14.7	4.99	2.7	1.85
<i>Safaida Chitti</i> .. .. .	R	0.05	11.66	2.29	0.49	0.12	..	70.2	16.47	6.09	2.21	2.76

P = Parboiled.

R = Raw.

NOTE.—All percentages are reckoned on the basis of the total weight of the sample.

APPENDIX XVIII.

*Physical characteristics of important commercial varieties of rice grown in Sind.*

Trade description.	Raw or parboiled.	Foreign matter other than rice.	Broken grains including small fragments.	Red grains.	Other rices.	Immature grains.	Weevilled grains.	Natural test weight per bushel.	1,000 kernel weight.	Average length.	Average breadth.	Ratio of length to breadth.
	1	2	3	4	5	6	7	8	9	10	11	12
		(Per cent).	(Per cent).	(Per cent).	(Per cent).	(Per cent).	(Per cent).	(lb.)	(Grammes).	(Milli-metres).	(Milli-metres).	
<i>Kugni No. 2</i> .. ..	R	0.07	13.21	..	2.3	0.81	..	..	17.53	..	..	..
<i>Sugdasi No. 1</i> .. ..	R	0.11	6.16	..	4.64	0.21	..	..	16.18	..	..	..

R = Raw.

NOTE.—All percentages are reckoned on the basis of the total weight of the sample.

APPENDIX XIX.

*Physical characteristics of important commercial varieties of rice grown in the United Provinces.*

Trade description.	Raw or parboiled.	Foreign matter other than rice.	Broken grains including small fragments.	Red grains.	Other rices.	Immature grains.	Weevilled grains.	Natural test weight per bushel.	1,000 kernel weight.	Average length.	Average breadth.	Ratio of length to breadth.
	1	2	3	4	5	6	7	8	9	10	11	12
		(Per cent).	(Per cent).	(Per cent).	(Per cent).	(Per cent).	(Per cent).	(lb.)	(Grammes).	(Milli-metres).	(Milli-metres).	
<i>Dehra Dun Basmati</i> .. .. .	R	2.43	10.1	1.46	..	0.2	..	66.7	14.77	6.86	1.90	3.60
<i>Hansraj</i> .. .. .	R	1.87	17.55	1.42	..	..	.57	76.5	14.89	6.45	1.94	3.33
<i>Gaurya</i> .. .. .	R	0.50	18.56	1.12	..	..	..	83.6	13.50	5.49	2.65	2.07
<i>Anji</i> .. .. .	R	2.49	16.92	1.84	..	..	..	85.6	12.72	5.74	1.95	2.94
<i>Barma</i> .. .. .	R	0.49	11.03	2.16	..	..	..	81.0	11.96	5.18	2.40	2.15
<i>Raimunia</i> .. .. .	R	2.76	42.8	1.0	..	..	..	68.1	12.76	6.15	1.88	3.26
<i>Ramjwain</i> .. .. .	R	1.86	22.7	4.3	..	1.1	1.4	65.1	12.25	6.39	1.73	3.68
<i>Rambhog</i> .. .. .	R	0.76	30.25	4.3	..	..	..	81.4	17.00	6.56	2.19	2.99
<i>Didai</i> .. .. .	R	0.66	27.9	5.06	..	..	..	82.8	17.13	6.34	2.27	2.78
<i>Bankharcha</i> .. .. .	R	5.33	36.8	3.46	..	.46	..	68.1	8.89	6.34	1.84	3.51
<i>Anjana</i> .. .. .	R	3.27	30.1	2.48	..	..	..	74.4	14.84	5.82	2.19	2.65
<i>Bambhalu</i> .. .. .	R	3.6	37.4	.9	..	..	..	69.7	11.63	6.12	1.84	3.33
<i>Sondhi</i> .. .. .	R	3.4	29.12	3.0	..	..	..	71.8	13.78	4.82	2.36	2.04
<i>Pahari</i> .. .. .	R	..	20.0	6.0	..	..	..	91.1	15.84	6.58	2.84	2.35
<i>Dhanis</i> .. .. .	R	1.4	32.4	3.3	..	..	..	72.6	13.54	4.48	2.34	1.93
<i>Dalbadal</i> .. .. .	R	0.9	27.4	1.8	..	..	..	68.4	13.74	5.84	2.19	2.66
<i>Ramkaruni</i> .. .. .	R	3.65	24.1	5.95	..	0.1	..	68.8	13.90	4.99	2.50	1.98
<i>Kala Sukhdas</i> .. .. .	R	1.4	21.6	2.3	..	2.5	..	64.3	17.25	6.94	2.02	3.43
<i>Banki</i> .. .. .	R	7.6	41.4	1.3	..	..	..	71.5	15.20	5.28	2.39	2.20

R = Raw.

NOTE.— All percentages are reckoned on the basis of the total weight of the sample.

APPENDIX XX.

Relative dimensions of some important commercial varieties of rice grown in different provinces and States.  
Fine rices.

Trade descriptions.	Raw or parboiled.	Length (millimetres).			Breadth (millimetres).			Ratio.		
		Maximum.	Minimum.	Average.	Maximum.	Minimum.	Average.	Maximum.	Minimum.	Average.
<b>PUNJAB.</b>										
<i>Parnal</i>	Raw	6.74	5.85	6.55	2.15	1.64	1.79	4.09	3.64	3.71
<i>Hansraj or Bara Hansraj</i>	"	6.88	6.66	6.76	2.02	1.79	1.93	3.77	3.34	3.50
<i>Basmati</i>	"	6.77	6.25	6.51	2.14	1.67	1.90	4.04	3.05	3.43
<i>Mushkan</i>	"	6.87	6.93	6.45	2.01	1.83	1.91	3.73	3.09	3.40
<i>Chahora</i>	"	6.74	6.32	6.49	2.13	1.78	2.00	3.79	2.97	3.27
<b>UNITED PROVINCES.</b>										
<i>Sela (Saharanpur)</i>	Parboiled	7.38	6.87	7.11	1.89	1.81	1.85	3.95	3.76	3.83
<i>Dehra Dun Basmati</i>	Raw	7.06	6.47	6.86	2.03	1.80	1.90	3.90	3.40	3.60
<i>Hansraj</i>	"	6.91	6.10	6.45	2.09	1.85	1.94	3.52	3.00	3.33
<i>Raimunia</i>	"	6.33	5.82	6.15	1.90	1.87	1.88	3.34	3.11	3.28
<b>CENTRAL PROVINCES.</b>										
<i>Chinoor</i>	Raw	5.80	5.33	5.58	2.0	1.80	1.90	3.17	2.69	2.92
<i>Chhatri</i>	"	5.89	5.74	5.81	2.27	1.96	2.07	2.96	2.60	2.82
<i>Kalikamod</i>	"	5.96	5.08	5.35	2.13	1.90	1.98	3.14	2.46	2.72
<i>Banspatri</i>	"	4.99	3.62	4.04	2.35	1.95	2.07	2.12	1.85	1.95
<b>BOMBAY.</b>										
<i>Kamod</i>	Raw	5.85	5.15	5.50	2.15	1.80	1.96	3.05	2.64	2.80
<i>Kolamba (Zinia)</i>	"	5.26	4.49	4.95	1.91	1.61	1.73	2.75	2.78	2.79
<i>Kolpi</i>	"	5.60	5.05	5.33	2.05	1.95	2.00	2.73	2.59	2.66
<i>Iresal</i>	"	5.85	4.55	5.08	2.15	2.05	2.11	2.85	2.12	2.40
<b>MADRAS.</b>										
<i>G. E. B. 24 (Khichidi or Khichidi Samba)</i>	Raw	5.50	5.30	5.40	2.6	1.97	2.14	2.74	2.50	2.59
<i>Krishnakatukulu</i>	"	5.50	5.23	5.37	2.17	2.00	2.10	2.80	2.48	2.57

APPENDIX XX—contd.

Relative dimensions of some important commercial varieties of rice grown in different provinces and States—contd.

Fine rices—contd.

Trade descriptions.						Raw or parboiled.	Length (millimetres).			Breadth (millimetres).			Ratio.			
							Maximum.	Minimum.	Average.	Maximum.	Minimum.	Average.	Maximum.	Minimum.	Average.	
<b>BIHAR.</b>																
<i>Kalamdan</i>	..	..	..	..	..	Parboiled	6.81	6.33	6.62	2.05	1.74	1.86	3.89	3.09	3.43	
<i>Kalamkatti</i>	..	..	..	..	..	"	6.90	6.90	6.90	2.4	1.99	2.15	3.63	2.46	3.04	
<b>SIND.</b>																
<i>Sugdasi</i>	..	..	..	..	..	Raw	6.90	6.05	6.38	2.18	1.82	1.97	3.24	3.32	3.24	
<b>BENGAL</b>																
<i>Kalamkatti</i>	..	..	..	..	..	Parboiled	7.33	6.65	7.07	2.15	1.73	1.97	4.23	3.27	3.62	
<i>Sitasal</i>	..	..	..	..	..	"	6.26	5.80	5.96	1.96	1.77	1.85	3.29	3.19	3.23	
<i>Ballam</i>	..	..	..	..	..	Raw	6.86	6.00	6.47	2.27	2.04	2.13	3.25	2.94	3.09	
<i>Patnai</i>	..	..	..	..	..	Parboiled	7.30	6.40	6.96	2.30	2.15	2.23	3.37	2.84	3.13	
<b>ORISSA.</b>																
<i>Kalambank</i>	..	..	..	..	..	"	7.83	6.60	7.40	2.24	2.14	2.19	3.49	3.08	3.38	



APPENDIX XXI.

Relative dimensions of some important commercial varieties of rice grown in different provinces and States.

Medium rices.

Trade descriptions,	Raw or parboiled.	Length (millimetres).			Breadth (millimetres).			Ratio.		
		Maximum.	Minimum.	Average.	Maximum.	Minimum.	Average.	Maximum.	Minimum.	Average.
<b>PUNJAB.</b>										
<i>Begami</i> .. .. .	Raw	6.84	5.92	6.46	2.37	2.10	2.22	3.25	2.71	2.92
<i>Sona</i> .. .. .	"	5.66	5.26	5.48	2.12	1.91	1.99	2.93	2.62	2.76
<b>UNITED PROVINCES.</b>										
<i>Anji</i> .. .. .	Raw	5.82	5.63	5.74	1.98	1.92	1.95	3.00	2.84	2.94
<i>Rambhog</i> .. .. .	"			6.40			2.22			2.88
<i>Didai</i> .. .. .	"	6.70	5.97	6.34	2.40	2.14	2.27	2.79	2.78	2.78
<i>Anjana</i> .. .. .	"	7.70	5.23	5.82	2.27	2.12	2.19	3.63	3.32	2.66
<i>Sandhi</i> .. .. .	"	4.98	4.67	4.82	2.41	2.31	2.86	2.07	2.02	2.04
<b>CENTRAL PROVINCES.</b>										
<i>Samundrasok</i> .. .. .	Raw	6.57	5.91	6.19	2.13	1.99	2.06	3.33	2.86	3.03
<i>Hanea</i> .. .. .	"	6.12	5.50	5.81	2.55	2.03	2.20	2.90	2.19	2.67
<i>Lachoi</i> .. .. .	"	5.55	5.16	5.36	2.17	2.06	2.11	2.66	2.52	2.58
<b>BOMBAY.</b>										
<i>Satarsal</i> .. .. .	Raw	5.80	5.70	5.70	2.10	2.00	2.10	2.76	2.71	2.73
<i>Ambemohar</i> .. .. .	"	4.55	4.15	4.42	2.40	2.15	2.23	2.12	1.90	1.93
<b>MADRAS.</b>										
<i>Attragada</i> .. .. .	Raw	6.00	5.50	5.69	2.38	2.30	2.33	2.60	2.30	2.50
<i>Akkulu</i> .. .. .	"	5.80	5.40	5.57	2.40	2.20	2.25	2.53	2.30	2.48
<i>Sada Samba</i> .. .. .	"	5.30	5.20	5.25	2.20	2.20	2.20	2.40	2.00	2.28
<i>Sirumani (White)</i> .. .. .	Parboiled	5.00	4.50	4.80	2.30	2.30	2.32	2.20	2.00	2.10
<i>Sirumani (White)</i> .. .. .	Raw	5.50	3.70	4.36	2.40	2.30	2.36	2.30	1.61	1.84
<i>Do. (Red)</i> .. .. .	Parboiled	4.80	4.20	4.40	2.70	2.40	2.60	2.00	1.50	1.70
<i>Nellore Molagolukulu</i> .. .. .	Raw	5.30	5.20	5.20	2.40	2.30	2.35	2.30	2.20	2.20

APPENDIX XXI—contd.

Relative dimensions of some important commercial varieties of rice grown in different provinces and States—contd.

Medium rices.—contd.

Trade descriptions.	Raw or parboiled.	Length (millimetres).			Breadth (millimetres).			Ratio.		
		Maximum.	Minimum.	Average.	Maximum.	Minimum.	Average.	Maximum.	Minimum.	Average.
<b>BIHAR.</b>										
<i>Dudkhani</i>	Parboiled	5.75	5.50	5.62	1.72	1.70	1.71	3.23	2.34	2.78
<i>Dudraj</i>	"	5.62	5.40	5.47	2.20	2.10	2.35	2.57	3.48	2.50
<b>ORISSA.</b>										
<i>Saldhenti</i>	Parboiled	6.00	5.46	5.82	2.20	2.04	2.11	2.94	2.65	2.76
<i>Kankerbija</i>	"	6.83	6.83	6.48	2.14	1.91	2.07	3.32	2.92	3.13
<b>BENGAL.</b>										
<i>Kalma (Jata kalma)</i>	Parboiled	6.77	5.25	6.13	2.20	1.97	2.07	3.08	2.66	2.96
<i>Nagra</i>	"	6.63	5.50	6.12	2.20	2.12	2.15	3.13	2.50	2.85
<i>Indrasail</i>	"	5.95	5.80	5.88	2.40	2.37	2.39	2.47	2.44	2.46
<i>Banktulai</i>	"	..	..	6.03	..	..	2.03	..	..	2.96
<b>ASSAM.</b>										
<i>Nekiradhan</i>	Parboiled	..	..	6.73	..	..	2.23	..	..	3.00
<i>Kersail</i>	Raw	..	..	6.96	..	..	2.32	..	..	2.55
<i>Malair</i>	Parboiled	..	..	5.50	..	..	2.17	..	..	2.53
<i>Latisail</i>	"	..	..	5.52	..	..	2.29	..	..	2.41

APPENDIX XXII.

Relative dimensions of some important commercial varieties of rice grown in different provinces and States.

Bold rices.

Trade descriptions.	Raw or parboiled.	Length (millimetres).			Breadth (millimetres).			Ratio.		
		Maximum.	Minimum.	Average.	Maximum.	Minimum.	Average.	Maximum.	Minimum.	Average.
<i>Jhona</i> .. .. .	Raw	6.72	5.97	6.23	2.29	1.95	2.15	3.33	3.85	2.97
PUNJAB.										
<i>Pahari</i> .. .. .	Raw	..	..	6.58	..	..	2.84	..	..	2.35
<i>Banki</i> .. .. .	"	..	..	5.28	..	..	2.39	..	..	2.20
<i>Dhanis</i> .. .. .	"	..	..	4.48	..	..	2.34	..	..	1.93
UNITED PROVINCES.										
<i>Mota</i> .. .. .	Raw	6.61	5.45	5.85	2.94	2.16	2.44	3.19	2.02	2.42
<i>Gurmatia</i> .. .. .	"	6.20	5.37	5.69	2.59	2.04	2.36	2.71	2.1	2.41
<i>Bombay</i> .. .. .	"	5.80	5.45	5.63	2.90	2.30	2.55	2.37	1.95	2.22
<i>Pattani</i> .. .. .	"	6.00	5.40	5.70	2.40	2.20	2.30	2.60	2.40	2.50
CENTRAL PROVINCES.										
<i>Kusuma</i> .. .. .	Raw	6.00	5.40	5.60	2.40	2.00	2.20	2.70	2.40	2.50
<i>Konamani</i> .. .. .	"	5.60	4.00	5.10	2.40	1.90	2.20	2.80	1.70	2.40
<i>Vella</i> .. .. .	"	5.30	5.20	5.20	2.50	2.30	2.40	2.30	2.10	2.20
<i>Kudai</i> .. .. .	"	5.40	5.20	5.30	2.50	2.40	2.50	2.20	2.00	2.10
<i>Kurvai</i> .. .. .	Parboiled	6.10	5.30	5.70	2.55	2.14	2.34	2.77	2.23	2.45
MADRAS.										
<i>Satraj</i> .. .. .	Parboiled	5.88	5.10	5.57	2.48	2.10	2.31	2.62	2.27	2.41
<i>Mota (Chaudanna)</i> .. .. .	"	5.64	4.87	5.38	2.60	2.20	2.45	2.48	2.14	2.24
BIHAR.										
<i>Safi</i> .. .. .	Parboiled	6.92	5.50	6.49	2.33	2.04	2.18	2.97	2.69	2.97
ORISSA.										
<i>Kangni</i> .. .. .	Raw	5.56	5.50	5.53	2.52	2.23	2.37	2.46	2.21	2.33
SIND.										
<i>Badal</i> .. .. .	Raw	..	..	5.41	..	..	2.58	..	..	2.09
<i>Hatisail</i> .. .. .	Parboiled	6.63	5.50	6.12	2.20	2.12	2.15	3.13	2.50	2.26
ASSAM.										
<i>Karla</i> .. .. .	Parboiled	..	..	..	..	..	..	..	..	..
BENGAL.										

APPENDIX XXIII.

*Approximate classification of rice production in India and Burma based on (a) conformation (grain size) and (b) raw and parboiled.*

(Thousand tons).

	Average production, 1934-35/1936-37.	Net production less seed requirement.	Raw.	Par-boiled.	Fine.			Medium.			Bold.		
					Raw.	Par-boiled.	Total.	Raw.	Par-boiled.	Total.	Raw.	Par-boiled.	Total.
<b>INDIA.</b>													
Bengal .. .. .	8,429	8,053 (100%)	809 (10%)	7,244 (90%)	201	685	886 (11%)	519	2,420	2,939 (36%)	89	4,139	4,228 (53%)
Madras .. .. .	4,839	4,673 (100%)	3,164 (68%)	1,509 (32%)	775	53	828 (18%)	1,028	334	1,362 (29%)	1,361	1,122	2,483 (53%)
Bihar and Orissa ..	4,464	4,097 (100%)	397 (10%)	3,700 (90%)	82	365	447 (11%)	184	1,295	1,479 (36%)	131	2,040	2,171 (53%)
United Provinces ..	1,970	1,871 (100%)	1,641 (a) (88%)	230 (12%)	227	31	258 (14%)	480	65	545 (29%)	934	134	1,068 (57%)
Central Provinces and Berar	1,669	1,489 (100%)	1,414 (95%)	75 (5%)	191	..	191 (13%)	531	30	561 (38%)	692	45	737 (49%)
Assam .. .. .	1,665	1,610 (100%)	934 (58%)	676 (42%)	36	..	36 (2%)	313	174	487 (30%)	585	502	1,087 (68%)

Bombay .. ..	832	787 (100%)	752 (96%)	35 (4%)	216	..	216 (28%)	192	..	192 (24%)	344	35	379 (48%)
Sind .. ..	406	361 (b) (100%)	252 (70%)	109 (30%)	38	..	38 (11%)	..	..	..	214	109	323 (89%)
Punjab .. ..	823	819 (100%)	303 (95%)	16 (5%)	74	10	84 (26%)	33	3	36 (11%)	196	3	199 (63%)
Other provinces (c) ..	193	183 (100%)	76 (42%)	107 (58%)	15	9	24 (13%)	26	34	60 (33%)	35	64	99 (54%)
Total (British India) ..	24,790	23,443 (100%)	9,742 (42%)	13,701 (58%)	1,855	1,153	3,008 (13%)	3,306	4,355	7,661 (33%)	4,581	8,193	12,774 (54%)
Federated States in Orissa (d).	1,382	1,269 (100%)	200 (16%)	1,069 (84%)	40	135	175 (14%)	98	323	421 (33%)	62	611	673 (53%)
Central Provinces States (e)	462	403 (100%)	383 (95%)	20 (5%)	52	..	52 (13%)	145	8	153 (38%)	186	12	198 (49%)
Bombay States (including Khairpur State) (f).	189	179 (100%)	161 (90%)	18 (10%)	39	..	39 (22%)	36	..	36 (20%)	86	18	104 (58%)
Hyderabad .. ..	373	349 (100%)	349 (100%)	..	7	..	7 (2%)	126	..	126 (36%)	216	..	216 (62%)
Mysore .. ..	208	195 (100%)	188 (96%)	7 (4%)	59	..	59 (30%)	59	..	59 (30%)	70	7	77 (40%)

NOTE.—The above estimates do not take into account exports of paddy except in the case of Burma, where shipment of paddy accounts for about 4 per cent of the production of this country.

(a) Includes rice used for parching.

(b) Exceeding 20,000 tons used as flour, etc., and converted directly from paddy.

(c) Based on the average conditions prevailing in the provinces for which data are given in this statement.

(d) Estimated on the basis of conditions prevailing in Orissa.

(e) Estimated on the basis of conditions prevailing in the Central Provinces.

(f) Estimated on the basis of conditions prevailing in Bombay and Sind.

APPENDIX XXIII—contd.

Approximate classification of rice production in India and Burma based on (a) conformation grain (size) and (b) raw and parboiled—contd.  
(Thousand tons).

—	Average production, 1934-35/1936-37.	Net production less seed requirement.	Raw.	Par-boiled.	Fine.			Medium.			Bold.		
					Raw.	Par-boiled.	Total.	Raw.	Par-boiled.	Total.	Raw.	Par-boiled.	Total.
Baroda .. ..	49	46 (100%)	38 (83%)	8 (17%)	15	..	15 (33%)	15	2	17 (37%)	8	6	14 (30%)
Jammu and Kashmir ..	200	195 (100%)	195 (100%)	..	..	..	..	50	..	50 (26%)	145	..	145 (74%)
Patiala .. ..	4	4 (100%)	4 (100%)	Negligible.	..	..	Negligible.	1	..	1 (25%)	3	..	3 (75%)
Cochin and Travancore (g)	442	406 (100%)	33 (8%)	373 (92%)	..	4	4 (1%)	8	89	97 (24%)	25	280	305 (75%)
Other States (h) ..	278	256 (100%)	131 (51%)	125 (49%)	19	12	31 (12%)	44	35	79 (31%)	68	78	146 (57%)
Total (Indian States) ..	3,587	3,302 (100%)	1,682 (51%)	1,620 (49%)	231	151	382 (12%)	582	457	1,039 (31%)	869	1,012	1,881 (57%)
Grand total (India) ..	28,377	26,745 (a) (100%)	11,424 (43%)	(a)15,321 (57%)	2,086	1,304	3,390 (13%)	3,888	4,812	8,700 (32%)	5,450	9,205	14,655 (55%)
BURMA ..	4,750	4,364 (100%)	3,273 (75%)	1,091 (25%)	807	240	1,047 (24%)	585	70	655 (15%)	1,881	781	2,662 (61%)

NOTE.—The above estimates do not take into account exports of paddy except in the case of Burma, where shipment of paddy accounts for about 4 per cent of the production of this country.

(a) Includes rice used for parching.

(g) Estimated on the basis of conditions prevailing in Travancore.

(h) Based on the average conditions prevailing in the States for which data are given in this statement.

## APPENDIX XXIV.

*Approximate classification of rice production according to (a) raw and parboiled, and (b) machine-milled and hand-pounded.*

(Thousand tons).

	Average production, 1934-35/1936-37.	Net production less seed requirement.	Raw.			Parboiled.		
			Machine-milled.	Hand-pounded.	Total.	Machine-milled.	Hand-pounded.	Total.
<b>INDIA.</b>								
Bengal .. .. .	8,429	8,053 (100%)	84 (1%)	725 (9%)	809 (10%)	1,180 (15%)	6,064 (75%)	7,244 (90%)
Madras .. .. .	4,839	4,673 (100%)	2,233 (48%)	931 (20%)	3,164 (68%)	650 (14%)	859 (18%)	1,509 (32%)
Bihar and Orissa ..	4,464	4,097 (100%)	79 (2%)	318 (8%)	397 (10%)	949 (8%)	3,352 (82%)	3,700 (90%)
United Provinces ..	1,970	1,871 (100%)	100 (5%)	1,541 (83%)	1,641 (88%)	30 (2%)	200 (10%)	230 (12%)
Central Provinces and Berar	1,669	1,489 (100%)	372 (25%)	1,042 (70%)	1,414 (95%)	75 (5%)	..	75 (5%)
Assam .. .. .	1,665	1,610 (100%)	49 (3%)	885 (55%)	934 (58%)	5	671 (42%)	676 (42%)
Bombay .. .. .	832	787 (100%)	419 (53%)	333 (43%)	752 (96%)	15 (2%)	20 (2%)	35 (4%)
Sind .. .. .	406	381 (b)	218 (60%)	34 (10%)	252 (70%)	109 (30%)	..	109 (30%)
Punjab .. .. .	323	319 (100%)	271 (85%)	32 (10%)	303 (95%)	16 (5%)	Negligible.	16 (5%)
Other provinces (c) ..	193	183 (100%)	30 (17%)	46 (25%)	76 (42%)	19 (10%)	88 (48%)	107 (58%)
Total (British India) ..	24,790	(a) 23,443 (100%)	3,855 (17%)	5,887 (25%)	9,742 (42%)	2,447 (10%)	11,254 (48%)	13,701 (58%)
Federated States in Orissa (now Eastern States Agency) (d).	1,382	1,269 (100%)	40 (3%)	160 (13%)	200 (16%)	90 (7%)	979 (77%)	1,069 (84%)
Central Provinces States (now Eastern States Agency) (e).	462	403 (100%)	101 (25%)	282 (70%)	383 (95%)	20 (5%)	..	20 (5%)
Bombay States (including Khairpur State in Sind) (f).	189	179 (100%)	99 (55%)	62 (35%)	161 (90%)	14 (8%)	4 (2%)	18 (10%)

NOTE.—The above estimates do not take into account exports of paddy except in the case of Burma, where shipment of paddy accounts for about 4 per cent of the production of this country.

(a) Includes rice used for parboiling.

(b) Exceeding 20,000 tons used as flour, etc., and converted directly from paddy.

(c) Based on the average conditions prevailing in the provinces for which data are given in this statement.

(d) Estimated on the basis of conditions prevailing in Orissa.

(e) Estimated on the basis of conditions prevailing in the Central Provinces.

(f) Estimated on the basis of conditions prevailing in Bombay and Sind.

## APPENDIX XXIV—contd.

Approximate classification of rice production according to (a) raw and parboiled and (b) machine-milled and hand-pounded—contd.

(Thousand tons).

	Average Production, 1934-35/1936-37.	Net production less seed requirement.	Raw.			Parboiled.		
			Machine-milled.	Hand-pounded.	Total.	Machine-milled.	Hand-pounded.	Total.
Hyderabad .. .. .	373	349 (100%)	215 (62%)	134 (38%)	349 (100%)	..	..	..
Mysore .. .. .	208	195 (100%)	137 (70%)	51 (26%)	188 (96%)	7 (4%)	..	7 (4%)
Baroda .. .. .	49	46 (100%)	33 (72%)	5 (11%)	38 (83%)	..	8 (17%)	8 (17%)
Jammu and Kashmir ..	(a) 200	195 (100%)	39 (20%)	156 (80%)	195 (100%)	..	..	..
Patiala .. .. .	4	4 (100%)	3 (75%)	1 (25%)	4 (100%)	..	..	Negligible.
Cochin .. .. .	101	91 (100%)	..	1 (1%)	1 (1%)	85 (94%)	5 (5%)	90 (99%)
Travancore .. .. .	(g) 341	315 (100%)	7 (2%)	25 (8%)	32 (10%)	66 (21%)	217 (69%)	283 (90%)
Other States (h) .. ..	278	256 (100%)	57 (22%)	74 (29%)	131 (51%)	23 (9%)	102 (40%)	125 (49%)
Total (Indian States) ..	3,587	3,302 (100%)	731 (22%)	951 (29%)	1,682 (51%)	305 (9%)	1,315 (40%)	1,620 (49%)
Grand total (India) ..	28,377	26,745 (100%)	4,586 (17%)	6,838 (26%)	11,424 (43%)	2,752 (10%)	12,569 (47%)	(a) 15,321 (57%)
BURMA .. .. .	4,750	4,364 (100%)	2,913 (67%)	360 (8%)	3,273 (75%)	1,091 (25%)	..	1,091 (25%)

NOTE.—The above estimates do not take into account exports [of paddy except in the case of Burma, where shipment of paddy accounts for about 4 per cent of the production of this country.

(a) Includes rice used for parching.

(g) Average for the quinquennium ending 1936-37.

(h) Based on the average conditions prevailing in the State for which data are given in this statement.



## APPENDIX XXV.

Qualitative composition of the types of rice constituting the marketable surplus of production in India.

NOTE.—The data given in this Appendix must be regarded as rough approximations only based on general observations.

(Thousand tons).

—	Total.	Fine.	Medium.	Bold or coarse.	Machine-milled.		Hand-pounded.	
					Raw.	Parboiled.	Raw.	Par-boiled.
<b>PROVINCES.</b>								
<b>Bengal—</b>								
Production less seed ..	8,053	886	2,939	4,228	84	1,180	725	6,064
Estimated marketable surplus	3,877	842	2,351	684	Practically all.	Practically all.	550	2,063
Proportion of production ..	48%	95%	80%	16%	..	..	76%	34%
<b>Madras—</b>								
Production less seed ..	4,673	828	1,362	2,483	2,233	650	931	859
Estimated marketable surplus	3,145	803	1,158	1,184	2,033	600	340	172
Proportion of production ..	67%	97%	85%	48%	91%	92%	37%	20%
<b>Bihar and Orissa—</b>								
Production less seed ..	4,097	447	1,479	2,171	79	348	318	3,352
Estimated marketable surplus	1,339	402	739	198	Practically all.	328	120	812
Proportion of production ..	33%	90%	50%	9%	..	94%	38%	24%
<b>United Provinces—</b>								
Production less seed ..	1,871	258	545	1,068	100	30	1,541	200
Estimated marketable surplus	709	232	327	150	Practically all.	Practically all.	520	59
Proportion of production ..	38%	90%	60%	14%	..	..	34%	30%
<b>Central Provinces—</b>								
Production less seed ..	1,489	191	561	737	372	75	1,042	..
Estimated marketable surplus	567	172	280	115	352	Practically all.	140	..
Proportion of production ..	38%	90%	50%	16%	95%	..	13%	..
<b>Assam—</b>								
Production less seed ..	1,610	36	487	1,087	49	5	885	671
Estimated marketable surplus	100	30	40	30	Practically all.	Practically all.	30	16
Proportion of production ..	6%	83%	8%	3%	..	..	3%	2%
<b>Bombay—</b>								
Production less seed ..	787	216	192	379	419	15	333	20
Estimated marketable surplus	283	173	77	33	210	Practically all.	58	..
Proportion of production ..	36%	80%	40%	9%	50%	..	17%	..
<b>Sind—</b>								
Production less seed ..	361	38	..	323	218	109	34	..
Estimated marketable surplus	276	34	..	242	167	Practically all.	..	..
Proportion of production ..	76%	89%	..	75%	77%	..	..	..
<b>Punjab—</b>								
Production less seed ..	319	84	36	199	271	16	32	..
Estimated marketable surplus	194	75	29	90	178	Practically all.	..	..
Proportion of production ..	61%	89%	81%	45%	66%	..	..	..
<b>Other provinces—</b>								
Production less seed ..	183	24	60	99	30	19	46	88
Estimated marketable surplus	93	19	36	38	Practically all.	Practically all.	12	32
Proportion of production ..	51%	79%	60%	38%	..	..	26%	36%
<b>Total (British India)—</b>								
Production less seed ..	23,443	3,008	7,661	12,774	3,855	2,447	5,887	11,254
Estimated marketable surplus	10,583	2,782	5,037	2,764	3,282	2,377	1,770	3,154
Proportion of production ..	45%	92%	66%	22%	85%	97%	30%	28

\* Average 1934-35/1936-37.

## APPENDIX XXV—contd.

Qualitative composition of the types of rice constituting the marketable surplus of production in India—contd.

NOTE.—The data given in this Appendix must be regarded as rough approximations only based on general observations.

(Thousand tons).

	Total.	Fine.	Medium.	Bold or coarse.	Machine-milled.		Hand-pounded.	
					Raw.	Parboiled.	Raw.	Pat-boiled.
<b>STATES.</b>								
<b>Hyderabad—</b>								
Production less seed ..	349	7	126	216	215	..	134	..
Estimated marketable surplus	196	6	88	102	180	..	16	..
Proportion of production ..	56%	86%	70%	47%	84%	..	12%	..
<b>Mysore—</b>								
Production less seed ..	195	59	59	77	137	7	51	..
Estimated marketable surplus	126	Practically all.	47	20	105	Practically all.	14	..
Proportion of production ..	65%	..	80%	26%	77%	..	27%	..
<b>Baroda—</b>								
Production less seed ..	46	15	17	14	33	..	5	8
Estimated marketable surplus	40	Practically all.	15	10	Practically all.	..	3	4
Proportion of production ..	87%	..	88%	71%	..	..	60%	50%
<b>Other States—</b>								
Production less seed ..	2,712	301	837	1,574	346	298	761	1,307
Estimated marketable surplus	554	241	251	62	230	200	44	80
Proportion of production ..	20%	80%	30%	39%	66%	67%	6%	6%
<b>Total (Indian States)—</b>								
Production less seed ..	3,302	382	1,039	1,881	731	305	951	1,315
Estimated marketable surplus	916	321	401	194	548	207	77	84
Proportion of production	28%	84%	39%	10%	75%	68%	8%	6%
<b>Grand total (India)—</b>								
Production less seed ..	26,745	3,390	8,700	14,655	4,586	2,752	6,838	12,569
Estimated marketable surplus	11,499	3,103	5,438	2,958	3,830	2,584	1,847	3,238
Proportion of production	43%	91%	63%	20%	84%	94%	27%	26%

## Summary.

	Percentage of marketable surplus.
Fine rices .. .. .	27.0
Medium .. .. .	47.3
Bold (or Coarse) .. .. .	25.7
Raw .. .. .	49.4
Parboiled .. .. .	50.6
Machines-milled .. .. .	55.8
Hand-pounded .. .. .	44.2

APPENDIX XXVI

Area, production, imports and exports of paddy (rice in the husk) and rice and total net available supplies.

(Thousand).

Year.	Area.	Production.	Imports.		Exports.		Total supplies available for consumption.	
			Paddy.	Rice.	Paddy.	Rice.	Including seed.	Excluding seed.
			Acres.	Tons.	Tons.	Tons.	Tons.	Tons.
1919-20	68,942	28,338	60	1,750	..	126	30,002	28,567
1920-21	68,614	23,584	85	970	..	126	24,486	23,057
1921-22	70,666	28,520	100	903	..	204	29,286	27,815
1922-23	71,114	29,097	141	562	4	330	29,420	27,940
1923-24	67,195	24,031	91	463	10	406	24,142	22,743
1924-25	69,329	26,005	118	511	3	426	26,167	24,724
1925-26	70,166	25,994	157	860	3	378	26,579	25,118
1926-27	67,248	24,568	130	593	2	268	24,978	23,578
1927-28	72,150*	26,060*	197	978	6	291	26,874	25,372
1928-29	76,600	30,280	232	1,190	6	278	31,348	29,753
1929-30	73,850	29,170	175	921	4	273	29,932	28,394
1930-31	76,210	30,060	177	818	4	278	30,715	29,128
1931-32‡	78,040	31,660	203	1,161	2	261	32,694	31,069
1932-33	76,520	29,070	135	1,037	4	250	29,944	28,351
1933-34	76,930	28,650	184	1,755	1	242	30,285	28,683
1934-35	76,000	28,470	353	2,314	4	229	30,788	29,206
1935-36	77,120	25,740	316	1,714	4	211	27,451	25,845
1936-37	79,160	30,920	170	1,595	1	256	32,372	30,724
1937-38	79,190	29,530	68	1,354	1	250	30,679	29,030
1938-39†	73,380	23,920	125	1,437	3	299	25,139	23,811
1939-40† (for ten months)	72,340	25,260	319	1,632	3	223	26,881	25,375

\* From 1927-28 to 1937-38 revised figures for acreage and production have been used.

Figures for 1938-39 and 1939-40 are provisional as given in the final forecasts.

† Figures upto 1936-37 do not include exports to Burma.

‡ Area and production data for 1938-39 and 1939-40 are incomplete and, therefore, not strictly comparable with the previous years' figures.

§ Imports and exports at land frontier stations are available from 1931-32 onwards and are included.

## APPENDIX

Monthly imports of paddy (rice in the  
(Tons).

	1935-36.				1936-37.				1937-	
	British India ports.	Kathiwar and Travancore ports.	Land frontier routes.	Total.	British India ports.	Kathiwar and Travancore ports.	Land frontier routes.	Total.	British India ports.	Kathiwar and Travancore ports.
April .. ..	20,631	6,528	4,453	31,611	22,233	14,727	2,388	39,348	3,939	627
May .. ..	25,657	21,199	3,809	50,665	25,620	8,544	403	34,567	4,065	936
June .. ..	13,317	106	884	14,307	16,434	..	186	16,620	4,375	55
July .. ..	18,331	..	716	19,047	36,181	..	63	36,244	6,157	..
August .. ..	25,173	101	607	25,881	5,044	..	195	5,239	3,070	..
September .. ..	21,450	1,425	280	23,155	2,218	..	264	2,482	3,082	..
October .. ..	21,329	2,853	292	24,474	1,057	..	790	1,847	106	243
November .. ..	7,664	353	220	8,237	8	36	597	641	1,449	..
December .. ..	8,182	369	951	9,502	1,603	96	1,949	3,648	654	..
January .. ..	27,940	4,097	2,097	34,134	2,152	938	2,721	5,811	222	1,046
February .. ..	21,943	4,089	2,596	28,628	3,620	834	2,940	7,394	1,095	4,805
March .. ..	37,293	4,272	4,405	45,970	6,531	5,713	3,462	15,706	7,799	8,068
Grand total	248,910	45,392	21,309	315,611	1,22,701	30,888	15,958	169,547	36,013	15,780
Percentage ..	78.6%	14.3%	7.1%	100	72.4%	18.2%	9.4%	100	53.1%	23.3%

Approximate percentage share (by sea) of	1935-36.	1936-37.
Bengal .. ..	21	30
Madras .. ..	78	70
Sind .. ..	..	..
Bombay .. ..	1	..

Source.—(1) Accounts relating to the Sea-borne Trade and Navigation of British  
(2) Trade Statistics relating to the maritime States in Kathiwar and

## XXVII.

*Asst) into India.*

38.		1938-39.				1939-40.				Average 1935-36 to 1939-40.
Land frontier routes.	Total.	British India ports.	Kathia- war and Travan- core ports.	Land frontier routes.	Total.	British India ports.	Kathia- war and Travan- core ports.	Land fron- tier routes.	Total.	
2,063	6,629	9,591	6,915	1,838	18,344	27,562	2,530	2,255	32,347	25,656
2,956	7,957	7,878	2,232	904	11,014	89,536	738	1,252	91,528	39,146
798	5,228	7,899	..	658	8,557	46,637	..	327	46,964	18,335
318	6,475	244	..	424	668	39,287	..	172	39,459	20,379
164	3,234	35	..	388	423	16,249	..	363	16,612	10,278
72	3,154	1	..	494	495	26,835	..	148	26,983	11,254
333	682	5	26	1,187	1,218	27,635	..	430	28,065	11,257
502	1,951	96	..	530	626	18,818	..	..	18,818	6,055
1,506	2,160	2,558	698	896	4,150	7,725	..	..	7,725	5,437
2,248	3,516	9,262	2,140	1,445	12,847	10,294	..	..	10,294	13,320
2,507	8,407	9,689	5,003	2,790	17,482	..	..	..	..	15,478
2,582	18,449	36,585	8,813	3,616	49,014	..	..	..	..	32,285
16,049	67,842	83,841	25,827	15,170	124,838	..	..	..	..	208,880
23.6%	100	67.2	20.7	12.1	100	..	..	..	..	..

1937-38.	1938-39.	1939-40.
12	9	9
86	90	91
..	..	..
2	1	..

India.  
the State of Travancore.

APPENDIX  
Monthly imports of rice  
(Tons).

	1935-36.				1936-37.				1937-	
	British India ports.	Kathiwar and Travancore ports.	Land frontier routes.	Total.	British India ports.	Kathiwar and Travancore ports.	Land frontier routes.	Total.	British India ports.	Kathiwar and Travancore ports.
April .. ..	69,483	7,437	6,327	103,247	159,495	16,574	4,862	1,80,931	142,173	10,668
May .. ..	148,699	18,396	4,367	171,462	155,709	8,277	3,320	167,306	140,817	8,774
June .. ..	114,790	3,325	3,948	122,063	132,869	5,200	3,394	141,463	132,989	2,190
July .. ..	148,581	5,009	3,120	156,710	147,662	1,948	2,176	151,786	94,543	3,431
August .. ..	135,566	2,485	1,912	139,963	135,104	7,472	1,930	144,506	124,484	3,395
September .. ..	109,559	13,449	1,712	124,720	84,536	6,803	2,166	93,505	75,594	4,446
October .. ..	90,759	10,163	3,329	104,251	61,882	2,923	3,056	67,861	49,971	7,782
November .. ..	64,358	8,132	4,503	76,993	69,789	4,607	2,437	76,833	80,475	4,860
December .. ..	65,216	4,630	6,038	75,884	69,159	4,198	3,314	76,671	65,682	5,653
January .. ..	161,576	14,876	5,535	181,987	122,611	11,323	3,733	137,667	67,052	7,949
February .. ..	203,342	16,426	4,990	224,758	148,014	12,482	5,560	166,056	70,958	18,418
March .. ..	215,622	11,791	4,966	232,379	163,818	19,462	7,604	190,884	153,325	20,301
Grand total .. ..	1,547,551	116,119	50,747	1,714,417	1,450,648	101,269	43,552	1,595,469	1,198,063	97,867
Percentage .. ..	90.3	6.8	2.9	100	91.0	6.4	2.6	100	88.5	7.2

Approximate percentage share (by sea) of	1935-36.		1936-37.	
Bengal.. ..	..	..	18	28
Madras .. ..	..	..	61	46
Sind .. ..	..	..	..	..
Bombay .. ..	..	..	21	26

Source.—(1) Accounts relating to the Sea-borne Trade and Navigation of British  
(2) Trade Statistics relating to the maritime States in Kathiwar and  
(3) Trade at Stations adjacent to land frontier routes.

## XXVIII.

into India.

28.		1938-39.				1939-40.				Average 1935-36 to 1939-40.
Land frontier routes.	Total.	British Indian ports.	Kathia- war and Travan- core ports.	Land frontier routes.	Total.	British India ports.	Kathia- war and Travan- core ports.	Land fron- tier routes.	Total.	
6,092	158,933	122,971	15,868	6,136	144,970	167,212	17,202	6,144	190,558	155,728
6,564	156,155	141,522	10,010	5,953	157,485	186,891	15,454	6,957	209,302	172,342
4,335	139,514	116,115	1,926	3,895	121,936	248,025	4,984	6,086	259,095	156,814
3,879	101,853	87,749	2,942	5,118	95,809	152,825	1,485	5,140	159,450	133,122
2,625	130,504	59,610	3,069	3,235	85,914	176,754	979	3,130	180,863	132,350
1,886	81,926	45,142	2,217	2,871	50,230	141,847	2,798	2,337	146,982	99,478
2,342	60,095	57,507	7,497	4,861	69,865	158,333	11,144	3,592	173,069	95,028
2,793	88,128	66,083	8,271	5,134	79,488	101,850	4,991	..	106,841	85,657
5,301	76,636	59,146	2,172	5,881	67,199	74,166	4,045	..	78,211	74,920
6,820	81,821	109,908	7,653	5,396	122,957	131,868	..	..	131,868	131,260
7,094	96,470	156,218	16,783	6,759	179,760	..	..	..	..	166,761
8,508	182,134	259,726	14,737	7,328	281,791	..	..	..	..	221,797
58,239	1,354,169	1,281,697	93,140	62,567	1,437,404	..	..	33,386	..	1,625,252
4.8	100	89.2	6.5	4.3	100	..	..	..	..	..

1937-38.	1938-39.	1939-40.
12	22	35
57	53	42
..	..	..
31	25	23

India.

the State of Travancore.

## APPENDIX

Monthly exports of paddy (rice in the husk)  
(Tons).

	1935-36.				1936-37.				1937-	
	By sea.		By land frontier routes. Rice.	Total rice.	By sea.		By land frontier routes. Rice.	Total rice.	By sea.	
	Paddy.	Rice.			Paddy.	Rice.			Paddy.	Rice.
April .. ..	225	17,689	1,960	19,649	134	27,286	2,225	29,511	64	27,412
May .. ..	5	19,055	1,673	20,728	91	16,631	2,058	18,689	100	20,083
June .. ..	261	15,170	1,339	16,509	..	13,934	1,490	15,424	24	14,180
July .. ..	785	13,242	1,437	14,679	101	12,724	1,709	14,433	..	23,248
August ..	376	14,396	1,669	16,065	155	20,283	1,281	21,564	7	15,149
September ..	228	17,159	1,778	18,937	71	14,766	1,051	15,817	58	16,106
October ..	597	17,313	1,600	18,913	4	14,870	1,676	16,546	34	16,586
November ..	218	19,594	1,923	21,517	..	13,330	1,946	15,276	20	18,155
December ..	286	9,767	2,368	12,135	..	16,029	2,110	18,139	3	14,635
January ..	292	11,575	2,267	13,842	29	19,757	2,434	22,191	27	18,006
February ..	309	15,397	2,444	17,841	134	27,441	1,680	29,121	206	18,476
March .. ..	500	17,962	2,259	20,221	31	37,351	2,631	39,982	288	25,290
Total ..	4,082	188,319	22,717	211,036	750	234,402	22,291	256,693	831	227,326
Approximate percentage share (by sea) of—										
Bengal. ....	..	42	..	..	..	47	..	..	..	47
Madras .. ..	..	39	..	..	..	36	..	..	..	39
Sind .. ..	..	12	..	..	..	12	..	..	..	12
Bombay .. ..	..	7	..	..	..	5	..	..	..	2

Source.—(1) Accounts relating to the Sea-borne Trade and Navigation of British

(2) Trade statistics relating to maritime States in Kathiawar and the State

(3) Trade at stations adjacent to land frontier routes.

NOTE.—There are no exports of paddy by land.



## XXIX.

and rice from India.

88.		1938-39.				1939-40.				Average 1935-36/ 1939-40.	Average 1935-36/ 1939-40.
By land frontier routes. Rice.	Total rice.	By sea.		By land fron- tier routes. Rice.	Total rice.	By sea.		By land fron- tier routes. Rice.	Total rice.	Paddy.	Rice.
		Paddy.	Rice.			Paddy.	Rice.				
2,635	30,047	322	37,253	2,743	39,996	129	28,926	2,412	31,338	175	30,108
2,012	22,095	76	20,692	1,529	22,221	223	19,979	1,622	21,601	99	21,067
1,248	15,428	55	17,912	1,018	18,930	390	28,610	1,353	29,963	146	19,251
1,264	24,512	157	27,074	1,202	28,276	165	15,888	1,398	17,286	242	19,837
1,089	16,238	245	19,302	753	20,055	415	14,812	1,732	16,544	239	18,093
986	17,092	673	21,690	772	22,462	628	27,704	838	28,542	332	20,570
1,622	18,208	155	21,463	1,518	22,981	771	21,242	1,195	22,437	312	19,817
2,164	20,319	218	16,426	1,903	18,229	235	21,237	1,235	22,472	138	19,563
1,912	16,547	1	18,141	1,968	20,109	..	15,298	1,445	16,743	58	16,735
2,711	20,717	15	17,642	2,026	19,668	115	16,607	..	16,607	96	18,605
2,704	21,180	97	17,853	1,980	19,833	..	..	..	..	186	21,994
2,240	27,530	675	45,210	1,700	46,910	..	..	..	..	373	33,661
22,587	249,913	2,689	280,658	19,012	299,670	3,071	210,303	13,230	223,533	2,396	259,301
..	..	..	49	..	..	..	44	..	..	..	..
..	..	..	36	..	..	..	37	..	..	..	..
..	..	..	13	..	..	..	16	..	..	..	..
..	..	..	2	..	..	..	3	..	..	..	..

India.  
of Travancore.

APPENDIX XXX.

Exports of rice from India by sea showing destinations.  
(Thousand tons).

Shipped to.	1920-21.	1921-22.	1922-23.	1923-24.	1924-25.	1925-26.	1926-27.	1927-28.	1928-29.	1929-30.	1930-31.	1931-32.	1932-33.	1933-34.	1934-35.	1935-36.	1936-37.	1937-38.	1938-39.	1939-40. (Ten months)
Straits Settlements ..	..	..	1	3	4	22	3	4	5	5	4	4	4	5	5	5	5	5	11	7
Federated Malay States ..	..	..	1	..	..	..	1	1	2	2	2	2	1	2	1	2	1	2	3	2
Sumatra .. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Java .. ..	8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Hongkong .. ..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..
China (excluding Hongkong)	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Japan .. ..	..	40	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Korea .. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Ceylon .. ..	6	52	95	175	188	86	124	102	106	110	114	78	88	81	75	72	84	91	105	71
South Africa .. ..	1	1	8	13	15	11	11	12	11	12	14	17	15	17	18	19	23	23	25	25
Zanzibar and Pemba ..	..	..	2	2	1	1	1	1	1	..	1	..	..	1	1	1	2	2	3	2
Mauritius and Dependencies.	..	..	41	34	50	25	22	22	27	25	23	26	19	22	29	14	26	20	39	25
Aden and Dependencies..	7	8	12	11	8	11	7	14	15	10	13	7	5	5	5	5	11	12	13	10
Bahrein Islands ..	28	25	36	24	19	23	14	29	16	22	16	16	17	12	8	14	14	9	8	9
Muscat Territory ..	16	24	32	30	16	24	21	29	18	23	22	19	22	17	20	19	..	18	..	..
Other Native States in Arabia.	20	21	39	32	11	20	19	25	24	16	16	17	17	14	12	14	..	..	..	..
Turkey (Asiatic) ..	..	..	..	..	2	2	..	3	..	1	1	..	..	..	..	..	..	..	..	..

Mesopotamia ..	..	..	19	9	4	8	12	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Iraq ..	..	..	..	..	..	..	..	..	3	..	1	..	..	..	..	..	..	..	..	..	..
Persia ..	..	5	1	9	8	10	11	6	6	4	6	3	..	1	..	..	..	..	..	..	..
Egypt ..	..	..	..	1	1	2	3	3	2	2	2	2	1	1	..	..	..	..	..	..	..
United Kingdom	..	1	1	7	12	16	5	3	5	5	4	5	8	5	5	5	5	8	6	6	4
Germany ..	..	..	..	1	10	22	5	3	4	2	2	5	9	4	7	..	..	..	..	..	..
Netherlands ..	..	..	..	2	6	6	4	4	4	6	7	10	12	4	8	5	3	9	6	3	1
Poland ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Belgium ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..
France ..	..	..	..	..	1	1	1	..	..	..	..	..	1	1	1	1	1	..	..	..	..
Italy ..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..
Sweden ..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Portugal ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Australia ..	..	..	..	1	1	1	..	..	..	..	..	..	..	..	..	..	..	5	..	..	..
British West Indies	..	..	..	6	21	10	3	2	1	1	..	..	..	..	1	2	2	20	3	4	4
Cuba ..	..	9	9	19	10	18	71	10	12	6	9	8	4	3	5	1	2	1	3	3	2
Other countries	..	25	3	8	8	16	37	14	12	22	15	19	14	19	13	12	10	16	24	58	46
Total	..	126	204	330	406	426	378	268	291	273	273	278	235	226	216	203	188	234	227	281	210

APPENDIX XXXI.

Shares of maritime provinces and States in exports of rice from India.

Years.	Bengal.		Bombay.		Sind.		Madras.		Kathiawar and Travancore.		Total.
	Tons.	Per cent.	Tons.	Per cent.	Tons.	Per cent.	Tons.	Per cent.	Tons.	Per cent.	
<b>RAW RICE.</b>											
1931-32 .. .. .	32,050	69	13,081	28	1,209	3	103	Neg.	55	Neg.	46,498
1932-33 .. .. .	13,269	52	11,590	45	665	3	23	Neg.	52	Neg.	25,599
1933-34 .. .. .	25,104	66	12,366	32	643	2	140	Neg.	47	Neg.	38,300
1934-35 .. .. .	14,269	52	12,559	45	824	3	22	Neg.	80	Neg.	27,754
1935-36 .. .. .	9,392	41	12,922	56	655	3	125	Neg.	86	Neg.	23,180
1936-37 .. .. .	15,781	55	12,131	42	840	3	39	Neg.	55	Neg.	28,846
1937-38 .. .. .	13,487	68	4,905	25	1,371	7	44	Neg.	35	Neg.	19,842
Average .. .. .	17,622	59	11,365	38	887	3	71	Neg.	58	Neg.	30,003
<b>PARBOILED RICE.</b>											
1931-32 .. .. .	89,823	48	14	Neg.	36,475	19	61,119	33	..	..	187,431
1932-33 .. .. .	106,814	54	8	Neg.	27,248	14	64,858	32	..	..	198,928
1933-34 .. .. .	80,415	46	15	Neg.	16,797	10	78,080	44	..	..	175,307
1934-35 .. .. .	78,897	45	36	Neg.	22,329	13	72,877	42	..	..	174,139
1935-36 .. .. .	69,747	43	..	..	23,416	14	70,532	43	..	..	163,695
1936-37 .. .. .	92,151	46	322	Neg.	25,576	13	84,032	41	..	..	202,081
1937-38 .. .. .	90,264	44	148	Neg.	26,058	13	88,357	43	..	..	204,827
Average .. .. .	86,873	46	78	Neg.	25,414	14	74,265	40	..	..	186,630

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						BROKEN BIOL.										
1931-32	..	..	..	..	..	955	83	35	3	164	14	1	Neg.	..	..	1,153
1932-33	..	..	..	..	..	707	62	7	1	419	37	..	..	..	..	1,139
1933-34	..	..	..	..	..	2,125	91	90	4	110	5	..	..	..	..	2,325
1934-35	..	..	..	..	..	970	82	126	10	92	8	..	..	..	..	1,188
1935-36	..	..	..	..	..	995	83	82	7	128	10	..	..	..	..	1,203
1936-37	..	..	..	..	..	2,664	88	119	4	239	8	..	..	..	..	3,022
1937-38	..	..	..	..	..	2,046	87	..	..	314	13	..	..	..	..	2,360
Average	..	..	..	..	..	1,495	84	65	4	209	12	..	..	..	..	1,769
						UNCLASSIFIED.										
1931-32	..	..	..	..	..	357	63	212	37	..	..	2	Neg.	..	..	571
1932-33	..	..	..	..	..	12	5	234	94	..	..	3	1	..	..	249
1933-34	..	..	..	..	..	13	5	203	79	..	..	42	16	..	..	258
1934-35	..	..	..	..	..	15	5	250	92	..	..	7	3	..	..	272
1935-36	..	..	..	..	..	6	2	271	98	..	..	7	2	..	..	284
1936-37	..	..	..	..	..	156	36	268	62	..	..	10	2	..	..	434
1937-38	..	..	..	..	..	89	31	175	62	..	..	12	4	8	3	283
Average	..	..	..	..	..	92	27	230	69	..	..	12	4	1	..	835

APPENDIX XXXII.

Exports of paddy (rice in the husk) and rice from Burma by sea.

(Thousand tons).

	1931-32.		1932-33.		1933-34.		1934-35.		1935-36.		1936-37.		1937-38.		1938-39.		Average.		Percentage.	
	Paddy.	Rice.	Paddy.	Rice.	Paddy.	Rice.	Paddy.	Rice.	Paddy.	Rice.	Paddy.	Rice.	Paddy.	Rice.	Paddy.	Rice.	Paddy.	Rice.	Paddy.	Rice.
India .. .. .	169	1,086	110	936	161	1,628	222	1,978	174	1,573	87	1,534	59	1,296	96	1,374	135	1,426	86	49
Ceylon .. .. .	19	332	12	306	8	321	9	317	13	352	5	344	6	378	..	359	9	339	6	12
Straits Settlements .. .. .	..	229	..	152	..	149	..	130	..	133	..	156	..	195	..	171	..	164	..	6
Sumatra .. .. .	..	96	..	62	..	70	..	70	..	75	..	47	..	80	..	96	..	74	..	2
Federated Malay States .. .. .	..	67	..	56	..	58	..	52	..	66	..	70	..	82	..	72	..	65	..	2
United Kingdom .. .. .	..	43	..	70	..	64	..	83	..	45	..	46	..	174	..	62	..	73	..	2
Germany .. .. .	27	253	34	224	1	239	..	158	..	79	..	53	..	171	..	169	8	168	5	6
British West Indies .. .. .	..	19	..	14	..	20	..	34	..	41	..	27	..	38	..	39	..	29	..	1
Aden and Dependencies .. .. .	..	3	..	3	..	9	..	8	..	5	..	8	..	14	..	24	..	9	..	..
China .. .. .	..	354	..	234	..	171	..	173	..	72	..	17	..	33	..	17	..	134	..	5
Netherlands .. .. .	10	146	7	92	Neg.	73	Neg.	57	Neg.	67	2	103	..	21	..	14	4	72	2	2
Belgium .. .. .	3	..	1	..	Neg.	..	..	..	..	..	..	..	..	..	..	..	..	..	Neg.	..
Hongkong .. .. .	..	63	..	28	..	52	..	3	..	5	..	14	..	61	..	32	..	32	..	1
Mauritius and Dependencies .. .. .	..	25	..	33	..	30	..	33	..	41	..	24	..	40	..	15	..	30	..	1
Egypt .. .. .	..	85	..	36	..	24	..	30	..	14	..	9	..	15	..	15	..	28	..	1
Cuba .. .. .	..	66	..	36	..	41	..	16	..	23	..	31	..	17	..	1	..	29	..	1
Others .. .. .	Neg.	290	1	257	1	194	1	225	..	175	1	274	1	162	5	466	1	256	1	9
Total .. .. .	237	3,152	165	2,538	171	3,144	232	3,367	187	2,766	95	2,757	66	2,777	101	2,926	157	2,928	100	100

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APPENDIX XXXIII

Monthly exports of paddy (rice in the husk) and rice from Burma by sea.  
(Thousand tons).

	Paddy.						Rice.					
	1935-36.	1936-37.	1937-38.	1938-39.	Average.	Percentage.	1935-36.	1936-37.	1937-38.	1938-39.	Average.	Percentage.
April .. ..	29	34	12	20	24	21	228	313	339	368	312	11
May .. ..	36	22	5	8	18	16	388	257	295	323	316	11
June .. ..	7	5	3	2	4	4	211	225	254	219	227	8
July .. ..	10	3	4	1	4	4	228	241	212	175	214	8
August .. ..	11	1	2	Neg.	4	4	217	219	226	170	208	7
September .. ..	7	1	1	Neg.	2	2	184	149	203	153	172	6
October .. ..	4	1	1	Neg.	2	2	179	162	126	172	160	6
November .. ..	1	1	Neg.	Neg.	Neg.	..	114	143	150	124	133	5
December .. ..	3	2	Neg.	13	5	4	93	129	125	140	122	4
January .. ..	33	3	4	18	14	12	214	228	168	253	216	8
February .. ..	21	8	15	20	16	14	299	303	273	341	304	11
March .. ..	25	14	19	19	19	17	411	388	406	488	423	15
Total .. ..	187	95	66	101	112	100	2,766	2,757	2,777	2,926	2,807	100

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APPENDIX XXXIV.

*Average annual seed requirements in important rice producing areas.*

	Average rice acreage, 1934-35 to 1936-37. (Million acres.)			Average seed rate. (lb. per acre.)		Average seed require- ments of paddy. (Thousand tons).	Approximate equivalent in terms of rice. (Thousand tons).
	Total (a).	Transplanted.	Broadcast.	Transplanted.	Broadcast.		
<i>British India—</i>							
Bengal .. .. .	21.27	10.55	10.72	31	82	538	376
Madras .. .. .	10.47	7.52	2.95	41	81	244	166
Bihar :							
(a) Bihar Proper .. .. .	6.50	4.05	2.45	80	50	199	125
(b) Chota Nagpur and Santhal Parganas.	3.44	1.40	2.04	120	150	212	132
United Provinces .. .. .	6.57	2.58	3.99	33	62	148	99
Central Provinces .. .. .	5.63	1.05	4.58	78	114	270	180
Assam .. .. .	5.19	4.28	0.91	31	62	85	55
Orissa .. .. .	4.02	1.85	2.17	85	110	177	110
Bombay .. .. .	1.95	(b)	(b)		74	64	45
Sind .. .. .	1.14	0.92	0.22	80	100	35	25
Punjab .. .. .	0.99	0.68	0.31	10	20	6	4
Coorg .. .. .	0.08	0.07	0.01	60	160	3	2



<i>Indian States—</i>							
<i>Eastern States Agency :</i>							
(a) Orissa Feudatory States ..	3.46	0.43	3.03	110		170	113
(b) Central Provinces States ..	1.64	..	1.64	..	120	88	59
Hyderabad .. ..	1.13 (c)	0.21	0.83	30	100	41	24
Madras States .. ..	1.04	(b)	(b)	121		56	39
Cochin .. ..	0.21 (d)	(b)	(b)	104	122	15	10
Pudukkottai .. ..	0.08	0.07	0.01	112	75	4	3
Mysore .. ..	0.71	(c)	(c)	17	78	18	13
Kashmir .. ..	0.47	(c)	(c)	37		8	5
Bombay States .. ..	0.44	(c)	(c)	74		15	10
Baroda .. ..	0.20	0.20	Negligible.	60	..	5	3.5
(e) Total India ..	..	..	..	..	..	2,414	1,612
<i>Burma</i> .. ..	12.60	11.97	0.63	44.3	54	252	185

(a) The figures shown in this column are as received from the respective Provinces and States. In certain cases they differ somewhat from those shown in Appendix III (showing acreage under rice crop).

(b) Information not available.

(c) Besides transplanted and broadcast crop areas, the figure includes 91,000 acres of drill crop area with an average seed rate of 40 lb. per acre.

(d) Actual area over the above period was 215,540 acres. This figure, however, includes 85,330 acres of double crop land making a total of 300,870 acres bearing rice. Seed requirements have, therefore, been based on the latter figure.

(e) Including British provinces and Indian States not shown individually.

APPENDIX XXXV.

*Approximate output of rice products in terms of rice.*

Province or State.	Production of rice. Average for 3 years ending 1936-37.	<i>Murmura</i> (parched rice).		<i>Kheel</i> (parched paddy).		<i>Chura</i> (beaten rice).		Total of all three products.	
		Approximate proportion of the rice crop used for making <i>murmura</i> .	Equivalent to.	Approximate proportion of the rice crop used for making <i>kheel</i> .	Equivalent to.	Approximate proportion of the rice crop used for making <i>chura</i> .	Equivalent to.	Total proportion of the crop used for making the rice products ( <i>murmura</i> , <i>kheel</i> and <i>chura</i> ).	Equivalent to.
	(Thousand tons).	Per cent.	(Thousand tons).	Per cent.	(Thousand tons).	Per cent.	(Thousand tons).	Per cent.	(Thousand tons).
Bengal .. ..	8,429	4	337.16	1	84.29	3	252.87	8.0	674.32
Madras .. ..	4,839	0.6	29.03	Negligible	Negligible.	0.1	4.84	0.7	33.87
Bihar and Orissa ..	4,464	1.1	49.10	0.3	13.39	1.6	71.43	3.0	133.92
United Provinces ..	1,970	5	98.50	2.5	49.25	5	98.50	12.5	246.25
Central Provinces and Berar.	1,669	0.2	3.34	0.1	1.67	0.6	10.01	0.9	15.02
Assam .. ..	1,665	..	..	..	..	0.5	8.33	0.5	8.33

Bombay .. ..	832	1.1	9.15	..	..	1.5	12.48	2.6	21.63
Sind .. ..	408	0.05	0.22	Negligible.	Negligible.	0.02	0.07	0.07	0.29
Punjab .. ..	323	0.5	1.61	0.2	0.65	0.1	0.32	0.8	2.58
Hyderabad .. ..	373	0.2	0.75	0.2	0.75	1.2	4.47	1.6	5.97
Travancore .. ..	341	0.07	0.24	0.02	.07	0.01	0.03	0.1	0.84
Baroda .. ..	49	0.25	0.12	0.05	.02	0.5	0.25	0.8	0.39
Gwalior .. ..	14	0.6	0.08	1.2	.17	0.2	0.03	2.0	0.28
<b>Total .. ..</b>	<b>25,374</b>	<b>2.09</b>	<b>529.30</b>	<b>0.6</b>	<b>150.26</b>	<b>1.83</b>	<b>463.63</b>	<b>4.51</b>	<b>1,143.19</b>
<b>Others .. ..</b>	<b>3,003</b>	<b>2.22</b>	<b>66.62</b>	<b>0.7</b>	<b>20.0</b>	<b>2.04</b>	<b>61.34</b>	<b>4.93</b>	<b>147.96</b>
<b>Grand total for India including Indian States.</b>	<b>28,377</b>	<b>2.10</b>	<b>595.92</b>	<b>0.6</b>	<b>170.26</b>	<b>1.85</b>	<b>524.97</b>	<b>4.55</b>	<b>1,291.15</b>

APPENDIX XXXVI.

*Net available supplies and per capita consumption of rice in important areas in India and in Burma.*

(All figures are expressed in terms of rice.)

Provinces and States.	Production* (Thousand tons).	Imports. (Thousand tons).							Exports. (Thousand tons).							Seed requirements. (Thousand tons). †	Net available supplies. (Thousand tons).	Estimated population for 1938. (Millions). ‡	Per capita consumption. (lb.)
		By sea. †		By land frontier routes. ‡		By rail and river.		Total.	By sea. †		By land frontier routes. ‡		By rail and river.		Total.				
		Paddy.	Rice.	Paddy.	Rice.	Paddy.	Rice.		Paddy.	Rice.	Paddy.	Rice.	Paddy.	Rice.					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<i>India—</i>																			
Bengal .. ..	8,378	36.5	391.5	0.2	0.2	28.7	78.0	535.1	4.7	113.0	..	10.4	6.9	325.8	460.8	376	8,076	52.6	344
Madras (including Madras' States) .. ..	5,182	104.0	838.3	..	..	25.4	72.9	1,040.6	2.2	87.1	..	..	1.6	137.6	228.5	205	5,789	56.4	230
Bihar and Orissa (including B. and O. States) ..	5,844	..	..	4.4	39.7	11.2	204.9	260.2	13.5	4.8	..	2.9	32.0	98.9	152.1	480	5,472	47.3	259
United Provinces ..	2,006	..	..	7.5	8.4	4.2	222.0	242.1	..	..	..	2.1	1.1	25.3	28.5	99	2,121	50.7	94
Central Provinces (including C. P. States) ..	2,231	..	..	..	..	0.1	4.7	4.8	..	..	..	..	15.1	163.4	178.5	239	1,818	19.4	210
Assam .. ..	1,686	..	..	..	..	0.1	29.4	29.5	..	..	..	..	14.6	23.9	38.5	55	1,622	9.5	382

Bombay (including Bombay States) ..	..	1,022	0.9	390.0	..	..	3.2	64.8	458.9	7.1	34.5 (a)	..	..	..	9.9	51.5	55	1,374	28.8	107
Sind ..	..	447	..	2.9	..	..	..	6.1	9.0	0.1	35.0	..	..	0.2	85.4	120.7	25	310	4.4	158
Punjab (b) ..	..	345	..	..	..	..	0.3	67.1	67.4	..	..	..	..	0.5	38.9	39.4	4	369	29.2	28
Hyderabad ..	..	368	..	..	..	..	0.2	56.6	56.8	..	..	..	..	..	0.3	0.3	24	401	16.0	56
Mysore ..	..	210	..	..	..	..	0.6	61.1	61.7	..	..	..	..	2.1	0.4	2.5	13	256	7.0	82
Kashmir ..	..	200 (c)	..	..	..	..	..	0.1	0.1	..	..	..	..	0.1	0.3	0.4	5	195	3.9	112
Burma ..	..	4,844	0.1	1.2	0.4	4.0	..	..	5.7	90.8	2,918.6	..	0.5	..	..	3,009.9	186	1,654	15.8	234

NOTES.—(1) It is important to observe that the data shown in the above table are all in terms of rice. The quantities of paddy shown in columns 3, 5, 7, 10, 12 and 14 have been converted in terms of rice on the basis of the conventional official estimate that one unit of paddy is equivalent to approximately two-thirds its weight of rice.

(2) Except as otherwise stated, the figures quoted are averages for the quinquennium ending 1938-39.

\* In the case of Madras States an average for 3 years ending 1936-37 has been taken and in the case of B. and O. States, C. P. States, Bombay States and the Punjab. the averages are for the 4 years ending 1937-38.

† Including coast wise shipments.

‡ Average for 3 years ending 1936-37.

§ Calculated at a constant unitary rate of increase based upon the difference between the 1921 and 1931 census figures.

(a) Including a relatively small quantity of rice flour.

(b) Includes Delhi and North-West Frontier Province.

(c) Approximate only.

APPENDIX XXXVII.

*Imports and exports of paddy (rice in the husk) by rail and river into and from the different trade blocks of India.*  
(Thousand tons).

	Imports.							Exports.						
	Average 1911-12 to 1913-14.	Average 1918-19 to 1920-21.	Average 1933-34 to 1935-36.	1936-37.	1937-38.	1938-39.	1939-40.*	Average 1911-12 to 1913-14.	Average 1918-19 to 1920-21.	Average 1933-34 to 1935-36.	1936-37.	1937-38.	1938-39.	1939-40.*
Assam ..	12.3	0.7	0.1	0.1	..	0.4	0.4	135.4	113.8	14.8	30.2	23.9	19.8	6.6
Bengal ..	147.3	118.7	37.2	57.4	33.7	47.5	33.2	115.4	174.9	107.3	73.9	87.8	106.2	39.9
Bihar and Orissa	9.9	35.8	17.0	27.1	6.9	9.9	4.7	26.9	23.1	40.9	50.5	35.7	46.1	33.1
United Provinces	11.0	23.3	6.6	8.2	7.9	5.2	1.8	2.8	0.4	2.4	1.0	0.4	1.4	0.3
Punjab† ..	1.7	0.6	0.4	0.7	0.7	0.4	0.2	3.9	8.3	1.1	0.8	0.3	0.1	0.2
Sind and British Baluchistan.	3.1	8.3	..	..	..	..	..	2.5	0.4	0.6	0.4	0.5	0.5	0.1
Central Provinces and Berar.	..	0.1	..	..	0.4	0.6	0.2	3.7	2.2	71.0	37.6	16.3	12.9	9.0

Bombay ..	3.8	2.5	4.0	5.4	5.6	4.9	4.4	0.5	0.9	0.8	0.5	0.3	0.5	0.2
Madras ..	56.4	14.8	97.3	86.8	57.0	86.9	157.5	76.9	34.6	6.9	9.8	12.0	11.0	6.4
Rajputana ..	..	0.1	0.3	0.3	0.3	0.3	0.1	..	0.2	..	..	..	..	..
Central India ..	0.4	..	0.2	0.3	0.2	0.2	0.2	0.3	0.3	0.3	0.1	..	0.1	0.2
Nizam's Territory	0.5	1.2	0.2	0.3	0.3	0.2	0.1	..	0.1	..	0.1	..	..	..
Mysore ..	0.7	0.6	0.6	0.3	0.1	2.9	1.8	23.6	1.1	2.6	3.9	4.0	3.0	2.4
Kashmir ..	..	..	..	..	..	..	..	0.4	..	0.1	0.5	0.1	0.1	..
Calcutta ..	113.1	134.2	100.3	64.8	77.9	97.8	37.4	28.6	11.6	4.0	5.4	5.1	15.1	17.8
Bombay port ..	0.4	0.4	0.8	0.5	0.3	0.4	0.2	0.2	0.3	0.2	0.1	0.2	..	..
Karachi ..	2.0	0.3	0.3	..	..	0.3	0.1	..	0.1	..	..	..	..	..
Madras ports ..	76.3	36.5	7.3	9.5	12.4	10.3	5.8	17.8	6.4	73.6	46.9	17.1	51.4	131.8
Grand total ..	438.9	378.1	272.6	261.7	203.7	268.2	248.1	438.9	378.1	272.6	261.7	203.7	268.2	248.1

\*April/November 1939.

†Includes Delhi and North-West Frontier Province.

APPENDIX XXXVIII.

*Imports and exports of rice (not in the husk) by rail and river into and from the different trade blocks of India.*  
(Thousand tons).

	Imports.							Exports.						
	Average 1911-12 to 1913-14.	Average 1918-19 to 1920-21.	Average 1933-34 to 1935-36.	1936-37.	1937-38.	1938-39.	1939-40*.	Average 1911-12 to 1913-14.	Average 1918-19 to 1920-21.	Average 1933-34 to 1935-36.	1936-37.	1937-38.	1938-39.	1939-40*.
Assam ..	27.4	26.4	50.6	18.8	13.5	22.0	29.2	69.0	14.6	16.4	36.6	31.6	18.2	3.6
Bengal ..	50.4	58.4	108.2	122.4	53.4	164.5	238.1	533.4	464.3	249.8	247.5	351.5	293.3	154.6
Bihar and Orissa	37.9	124.2	222.1	229.3	168.8	181.7	124.1	105.4	98.7	64.0	82.8	121.8	153.5	80.8
United Provinces	88.6	174.6	227.9	248.2	282.0	179.5	131.8	38.1	36.2	24.9	28.6	18.7	22.0	12.9
Punjab† ..	32.4	45.7	61.8	76.8	78.2	55.6	21.2	16.2	18.8	29.5	39.6	47.3	51.8	30.1
Sind and British Baluchistan.	0.4	9.3	2.6	2.2	1.7	2.4	1.3	90.5	70.8	109.2	152.6	148.4	165.5	107.8
Central Provinces and Berar.	8.8	78.8	4.1	4.7	4.8	4.1	2.8	66.9	38.9	136.4	192.2	172.7	183.2	117.4
Bombay ..	114.4	320.9	170.4	217.5	220.4	213.3	156.9	14.8	12.8	15.3	14.7	13.2	14.9	8.8

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Madras ..	54.8	158.1	250.1	166.9	160.3	186.2	176.5	193.1	135.8	195.9	254.3	228.8	242.5	171.6
Rajputana ..	34.3	31.3	27.5	29.2	32.1	27.6	14.8	2.2	1.8	0.1	0.1	..	0.1	..
Central India ..		13.3	19.5	22.1	24.1	19.8	8.3		0.5	4.5	9.5	4.6	4.7	3.9
Nizam's Territory.	36.6	88.2	43.9	59.0	61.6	67.8	52.1	0.9	0.5	0.4	0.3	0.1	0.2	0.1
Mysore ..	24.7	39.0	67.2	49.0	43.9	56.3	35.6	0.9	2.0	0.4	0.6	0.5	0.3	0.3
Kashmir ..	0.2	0.1	0.4	0.1	0.1	..	0.1	0.1	..	..	0.1	0.5	1.0	0.2
Calcutta ..	554.9	297.0	86.1	107.4	113.7	144.6	63.7	87.2	381.1	289.8	228.8	85.1	148.2	270.0
Bombay port ..	50.9	94.8	15.0	14.5	13.6	14.4	10.5	54.1	311.2	137.7	143.0	151.9	138.2	113.8
Karachi ..	76.0	86.8	46.6	60.1	59.7	90.2	68.2	0.2	7.4	3.2	2.1	0.9	1.0	..
Madras ports ..	131.0	128.5	129.3	151.9	173.1	168.6	93.4	50.7	180.5	255.8	146.7	127.4	160.0	152.7
Grand total ..	1,323.7	1,775.4	1,533.3	1,580.1	1,505.0	1,598.6	1,228.6	1,323.7	1,775.4	1,533.3	1,580.1	1,505.0	1,598.6	1,228.6

\* April/November, 1939.

† Includes Delhi and North-West Frontier Province.

APPENDIX XXXIX.

Monthly exports (rail and river-borne) of rice and paddy (rice in the husk) from different trade blocks.

Average 1934—38.

(Thousand tons).

Month.	Rice.														Paddy.							
	Assam.	Bengal.	Bihar and Orissa.	United Provinces.	Punjab.	Sind and British Baluchistan.	Central Provinces and Berar.	Madras.	Calcutta.	Bombay port.	Madras ports.	Others.	Total.	Percentage to total.	Assam.	Bengal.	Bihar and Orissa.	Central Provinces and Berar.	Madras ports.	Others.	Total.	Percentage to total.
January	3.0	31.4	14.1	2.7	3.5	18.9	20.2	19.4	12.7	10.0	16.3	2.6	154.8	9.5	1.9	14.9	3.5	1.1	4.0	1.8	27.2	10.1
February	3.0	34.8	14.8	2.6	2.7	13.8	14.3	18.5	24.1	9.0	18.1	2.1	157.8	9.7	2.8	11.8	5.3	1.8	4.0	1.6	27.3	10.1
March ..	2.4	35.6	12.7	3.2	3.0	12.7	14.3	20.2	25.9	13.4	16.6	2.1	162.1	10.0	3.1	12.8	6.0	2.4	5.7	1.8	31.8	11.8
April ..	2.2	27.8	11.4	3.3	3.3	10.8	14.1	18.2	26.0	14.6	17.7	2.3	151.7	9.3	2.9	9.4	5.1	2.0	5.6	1.8	26.8	9.9
May ..	2.2	21.6	12.0	2.5	2.9	9.0	13.0	19.0	29.0	17.6	17.1	1.9	147.8	9.1	3.3	7.8	5.0	2.7	5.1	2.0	25.9	9.6
June ..	1.8	17.9	13.2	1.8	2.9	6.7	9.8	18.2	28.7	14.5	17.2	1.7	134.4	8.3	1.6	6.5	3.9	1.6	5.8	1.9	21.3	7.9
July ..	2.1	18.8	12.8	1.2	3.0	6.8	10.5	19.6	29.3	11.1	19.0	1.8	136.0	8.4	1.1	2.8	2.5	1.4	6.2	2.7	16.7	6.2
August ..	1.5	14.4	13.5	0.8	2.7	7.4	11.3	17.7	22.9	11.4	18.6	1.7	123.0	7.6	0.7	2.6	2.2	1.5	5.2	4.0	16.2	6.0
September	1.1	10.3	10.9	0.8	2.1	7.0	9.7	17.6	12.8	9.0	17.2	2.0	100.5	6.2	0.8	4.4	2.6	1.9	5.0	3.6	18.3	6.8
October	1.2	12.1	13.6	1.4	3.3	9.6	11.8	17.3	10.2	8.3	18.4	1.6	109.0	6.7	1.2	6.3	3.8	2.1	3.6	2.2	19.2	7.1
November	1.6	14.8	12.1	2.1	5.0	14.5	11.7	18.0	6.7	8.4	16.7	1.8	111.4	6.9	1.1	6.5	3.1	1.9	3.2	1.8	17.6	6.5
December	1.7	20.1	17.2	2.5	4.2	19.7	16.0	19.3	5.7	8.7	17.7	2.2	135.0	8.3	0.8	9.8	2.0	1.6	4.8	2.6	21.6	8.0
Total	23.8	259.6	158.5	24.9	38.6	136.9	156.7	221.0	233.1	136.0	210.6	23.8	1,623.5	100.0	21.3	95.6	45.0	22.0	58.2	27.8	269.9	100.0

## APPENDIX XL.

*Difference between the trade price of the Samhalu variety and the official price of "common" rice at Cawnpore (1932-36).*

(Per maund.)

	1932.	1933.	1934.	1935.	1936.
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
<i>January—</i>					
Trade .. ..	4 0 0	4 4 9	4 1 8	3 9 10	4 3 4
Official .. ..	4 0 0	4 0 0	3 11 0	3 10 0	5 0 0
Difference .. ..		0 4 9	0 6 8	-(0 0 2)	-(0 12 8)
<i>February—</i>					
Trade .. ..	4 5 0	4 0 5	3 13 8	3 14 1	4 3 10
Official .. ..	4 0 0	4 7 0	3 10 6	3 12 0	4 12 0
Difference .. ..	0 5 0	-(0 6 7)	0 3 2	0 2 1	-(0 8 2)
<i>March—</i>					
Trade .. ..	3 14 1	4 0 10	4 0 5	3 12 7	4 11 4
Official .. ..	4 0 0	4 0 0	3 10 3	4 0 0	4 12 0
Difference .. ..	-(0 1 11)	0 0 10	0 6 2	-(0 3 5)	-(0 0 8)
<i>April—</i>					
Trade .. ..	3 14 10	4 0 10	3 12 11	3 14 5	4 7 1
Official .. ..	4 7 0	4 7 0	4 3 0	4 0 0	4 4 0
Difference .. ..	-(0 8 2)	-(0 6 2)	-(0 6 1)	-(0 1 7)	0 3 1
<i>May—</i>					
Trade .. ..	4 2 11	4 0 10	3 14 10	3 11 2	4 11 4
Official .. ..	4 7 0	4 7 0	4 0 0	4 7 0	4 0 0
Difference .. ..	-(0 4 1)	-(0 6 2)	-(0 1 2)	-(0 11 10)	0 11 4
<i>June—</i>					
Trade .. ..	3 12 7	4 4 3	4 1 3	4 4 3	4 5 2
Official .. ..	4 11 0	4 7 0	3 10 3	4 7 0	4 4 0
Difference .. ..	-(0 14 5)	-(0 2 9)	0 7 0	-(0 2 9)	0 1 2

## APPENDIX XL—contd.

*Difference between the trade price of the Samhalu variety and the official price of "common" rice at Cawnpore (1932-36)—contd.*  
(Per maund.)

	1932.	1933.	1934.	1935	1936.
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
<i>July—</i>					
Trade .. ..	4 2 11	4 10 9	4 1 8	4 11 10	4 2 6
Official .. ..	4 7 0	4 7 0	3 10 3	4 7 0	3 14 0
Difference .. ..	—(0 4 1)	0 3 9	0 7 5	0 4 10	0 4 6
<i>August—</i>					
Trade .. ..	4 0 0	4 9 8	4 9 8	4 8 1	3 15 3
Official .. ..	4 7 0	4 4 0	4 0 0	4 4 0	4 2 0
Difference .. ..	—(0 7 0)	0 5 8	0 9 8	0 4 1	—(0 2 9)
<i>September—</i>					
Trade .. ..	4 12 5	4 10 9	4 11 4	4 9 2	4 6 2
Official .. ..	4 7 0	4 0 0	4 0 0	4 10 0	4 3 0
Difference .. ..	0 5 5	0 10 9	0 11 4	—(0 0 10)	0 3 2
<i>October—</i>					
Trade .. ..	4 8 1	4 2 6	4 3 4	4 12 5	4 10 2
Official .. ..	4 7 0	4 0 0	3 10 3	4 10 0	4 0 0
Difference .. ..	0 1 1	0 2 6	0 9 1	0 2 5	0 10 2
<i>November—</i>					
Trade .. ..	4 7 7	4 1 3	4 5 2	4 13 0	4 14 9
Official .. ..	4 7 0	3 10 3	3 5 0	4 10 0	3 10 0
Difference .. ..	0 0 7	0 7 0	1 0 2	0 3 0	1 4 9
<i>December—</i>					
Trade .. ..	3 15 7	4 0 5	3 13 4	4 1 8	4 5 8
Official .. ..	4 7 0	3 10 0	3 5 6	4 12 0	4 0 0
Difference .. ..	—(0 7 5)	0 6 5	0 7 10	—(0 10 4)	0 5 8

APPENDIX XII.

Relationship between the prices of some typical fine, medium and bold varieties.

Provinces/State.	Market.	Fine.		Medium.		Bold (or Coarse).		Percentage relationship.		
		Trade description.	Price per maund.	Trade description.	Price per maund.	Trade description.	Price per maund.	Bold.	Medium.	Fine.
(A)			Rs. A. P.	Rice.	Rs. A. P.		Rs. A. P.			
Madras ..	Bezwada ..	Vankasannalu	3 10 11	..	..	Kusuma ..	3 5 4	100	..	111
United Provinces ..	Etawah ..	Hansraj ..	5 11 6	Dhanis ..	4 0 0	Pahari ..	3 0 0	100	133	191
Central Provinces ..	Raipur ..	Baspatri ..	3 15 2	Hansa ..	3 0 4	Chadia ..	2 5 0	100	131	171
Central Provinces ..	Waraseoni ..	Chinoor ..	3 11 0	Samundrasok	2 14 5	Dhor ..	2 6 0	100	122	155
Bombay ..	Bombay ..	Jiresal ..	8 1 3	Kolamba ..	5 0 10	Pattani ..	3 15 2	100	128	205
Sind ..	Larkana ..	Sugdasi ..	5 0 9	Sone ..	3 14 0	Kangni ..	3 1 6	100	..	163
Punjab ..	Gujranwala ..	Basmati ..	6 2 0	..	..	Jhona ..	3 5 0	100	119	191
(B)										
Bengal ..	Jessore ..	Kalamkatti	3 14 0	Ballam (medium).	3 6 0	Kazla ..	2 14 0	100	118	136
Bihar ..	Dinapur ..	Nondescript	3 13 0	Nondescript	3 7 0	Mota ..	3 2 0	100	110	122
Bihar ..	Muzaffarpur ..	Joshua ..	4 2 6	Samardha ..	3 12 3	Dudhraj ..	3 7 0	100	109	121
Orissa ..	Cuttack ..	Saruchina ..	2 10 0	Safi ..	2 5 9	Lali (mixed)	2 2 6	100	109	122
				Paddy.						
Bengal ..	Jessore ..	Kalamkatti	2 6 0	Ballam (medium).	2 0 0	Kazla ..	1 12 0	100	114	136
Madras ..	Bezwada ..	Vankasannalu	2 6 0	..	..	Kusuma ..	2 3 8	100	..	107
Bihar ..	Dinapur ..	Nondescript	2 2 0	Nondescript	1 14 0	Nondescript	1 11 0	100	111	126
Orissa ..	Cuttack ..	Saruchina ..	1 9 0	Safi ..	1 6 0	Lali (mixed)	1 12 0	100	122	139
United Provinces ..	Etawah ..	Hansraj ..	2 0 0	Dhanis ..	1 14 6	Pahari ..	1 8 0	100	127	133
Central Provinces ..	Raipur ..	Baspatri ..	1 8 0	Hansa ..	1 3 0	Chadia ..	1 0 0	100	119	160
Sind ..	Larkana ..	Sugdasi ..	2 3 0	..	..	Kangni ..	1 10 6	100	..	132
Punjab ..	Gujranwala ..	Basmati ..	3 1 9	Sone ..	2 3 0	Jhona ..	2 0 9	100	107	152
Hyderabad ..	Warangal ..	Khichidi ..	2 9 0	..	..	Nondescript	2 1 0	100	..	124

Note—The price data quoted in this appendix relate to the annual average price prevailing in 1934 and 1935.

## APPENDIX

Average monthly wholesale

(Per maund)

				January.	February.	March.	April.	May.
				Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
<i>Calcutta.</i>								
<b>1. Ballam—</b>								
1930	..	..	..	6 10 0	6 6 0	6 1 6	6 4 9	6 6 6
1931	..	..	..	4 6 0	3 14 0	4 0 3	4 4 6	4 2 0
1932	..	..	..	3 13 6	3 10 9	3 10 0	3 8 6	3 7 0
1933	..	..	..	2 10 6	2 12 3	2 12 6	2 12 6	2 14 6
1934	..	..	..	3 12 0	3 7 9	3 7 9	3 9 0	3 12 3
1935	..	..	..	3 5 0	3 9 0	3 8 6	3 8 6	3 11 6
1936	..	..	..	3 15 0	3 13 6	3 12 0	3 14 3	4 1 6
1937	..	..	..	3 11 6	3 12 0	3 12 9	3 13 6	3 15 6
1938	..	..	..	4 0 0	3 12 0	3 11 3	3 11 9	4 0 0
1939	..	..	..	3 12 0	3 15 6	4 0 0	4 2 9	4 8 0
<b>2. Seeta—</b>								
1932	..	..	..	4 14 0	4 7 4	4 6 0	4 3 6	4 1 0
1933	..	..	..	3 8 9	3 8 3	3 6 3	3 8 6	3 11 0
1934	..	..	..	4 3 9	3 8 6	3 11 6	3 9 6	3 9 0
1935	..	..	..	3 14 6	4 5 6	4 6 6	4 4 0	4 4 9
1936	..	..	..	5 2 3	5 5 6	5 1 0	5 0 0	4 14 9
1937	..	..	..	4 8 6	4 5 3	3 15 6	3 15 3	4 0 0
1938	..	..	..	3 11 9	3 8 9	3 5 6	3 6 3	3 14 0
1939	..	..	..	4 14 3	4 1 6	4 0 6	4 1 0	4 12 6
<i>Madras.</i>								
<i>Molagolukulu—</i>								
1933	..	..	..	5 1 0	4 15 0	5 0 0	5 0 0	4 15 0
1934	..	..	..	5 1 0	4 15 0	4 14 0	5 0 0	4 13 0
1935	..	..	..	5 1 0	5 4 6	5 11 6	5 8 0	5 6 0
1936	..	..	..	5 1 0	4 15 0	4 15 0	4 12 0	4 10 0
1937	..	..	..	4 11 0	4 11 0	4 11 0	4 11 0	5 4 6
1938	..	..	..	5 4 0	5 3 0	5 3 0	5 1 6	5 0 3
1939	..	..	..	5 4 0	5 3 9	5 2 3	4 9 6	4 5 6
<i>Raipur.</i>								
<i>Gurmatia—</i>								
1933	..	..	..	2 3 0	2 2 0	1 14 0	2 3 0	2 4 0
1934	..	..	..	1 15 0	2 2 0	2 2 0	2 2 0	2 3 0
1935	..	..	..	2 5 0	2 3 0	2 8 0	2 5 0	2 5 0
1936	..	..	..	2 10 0	2 5 0	2 5 0	2 5 0	2 10 0
1937	..	..	..	2 8 0	2 6 0	2 7 0	2 8 0	2 9 0
1938	..	..	..	2 7 0	2 7 0	2 7 0	2 7 0	2 7 0
1939	..	..	..	2 8 0	2 8 0	2 7 0	2 7 0	2 7 0

## XLIII

prices of rice.  
of 82 2/7 lb.).

June.	July.	August.	September.	October.	November.	December.	Average.
Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
6 7 0	6 13 3	6 10 6	6 6 6	5 10 3	5 2 0	5 3 0	6 2 9
4 0 0	3 13 9	4 1 6	4 0 0	4 1 0	3 15 9	3 15 0	4 0 9
3 6 0	3 5 6	3 6 0	3 5 6	3 5 0	3 7 0	3 6 3	3 7 9
3 5 0	3 6 0	3 6 3	3 6 9	3 8 0	3 13 6	4 2 9	3 4 0
3 12 9	3 13 3	3 13 3	3 14 0	3 12 3	3 10 9	3 10 0	3 11 3
3 12 0	3 12 0	3 10 6	3 8 6	3 10 3	3 8 9	3 9 3	3 9 6
4 2 6	4 3 3	4 0 9	4 1 9	4 6 9	4 5 9	4 3 0	4 1 3
4 2 9	4 1 9	4 0 0	3 15 6	4 2 0	4 1 6	4 1 0	3 15 6
4 0 0	4 0 0	4 2 0	4 4 0	4 4 0	4 2 0	4 0 0	4 0 0
4 11 3	4 13 0	4 14 0	5 1 3	5 4 0	5 4 0	5 6 0	4 10 3
3 14 6	3 12 0	3 12 0	3 12 0	3 12 0	3 14 0	3 14 9	4 1 9
4 2 9	4 5 9	4 8 6	4 10 0	4 15 6	5 2 0	5 5 6	4 3 9
3 8 0	3 8 0	3 10 6	3 14 0	3 14 0	3 14 0	3 14 0	3 11 9
4 4 0	4 4 0	4 5 0	4 4 6	4 8 9	4 11 3	4 14 0	4 6 0
5 0 0	5 0 6	5 2 0	5 2 6	5 8 0	5 8 0	5 8 0	5 3 0
3 15 6	3 15 6	4 2 0	4 3 6	4 4 0	4 1 9	3 15 6	4 1 9
3 14 0	3 14 9	4 3 0	4 4 6	4 5 0	4 4 6	4 8 0	3 15 0
4 14 0	4 13 0	4 13 0	5 4 0	5 7 3	5 6 6	5 6 0	4 13 3
4 11 0	4 10 0	4 10 0	4 13 0	4 11 0	4 9 0	4 9 0	4 12 9
4 13 0	4 12 0	4 13 0	4 15 0	5 2 0	5 1 0	5 2 0	4 15 0
5 6 0	5 6 0	5 2 0	5 0 0	4 15 0	4 15 0	5 2 0	5 3 9
4 12 0	4 11 0	4 11 0	4 10 0	5 0 0	4 10 0	4 10 0	4 12 6
4 12 0	4 14 0	5 1 0	5 2 0	5 0 0	5 1 0	5 4 0	4 15 0
5 0 0	5 0 0	5 0 0	5 0 0	5 0 0	4 15 0	5 2 3	5 1 0
4 6 0	4 6 0	4 6 0	4 10 6	4 10 6	4 10 3	5 0 0	4 11 6
2 3 0	2 3 0	2 3 0	2 3 0	2 1 0	1 14 0	1 13 0	2 1 6
2 2 0	2 2 0	2 3 0	2 3 0	2 5 0	2 4 0	2 4 0	2 2 7
2 10 0	2 5 0	2 4 0	2 8 0	2 10 0	2 13 0	2 11 0	2 6 10
2 10 0	2 9 0	2 12 0	2 10 0	2 10 0	2 10 0	2 5 0	2 8 5
2 11 0	2 11 0	2 11 0	2 11 0	2 11 0	2 9 0	2 11 0	2 9 5
2 7 0	2 9 0	2 9 0	2 9 0	2 9 0	2 9 0	2 9 0	2 8 0
2 8 0	2 10 0	2 8 0	3 0 0	3 0 0	3 8 0	3 0 0	2 10 7

**APPENDIX XLIII.**

*Grade designations and definitions of quality of the variety of raw milled rice known commercially as Dehra Dun Basmati rice grown in the Dehra Dun tahsil in the United Provinces.*

Grade designation.	Special characteristics.										General characteristics.	
	Maximum limits of tolerance:								1,000 kernel weight.	Size of grain.		
	Foreign matter other than rice.	Broken grains.	Fragments.	Other rices including red grains.	Damaged or discoloured grains.	Weevilled grains.	Chalky grains.	Total.		Length.		Breadth.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Grammes.	Millimetres.	Millimetres.	
Special ..	Slight trace	3.0	Nil	1.0	0.25	Reasonably free having regard to the age of the rice.	Nil	4.5	..	Shall not contain more than 2 per cent of whole grains whose length is less than 6.50 m.m.	..	(1) The grains shall be long, slender, of white creamy or greyish colour and translucent (not chalky). (2) The rice— (a) shall possess in a marked degree the natural fragrance characteristic of <i>Basmati</i> rice both in the raw and cooked state; (b) shall not have been artificially coloured and shall be free from polishing agents;
A. ..	0.25	7.0	Nil	2.0	0.50	Do.	Nil	10	..	Shall not contain more than 7 per cent of whole grains whose length is less than 6.50 m.m.	..	



B.	..	0.25	12.0	Nil	4.0	0.75	Do.	Nil	18	..	Shall not contain more than 15 per cent of whole grains whose length is less than 6.50 m.m.	..	(c) may contain up to 10 per cent of grains with an appreciable amount of bran thereon.
----	----	------	------	-----	-----	------	-----	-----	----	----	---	----	---

*Basis of quantitative determinations.*—All determinations and percentages shall be reckoned on the basis of the total weight of a representative sample.

*Broken grains.*—Broken grains shall include pieces of kernel which are less than three-fourths of the whole kernel.

*Fragments.*—Fragments shall include pieces of kernel smaller than one-fourth of the whole kernel.

*Other rice.*—The tolerances specified in column 11 shall include rice of other varieties.

*Chalky grains.*—A chalky grain shall be a grain of rice one-half or more of which is chalky.

For accidental errors a margin of  $\frac{1}{2}$ , 1 and  $1\frac{1}{2}$  per cent may be permitted in excess of the tolerances specified in column 3 for Special, A and B grades respectively, and a margin of 0.25 per cent may be permitted in excess of the specified tolerances in each of the columns 2, 4, 5, 6 and 8 in respect of A and B grades only, provided that in every case the total is not in excess of the total refraction specified in column 9.

## APPENDIX XLIV.

Monthly variations in premiums for age in respect of rice and paddy at two important centres in Madras.

Market.	Trade description.	Date.	Price per maund.		Difference.		
			New crop.	Old crop.	Per maund.	Equivalent percentage.	
			Rs. A. P.	Rs. A. P.	Rs. A. P.		
Rice. Berwada ..	Attragada ..	1938.					
		August ..	3 8 2	..	..	..	
		September ..	3 8 2	..	..	..	
		October ..	3 6 11	..	..	..	
		November ..	3 10 11	..	..	..	
		December ..	4 0 2	..	..	..	
		1939.					
		January ..	3 4 2	4 1 7	0 13 5	25.7	
		February ..	3 4 2	3 12 10	0 8 8	16.6	
		March ..	3 4 2	3 12 10	0 8 8	16.6	
		April ..	3 6 3	3 10 11	0 4 8	8.6	
		May ..	3 6 11	3 10 11	0 4 0	7.3	
		June ..	3 6 11	3 10 11	0 4 0	7.3	
		July ..	3 9 7	3 12 2	0 2 7	4.4	
Coonada ..	Khichili Samba	1938.					
		August ..	3 15 1	..	..	..	
		September ..	3 15 1	..	..	..	
		October ..	4 0 2	..	..	..	
		November ..	4 0 2	..	..	..	
		December ..	4 4 2	..	..	..	
		1939.					
		January ..	3 8 2	4 0 2	0 8 0	14.3	
		February ..	3 10 3	4 1 4	0 7 1	12.1	
		March ..	3 12 2	4 3 3	0 7 1	11.7	
		April ..	3 12 2	4 2 3	0 6 1	10.1	
		May ..	3 12 2	4 2 2	0 6 0	10.1	
		June ..	3 12 2	3 15 3	0 3 1	5.1	
		July ..	3 14 5	4 0 4	0 1 11	3.1	

## APPENDIX XLIV—contd.

Monthly variations in premiums for age in respect of rice and paddy at two important centres in Madras—contd.

Market.	Trade description.	Date.	Price per maund.		Difference.	
			New crop.	Old crop.	Per maund.	Equivalent percentage.
			Rs. A. P.	Rs. A. P.	Rs. A. P.	
		1938.				
<i>Paddy.</i>						
Baswada ..	Attragada ..	August ..	2 3 1	..	..	..
		September ..	2 3 8	..	..	..
		October ..	2 3 1	..	..	..
		November ..	2 6 9	..	..	..
		December ..	2 2 1	..	..	..
		1939.				
		January ..	2 1 2	2 5 8	0 4 6	13.1
		February ..	2 1 2	2 6 2	0 5 0	14.7
		March ..	2 0 8	2 4 8	0 4 0	11.5
		April ..	2 0 8	2 3 1	0 2 5	6.8
		May ..	2 1 2	2 3 7	0 2 5	6.8
		June ..	2 1 2	2 3 1	0 1 11	5.4
		July ..	2 4 2	2 6 3	0 2 1	5.7

## APPENDIX

Comparison between the wholesale prices of paddy (rice in the husk)

(Per maund)

		January.	February.	March.	April.	May.	June.
		Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
<b>PUNJAB.</b>							
<i>Gujranwala Jhon —</i>							
1931	Rice ..	3 6 0	3 8 0	3 7 0	3 7 0	3 5 0	3 3 0
	Paddy ..	2 3 0	2 2 0	2 1 0	2 0 0	1 14 0	1 13 0
1932	Rice ..	3 9 0	3 5 0	3 6 0	3 5 0	3 6 0	3 8 0
	Paddy ..	2 2 0	2 0 0	2 1 0	2 0 0	2 0 0	2 1 0
1933	Rice ..	3 11 0	3 9 0	3 8 0	3 9 0	3 9 0	3 9 0
	Paddy ..	2 5 0	2 3 0	2 1 0	2 2 0	2 2 0	2 2 0
1934	Rice ..	2 13 0	2 12 0	2 12 0	2 13 0	2 15 0	2 14 0
	Paddy ..	1 9 0	1 10 0	1 10 0	1 11 0	1 14 0	1 14 0
1935	Rice ..	3 5 0	3 6 0	3 4 0	3 5 0	3 6 0	3 6 0
	Paddy ..	2 1 0	2 1 0	2 0 0	2 2 0	2 3 0	2 3 0
1936	Rice ..	3 7 0	3 7 0	3 7 0	3 8 0	3 7 0	3 7 0
	Paddy ..	2 1 0	2 1 0	2 2 0	2 1 0	2 1 0	2 0 0
1937	Rice ..	3 10 0	3 5 0	3 6 0	3 10 0	3 9 0	3 9 0
	Paddy ..	2 2 0	2 1 0	2 2 0	2 4 0	2 3 0	2 4 0
<i>Basmati—</i>							
1931	Rice ..	6 8 0	6 8 0	6 12 0	7 6 0	7 10 0	7 12 0
	Paddy ..	3 0 0	3 0 0	3 4 0	3 7 0	3 9 0	3 8 0
1932	Rice ..	7 12 0	7 8 0	7 8 0	7 8 0	7 8 0	7 8 0
	Paddy ..	3 8 0	3 4 0	3 1 0	3 4 0	3 8 0	3 8 0
1933	Rice ..	6 6 0	6 6 0	6 2 0	6 0 0	6 0 0	6 2 0
	Paddy ..	3 0 0	2 15 0	2 12 0	2 12 0	2 13 0	2 13 0
1934	Rice ..	4 10 0	4 13 0	5 0 0	5 4 0	5 11 0	5 10 0
	Paddy ..	1 15 0	2 3 0	2 4 0	2 5 0	2 12 0	2 13 0
1935	Rice ..	6 9 0	6 8 0	6 6 0	6 12 0	6 12 0	6 12 0
	Paddy ..	3 2 0	3 4 0	3 2 0	3 5 0	3 5 0	3 5 0
1936	Rice ..	6 2 0	6 2 0	6 3 0	6 2 0	6 2 0	6 2 0
	Paddy ..	3 1 0	3 1 0	3 1 0	3 2 0	3 3 0	3 3 0
1937	Rice ..	5 4 0	5 5 0	5 8 0	5 8 0	5 10 0	5 8 0
	Paddy ..	2 12 0	2 13 0	2 14 0	2 12 0	2 14 0	2 13 0

XLV.

and rice at Gujranwala (Punjab).

of 82 2/7 lb.)

July.	August.	September.	October.	November.	December.	Average.	Difference.	Price of paddy expressed as a percentage of that of price.
Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	
3 3 0	3 3 0	3 6 0	3 3 0	3 6 0	3 10 0	3 6 0		
2 8 0	2 7 0	2 2 0	1 14 0	2 1 0	2 3 0	2 1 0	1 5 0	61.1
3 10 0	3 13 0	3 13 0	3 14 0	3 12 0	3 11 0	3 9 0		
2 4 0	2 7 0	2 7 0	2 6 0	2 5 0	2 5 0	2 3 0	1 6 0	61.4
3 10 0	3 8 0	3 9 0	3 0 0	3 3 0	3 0 0	3 7 0		
2 2 0	2 2 0	1 12 0	1 9 0	1 12 0	1 10 0	2 0 0	1 7 0	58.2
2 13 0	2 14 0	2 15 0	2 14 0	2 13 0	3 4 0	2 14 0		
1 14 0	1 15 0	1 15 0	1 12 0	1 11 0	2 1 0	1 13 0	1 1 0	63.0
3 6 0	3 6 0	3 6 0	3 12 0	3 8 0	3 8 0	3 7 0		
2 4 0	2 3 0	2 1 0	2 6 0	2 2 0	2 2 0	2 2 0	1 5 0	61.8
3 7 0	3 6 0	3 6 0	3 3 0	3 6 0	3 8 0	3 7 0		
2 1 0	2 3 0	2 1 0	1 14 0	1 14 0	1 15 0	2 0 0	1 7 0	58.2
..	..	..	..	..	..	3 8 0		
..	..	..	..	..	..	2 3 0	1 5 0	62.5
7 11 0	8 0 0	8 3 0	8 0 0	7 4 0	7 8 0	7 7 0		
3 8 0	3 12 0	3 10 0	3 4 0	2 14 0	3 4 0	3 5 0	4 2 0	44.5
7 12 0	8 0 0	7 12 0	6 12 0	6 9 0	6 8 0	7 6 0		
3 11 0	4 0 0	3 11 0	3 0 0	3 0 0	3 0 0	3 6 0	4 0 0	45.8
6 2 0	6 2 0	6 0 0	5 10 0	5 0 0	4 12 0	5 14 0		
2 13 0	2 13 0	2 13 0	2 2 0	2 2 0	2 1 0	2 10 0	3 4 0	44.7
5 13 0	5 14 0	6 0 0	6 4 0	6 4 0	6 8 0	5 10 0		
2 13 0	2 13 0	2 14 0	2 14 0	2 8 0	2 15 0	2 9 0	3 1 0	45.6
6 14 0	6 14 0	6 12 0	6 0 0	6 0 0	6 0 0	6 8 0		
3 5 0	3 5 0	3 4 0	3 2 0	2 14 0	3 0 0	3 3 0	3 5 0	49.0
6 0 0	6 4 0	6 1 0	6 4 0	6 2 0	6 0 0	6 2 0		
3 3 0	3 2 0	3 1 0	3 0 0	3 0 0	2 7 0	3 1 0	3 1 0	50.0
..	..	..	..	..	..	5 7 0		
..	..	..	..	..	..	2 13 0	2 10 0	51.7

## APPENDIX

Comparison between the wholesale prices of paddy (rice in the husk)  
(Per maund)

		January.	February.	March.	April.	May.	June.
		Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
<i>Batwa or Sone—</i>							
1931	{ Rice .. ..	4 6 0	4 4 0	4 5 0	4 5 0	4 4 0	4 3 0
	{ Paddy .. ..	2 5 0	2 2 0	2 4 0	2 3 0	2 3 0	2 3 0
1932	{ Rice .. ..	4 5 0	4 0 0	4 0 0	4 0 0	4 2 0	4 1 0
	{ Paddy .. ..	2 7 0	2 4 0	2 4 0	2 4 0	2 3 0	2 4 0
1933	{ Rice .. ..	3 14 0	3 14 0	3 12 0	3 13 0	3 14 0	3 14 0
	{ Paddy .. ..	2 6 0	2 5 0	2 3 0	2 3 0	2 3 0	2 3 0
1934	{ Rice .. ..	3 1 0	3 3 0	3 2 0	3 2 0	3 10 0	3 12 0
	{ Paddy .. ..	1 9 0	1 12 0	1 12 0	1 13 0	2 0 0	2 2 0
1935	{ Rice .. ..	4 0 0	4 1 0	3 15 0	4 0 0	4 4 0	4 4 0
	{ Paddy .. ..	2 4 0	2 4 0	2 2 0	2 3 0	2 5 0	2 5 0
1936	{ Rice .. ..	3 14 0	3 14 0	3 14 0	3 14 0	3 15 0	4 6 0
	{ Paddy .. ..	2 3 0	2 3 0	2 3 0	2 4 0	2 3 0	2 4 0
1937	{ Rice .. ..	4 0 0	4 1 0	4 1 0	4 2 0	4 5 0	4 3 0
	{ Paddy .. ..	2 5 0	2 4 0	2 4 0	2 4 0	2 5 0	2 5 0

XLV—contd.

and rice at Gujranwala (Punjab)—contd.  
of 82 2/7 lb.).

July.	August.	September.	October.	November.	December.	Average.	Difference.	Price of paddy expressed as a percentage of that of price.
Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	
4 4 0	5 0 0	4 10 0	3 13 0	3 12 0	4 5 0	4 5 0		
2 6 9	2 12 0	2 8 0	1 15 0	2 4 0	2 6 0	2 5 0	2 0 0	53.6
4 1 0	4 4 0	4 4 0	3 15 0	3 14 0	3 14 0	4 1 0		
2 6 0	2 8 0	2 7 0	2 6 0	2 5 0	2 5 0	2 5 0	1 12 0	56.9
4 0 0	4 0 0	4 0 0	3 5 0	3 4 0	3 2 0	3 12 0		
3 3 0	2 3 0	2 3 0	1 11 0	1 14 0	1 11 0	2 2 0	1 10 0	56.7
3 12 0	3 14 0	3 15 0	3 7 0	3 6 0	4 0 0	3 8 0		
3 2 0	2 3 0	2 3 0	2 0 0	1 13 0	2 4 0	1 15 0	1 9 0	55.4
4 4 0	4 4 0	4 2 0	3 15 0	3 13 0	3 13 0	4 1 0		
2 5 0	2 5 0	2 4 0	2 6 0	2 3 0	2 3 0	2 4 0	1 13 0	55.4
4 0 9	4 2 0	4 4 0	3 14 0	3 12 0	3 12 0	3 15 0		
2 4 0	2 3 0	2 2 0	2 2 0	2 2 0	2 2 0	2 3 0	1 12 0	55.6
..	..	..	..	..	..	4 2 0		
..	..	..	..	..	..	2 5 0	1 13 0	56.1

## APPENDIX.

Comparison between the wholesale prices of paddy (rice in the husk)

(Per maund)

		January.	February.	March.	April.	May.	June.
		Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
<b>BENGAL.</b>							
<i>Burdwan—</i>							
1935	{ Rice .. ..	3 13 0	3 12 0	3 10 0	3 12 0	3 10 0	3 7 0
	{ Paddy .. ..	2 2 0	2 4 0	2 3 0	2 3 0	2 1 0	2 2 0
1936	{ Rice .. ..	3 15 0	3 11 0	3 12 0	4 0 0	4 3 0	4 2 0
	{ Paddy .. ..	2 6 0	2 3 0	2 4 0	2 9 0	2 9 0	2 9 0
1937	{ Rice .. ..	3 2 0	3 1 0	3 0 0	3 2 0	3 2 0	3 3 0
	{ Paddy .. ..	1 12 0	2 5 0	1 10 0	1 12 0	1 12 0	2 2 0
1938	{ Rice .. ..	2 13 0	2 11 0	2 11 0	2 12 0	3 1 0	2 10 0
	{ Paddy .. ..	1 9 0	1 8 0	1 8 0	1 12 0	1 12 0	1 11 0
1939	{ Rice .. ..	3 3 0	3 4 0	3 3 0	3 7 0	3 9 0	3 8 0
	{ Paddy .. ..	1 14 0	1 14 0	1 15 0	2 2 0	2 2 0	2 1 0
<i>Hooghly—</i>							
1935	{ Rice .. ..	..	..	..	3 8 0	3 8 0	3 8 0
	{ Paddy .. ..	..	..	..	2 2 0	2 2 0	2 2 0
1936	{ Rice .. ..	3 15 0	3 15 0	4 0 0	4 0 0	4 4 0	4 6 0
	{ Paddy .. ..	2 7 0	2 7 0	2 8 0	2 8 0	2 11 0	2 12 0
1937	{ Rice .. ..	3 1 0	2 13 0	2 13 0	3 1 0	3 1 0	3 2 0
	{ Paddy .. ..	1 13 0	1 11 0	1 11 0	1 13 0	1 13 0	1 14 0
1938	{ Rice .. ..	2 12 0	2 10 0	2 12 0	2 14 0	3 1 0	3 1 0
	{ Paddy .. ..	1 10 0	1 9 0	1 10 0	1 12 0	1 13 0	1 13 0
1939	{ Rice .. ..	3 5 0	3 5 0	3 5 0	3 14 0	3 14 0	4 0 0
	{ Paddy .. ..	2 0 0	2 0 0	2 0 0	2 6 0	2 6 0	2 8 0
1940	{ Rice .. ..	4 5 0	4 9 0	4 10 0	4 10 0	4 11 0	4 13 0
	{ Paddy .. ..	2 11 0	2 15 0	2 15 0	2 15 0	3 0 0	3 0 0



XLVI

and rice in certain important markets.

of 82 2/7 lb.).

July.	August.	September.	October.	November.	December.	Average.	Difference.	Price of paddy expressed as a percentage of that of price.
Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	
3 10 0	3 10 0	3 8 0	3 12 0	3 15 0	3 14 0	3 11 0		
2 2 0	2 2 0	2 1 0	2 5 0	2 6 0	2 6 0	2 3 0	1 8 0	59.3
4 4 0	4 2 0	4 2 0	4 2 0	3 12 0	3 1 0	3 12 0		
2 8 0	2 6 0	2 6 0	2 4 0	2 3 0	1 12 0	2 5 0	1 7 0	61.7
3 2 0	3 4 0	3 8 0	3 1 0	2 15 0	2 15 0	3 2 0		
1 13 0	2 2 0	2 2 0	1 11 0	1 11 0	1 12 0	1 14 0	1 4 0	60.0
2 13 0	3 4 0	3 4 0	3 7 0	3 5 0	3 5 0	3 0 0		
1 11 0	1 13 0	1 13 0	2 0 0	2 0 0	1 13 0	1 12 0	1 4 0	58.8
3 10 0	4 4 0	4 8 0	4 2 0	4 1 0	4 3 0	3 11 0		
2 1 0	2 6 0	2 7 0	2 7 0	2 6 0	2 3 0	2 3 0	1 8 0	59.3
3 11 0	3 11 0	3 11 0	4 1 0	4 1 0	4 0 0	3 12 0		
2 5 0	2 5 0	2 5 0	2 8 0	2 8 0	2 8 0	2 5 0	1 7 0	61.7
4 4 0	4 4 0	4 4 0	4 0 0	2 15 0	3 2 0	3 15 0		
2 10 0	2 11 0	2 11 0	2 8 0	1 12 0	1 14 0	2 7 0	1 8 0	61.9
3 2 0	3 1 0	2 15 0	2 15 0	2 14 0	2 12 0	3 0 0		
1 14 0	1 14 0	1 13 0	1 13 0	1 12 0	1 10 0	1 13 0	1 2 0	60.4
3 3 0	3 3 0	3 5 0	3 7 0	3 1 0	3 7 0	3 1 0		
1 15 0	1 15 0	2 0 0	2 2 0	1 13 0	2 2 0	1 14 0	1 3 0	61.2
4 0 0	4 4 0	4 8 0	4 5 0	4 1 0	4 4 0	3 15 0		
2 8 0	2 10 0	2 13 0	2 11 0	2 8 0	2 10 0	2 7 0	1 8 0	61.9
4 13 0	..	..	..	..	..	4 10 0		
3 0 0	..	..	..	..	..	2 15 0	1 11 0	63.5

## APPENDIX

		January.	February.	March.	April.	May.	June.
		Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
<b>MADRAS.</b>							
<i>Bezwada—</i>							
1931	{ Rice .. ..	4 3 0	4 3 0	4 3 0	4 0 0	3 13 0	3 4 0
	{ Paddy .. ..	2 0 0	2 2 0	2 3 0	2 2 0	2 1 0	1 15 0
1932	{ Rice .. ..	2 11 0	3 8 0	3 9 0	3 7 0	3 7 0	3 7 0
	{ Paddy .. ..	1 14 0	2 0 0	2 5 0	2 6 0	2 6 0	2 6 0
1933	{ Rice .. ..	2 8 0	2 11 0	2 12 0	2 9 0	2 9 0	2 12 0
	{ Paddy .. ..	1 13 0	1 15 0	1 13 0	1 12 0	1 13 0	1 14 0
1934	{ Rice .. ..	2 3 0	2 2 0	2 2 0	2 3 0	2 7 0	2 12 0
	{ Paddy .. ..	1 6 0	1 6 0	1 6 0	1 7 0	1 10 0	1 12 0
1935	{ Rice .. ..	2 13 0	3 7 0	3 3 0	3 3 0	3 7 0	3 7 0
	{ Paddy .. ..	2 1 0	2 3 0	2 3 0	2 4 0	2 6 0	2 6 0
1936	{ Rice .. ..	3 5 0	3 4 0	3 4 0	3 0	3 5 0	3 5 0
	{ Paddy .. ..	2 3 0	2 3 0	2 2 0	2 4 0	2 4 0	2 3 0
1937	{ Rice .. ..	3 4 0	3 4 0	3 4 0	3 12 0	3 10 0	3 11 0
	{ Paddy .. ..	2 3 0	2 3 0	2 4 0	2 6 0	2 6 0	2 7 0
<b>SIND.</b>							
<i>Larkana—</i>							
1933	{ Rice .. ..	..	..	..	..	..	..
	{ Paddy .. ..	..	..	..	..	..	..
1934	{ Rice .. ..	2 10 0	2 11 0	2 10 0	2 10 0	2 10 0	2 10 0
	{ Paddy .. ..	1 7 0	1 8 0	1 8 0	1 8 0	1 8 0	1 8 0
1935	{ Rice .. ..	2 12 0	2 15 0	2 15 0	3 0 0	3 0 0	3 4 0
	{ Paddy .. ..	1 12 0	1 12 0	1 8 0	1 12 0	1 13 0	1 12 0
1936	{ Rice .. ..	3 0 0	3 0 0	3 0 0	..	..	..
	{ Paddy .. ..	1 11 0	1 12 0	1 12 0	..	..	..
<b>ASSAM.</b>							
<i>Karimganj (Sylhet)—</i>							
1933	{ Rice .. ..	2 2 0	2 4 0	2 6 0	2 10 0	2 11 0	3 1 0
	{ Paddy .. ..	1 2 0	1 3 0	1 4 0	1 7 0	1 9 0	1 8 0
1934	{ Rice .. ..	2 14 0	2 14 0	2 14 0	2 13 0	2 10 0	2 10 0
	{ Paddy .. ..	2 0 0	2 0 0	2 0 0	2 0 0	2 0 0	2 0 0
1935	{ Rice .. ..	2 10 0	2 12 0	2 14 0	2 12 0	2 14 0	2 12 0
	{ Paddy .. ..	1 9 0	1 14 0	1 9 0	1 11 0	1 13 0	1 14 0

XLVI—contd.

July.	August.	September.	October.	November.	December.	Average.	Difference.	Price of paddy expressed as a percentage of that of price.
Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	
3 5 0	3 13 0	3 9 0	3 8 0	3 13 0	3 11 0	3 12 0		
2 0 0	3 4 0	2 5 0	2 5 0	2 6 0	2 4 0	2 3 0	1 9 0	58.3
3 8 0	3 8 0	3 7 0	3 7 0	3 7 0	3 5 0	3 6 0		
2 6 0	2 6 0	2 6 0	2 5 0	2 4 0	2 3 0	2 4 0	1 2 0	66.7
2 15 0	2 13 0	2 13 0	2 11 0	2 11 0	2 9 0	2 11 0		
1 13 0	1 13 0	1 12 0	1 11 0	1 11 0	1 10 0	1 13 0	0 14 0	67.4
2 11 0	2 15 0	3 2 0	3 8 0	3 8 0	3 3 0	2 12 0		
1 12 0	1 15 0	2 2 0	2 5 0	2 5 0	2 2 0	1 13 0	0 15 0	65.9
3 8 0	3 7 0	3 8 0	3 7 0	3 7 0	3 4 0	3 5 0		
2 6 0	2 6 0	2 7 0	2 6 0	2 5 0	2 3 0	2 5 0	1 0 0	69.8
3 5 0	3 5 0	3 6 0	3 5 0	3 5 0	3 6 0	3 5 0		
2 3 0	2 3 0	2 3 0	2 3 0	2 3 0	2 3 0	2 3 0	1 2 0	66.0
3 3 0	3 10 0	3 8 0	..	..	..	7 0		
2 5 0	2 5 0	2 5 0	..	..	..	2 5 0	1 2 0	67.3
..	..	..	..	2 13 0	2 12 0	2 13 0		
..	..	..	..	1 9 0	1 9	1 9 0	1 4 0	55.6
2 11 0	2 14 0	2 14 0	2 14	2 10 0	2 10	2 11 0		
1 7 0	1 7 0	1 8 0	1 8	1 7 0	1 8 0	1 8 0	1 3 0	55.8
3 4 0	3 4 0	3 4 0	3 4	3 4 0	3 0	3 1 0		
1 10 0	1 12 0	1 10	1 13 0	1 13 0	1 12 0	1 12 0	1 5 0	57.1
..	..	..	..	..	..	3 0 0		
..	..	..	..	..	..	1 12 0	1 4 0	58.3
2 14 0	2 15 0	2 15 0	2 15 0	2 15 0	2 12 0	2 11 0		
2 2 0	2 0 0	2 0 0	2 0 0	2 0 0	1 14 0	1 12 0	1 0 0	62.8
2 10 0	2 14 0	3 2 0	3 3	3 3 0	2 13 0	2 14 0		
2 0 0	1 15 0	2 0 0	2 0 0	1 14 0	1 9 0	1 15 0	0 15 0	67.4
3 3 0	3 2 0	2 13 0	3 0 0	2 8 0	2 8 0	2 13 0		
2 0 0	2 0 0	1 9 0	1 12 0	1 9 0	1 8 0	1 12 0	1 1 0	62.2

## APPENDIX

			January.	February.	March.	April.	May.	June.
			Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
<b>BIHAR.</b>								
<i>Jaynagar—</i>								
1933	{	Rice .. ..	2 14 0	2 13 0	2 11 0	2 10 0	2 11 0	2 14 0
		Paddy .. ..	1 11 0	1 10 0	1 10 0	1 10 0	1 10 0	1 12 0
1934	{	Rice .. ..	2 11 0	2 10 0	2 13 0	2 13 0	2 15 0	3 0 0
		Paddy .. ..	1 9 0	1 9 0	1 11 0	1 13 0	1 13 0	1 13 0
1935	{	Rice .. ..	3 0 0	3 2 0	3 3 0	3 4 0	3 4 0	3 7 0
		Paddy .. ..	1 14 0	2 0 0	2 1 0	2 0 0	2 1 0	2 2 0
1936	{	Rice .. ..	3 6 0	3 6 0	3 8 0	3 8 0	3 8 0	3 12 0
		Paddy .. ..	2 0 0	2 0 0	2 0 0	2 2 0	2 3 0	2 3 0
1937	{	Rice .. ..	3 3 0	3 4 0	3 4 0	3 4 0	3 4 0	3 9 0
		Paddy .. ..	1 14 0	1 14 0	1 15 0	1 15 0	1 15 0	1 15 0

XLVI—conold.

July.	August.	September.	October.	November.	December.	Average.	Difference.	Price of paddy expressed as a percentage of that of price.
Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	
2 15 0	2 0 0	2 13 0	2 11 0	2 13 0	2 11 0	2 13 0		
..	..	..	1 10 0	1 12 0	1 8 0	1 10 0	1 3 0	57.8
2 4 0	2 5 0	2 2 0	2 14 0	2 13 0	2 14 0	2 15 0		
2 1 0	..	..	..	..	1 8 0	1 10 0	1 5 0	55.3
2 2 0	2 2 0	2 2 0	2 7 0	2 6 0	2 6 0	2 5 0		
2 2 0	..	..	..	..	1 10 0	2 0 0	1 5 0	60.4
2 6 0	2 4 0	2 1 0	2 14 0	2 14 0	2 0 0	2 5 0		
..	..	..	..	1 14 0	1 10 0	2 0 0	1 5 0	60.4
2 4 0	2 6 0	2 5 0	2 5 0	2 2 0	2 15 0	2 4 0		
2 0 0	2 0 0	1 14 0	1 14 0	1 13 0	1 12 0	1 14 0	1 6 0	57.7

APPENDIX XLVII.

Relation of paddy to rice prices in Madras.

(Rice = 100).

						January.	April.	July.	October.	Annual average.
<i>Guntur.</i>										
<i>Kusuma (Bold)—</i>										
1931	..	..	..	..	..	..	53	69	60	61
1932	..	..	..	..	..	55	59	61	67	61
1933	..	..	..	..	..	64	67	69	64	66
1934	..	..	..	..	..	66	82	68	70	72
<i>Bezwada.</i>										
<i>Kusuma (Bold)—</i>										
1931	..	..	..	..	..	48	53	60	66	57
1932	..	..	..	..	..	70	69	68	68	69
1933	..	..	..	..	..	71	68	62	63	66
1934	..	..	..	..	..	63	64	64	66	64
1935	..	..	..	..	..	73	70	68	69	70

MAICAR

*Nellore.*

*Molagolukulu (Medium)—*

1931	..	..	..	..	..	62	64	64	62	63
1932	..	..	..	..	..	66	67	64	68	66
1933	..	..	..	..	..	62	69	63	62	64
1934	..	..	..	..	..	66	67	70	69	68
1935	..	..	..	..	..	67	71	61	66	66

*Coconada.*

*Nondescript (Bold)—*

1931	..	..	..	..	..	70	65	52	45	58
1932	..	..	..	..	..	69	68	59	50	62
1933	..	..	..	..	..	67	68	51	52	60
1934	..	..	..	..	..	66	59	64	50	60
1935	..	..	..	..	..	52	64	73	73	66

*Tanjore.*

*Nondescript (Bold)—*

1931	..	..	..	..	..	75	75	..	74	78
1932	..	..	..	..	..	75	..	75	74	75
1933	..	..	..	..	..	72	55	..	..	64
1934	..	..	..	..	..	..	..	..	55	55
1935	..	..	..	..	..	58	55	55	55	56

## APPENDIX

"Spot" and "future" prices of

(Per 100 baskets of

					January.	February.	March.	April.
					Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
<b>1934.</b>								
<i>Small Mills—</i>								
Special	..	..	..	..	1 10 3	1 10 3	1 8 6	1 8 6
One month	..	..	..	..	1 10 3	1 10 9	1 9 3	1 9 0
Two months	..	..	..	..	1 10 9	1 11 3	1 10 0	1 9 9
Three months	..	..	..	..	1 10 9	1 11 9	1 10 6	1 10 3
<b>1935.</b>								
<i>Small Mills—</i>								
Special	..	..	..	..	2 2 0	2 4 3	2 5 3	2 9 0
One month	..	..	..	..	2 2 6	2 4 9	2 5 6	2 9 3
Two months	..	..	..	..	2 3 3	2 5 6	2 6 6	2 10 0
Three months	..	..	..	..	2 4 0	..	2 7 6	2 10 6
<b>1936.</b>								
<i>Small Mills—</i>								
Special	..	..	..	..	2 2 3	2 3 9	2 6 9	2 7 6
One month	..	..	..	..	2 2 3	2 3 9	2 6 9	2 7 9
Two months	..	..	..	..	2 2 6	2 4 3	2 6 9	2 8 0
Three months	..	..	..	..	2 3 0	2 5 6	2 7 0	2 8 3
<b>1937.</b>								
<i>Small Mills—</i>								
Special	..	..	..	..	2 10 6	2 8 9	2 8 6	2 8 9
One month	..	..	..	..	2 11 0	2 9 6	2 9 0	2 9 9
Two months	..	..	..	..	2 12 0	2 10 6	2 10 6	2 10 9
Three months	..	..	..	..	2 13 0	2 11 6	2 11 0	2 11 3
<b>1938.</b>								
<i>Small Mills—</i>								
Special	..	..	..	..	2 4 0	2 4 0	2 4 9	2 6 3
One month	..	..	..	..	2 4 3	2 4 6	2 5 0	2 6 6
Two months	..	..	..	..	2 5 0	2 5 6	2 6 0	2 7 0
Three months	..	..	..	..	2 5 6	2 7 0	2 6 3	2 7 3



## XLVIII.

## Small Mills Specials at Rangoon.

75 lb. each).

May.	June.	July.	August.	September.	October.	November.	December
Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
1 10 3	1 13 0	2 1 6	2 7 6	2 5 9	2 6 0	2 1 6	1 15 0
1 10 9	1 13 3	2 1 9	2 8 0	2 6 6	2 6 0	2 2 3	1 13 9
1 11 3	1 13 3	2 2 9	2 9 0	2 6 9	2 6 3	1 14 9	1 15 6
1 12 0	..	2 3 3	2 9 9	2 7 6	..	1 15 9	1 15 9
2 10 9	2 10 9	2 10 9	2 7 9	2 9 0	2 11 9	2 10 9	2 12 0
2 10 9	2 10 9	2 10 9	2 7 3	2 8 3	2 10 9	2 9 9	2 4 0
2 11 3	2 11 0	2 10 9	2 7 0	2 7 9	2 10 0	2 4 0	2 4 0
2 13 0	2 11 3	2 10 9	2 7 0	..	2 5 0	..	2 3 0
2 7 9	2 7 6	2 6 9	2 8 6	2 8 0	2 6 0	2 8 3	2 11 3
2 8 0	2 7 9	2 7 3	2 9 0	2 8 3	2 5 9	2 7 3	2 10 "
2 8 3	2 8 0	2 7 6	2 9 6	2 8 9	2 5 9	2 5 3	2 11 0
2 8 6	2 8 0	2 7 9	2 9 9	..	2 4 9	2 6 0	2 11 3
2 8 0	2 7 6	2 7 9	2 10 0	2 11 3	2 13 3	2 10 6	2 7 9
2 8 9	2 8 0	2 8 3	2 10 6	2 12 3	2 4 3	..	2 6 0
2 10 3	2 9 0	2 9 0	2 11 3	2 13 3	..	..	2 6 3
2 10 6	2 9 9	2 10 0	2 12 0	..	..	2 6 0	2 3 0
2 8 6	2 8 9	2 9 0	2 9 6	2 8 3	2 8 6	2 5 9	2 3 0
2 9 3	2 9 3	2 9 3	2 10 3	2 8 6	2 8 3	..	2 2 0
2 10 0	2 10 6	2 10 9	2 11 3	2 9 0	..	..	..
2 10 6	2 11 0	2 12 0	2 12 0	..	..	..	2 1 9

## APPENDIX

## Average monthly wholesale

				January.	February.	March.	April.	May.
				Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
<b>Big Mills Specials—</b>								
1932	..	..	..	2 6 5	2 10 8	3 0 10	2 12 7	2 10 10
1933	..	..	..	1 14 4	1 12 9	1 10 10	1 11 0	1 11 11
1934	..	..	..	1 9 1	1 9 1	1 7 4	1 7 8	1 9 7
1935	..	..	..	1 15 11	2 2 0	2 3 4	2 7 3	2 9 11
1936	..	..	..	2 2 5	2 2 7	1 11 3	2 5 9	2 6 3
1937	..	..	..	2 8 2	2 6 7	2 7 2	2 7 6	2 6 10
1938	..	..	..	2 2 1	2 2 1	2 1 8	2 3 1	2 5 11
1939	..	..	..	2 1 2	2 2 1	2 4 6	2 7 9	2 8 1
1940	..	..	..	2 11 11	2 12 8	2 11 9	2 13 3	..
<b>Small Mills Specials—</b>								
1932	..	..	..	2 8 0	2 12 9	3 2 11	2 14 4	2 13 1
1933	..	..	..	1 15 11	1 14 6	1 12 10	1 12 8	1 14 4
1934	..	..	..	1 10 4	1 10 4	1 8 7	1 8 5	1 10 2
1935	..	..	..	2 1 10	2 4 4	2 5 2	2 8 11	2 10 10
1936	..	..	..	2 2 7	2 3 10	2 6 8	2 7 6	2 7 8
1937	..	..	..	2 10 6	2 8 7	2 8 4	2 8 11	2 8 0
1938	..	..	..	2 4 6	2 4 10	2 5 7	2 7 0	2 9 9
1939	..	..	..	2 2 5	2 2 11	2 5 7	2 8 9	2 9 8
1940	..	..	..	2 14 1	2 14 6	2 13 9	2 15 5	..
<b>Sugandhi (white)—</b>								
1932	..	..	..	2 12 3	3 1 2	3 5 2	2 15 9	2 14 4
1933	..	..	..	2 8 7	2 7 4	2 6 6	2 4 10	2 6 10
1934	..	..	..	1 14 0	1 14 4	1 13 8	1 13 0	1 15 5
1935	..	..	..	2 6 3	2 10 4	2 9 11	2 13 8	2 14 10
1936	..	..	..	2 9 5	2 11 2	2 12 9	2 15 0	2 15 7
1937	..	..	..	3 2 2	3 0 5	3 0 1	3 0 7	2 15 5
1938	..	..	..	2 8 7	2 10 1	2 11 0	2 11 8	2 15 3
1939	..	..	..	2 7 6	2 7 0	2 8 7	2 11 2	2 12 3
1940	..	..	..	3 1 2	3 1 4	3 1 3	3 3 6	..
<b>Milchar (steam dried)—</b>								
1932	..	..	..	2 8 0	2 12 3	3 2 0	2 6 3	2 5 11
1933	..	..	..	2 4 6	2 3 6	1 14 6	1 14 2	2 0 1
1934	..	..	..	1 13 6	1 13 4	1 12 3	1 13 4	..
1935	..	..	..	2 3 10	2 5 7	2 8 2	2 12 1	2 14 0
1936	..	..	..	2 5 1	2 5 11	2 7 10	2 9 3	2 10 0
1937	..	..	..	2 12 7	2 10 4	2 9 7	2 10 1	2 9 1
1938	..	..	..	2 6 8	2 4 0	2 3 7	2 4 6	2 7 6
1939	..	..	..	2 6 9	2 6 4	2 7 7	2 10 10	2 11 6
1940	..	..	..	2 15 7	2 15 7	2 15 2	3 0 7	..
<b>Broken Rice No. 3—</b>								
1932	..	..	..	1 9 3	1 12 2	2 3 8	1 15 3	1 15 1
1933	..	..	..	1 4 1	1 3 11	1 2 6	1 0 5	1 1 0
1934	..	..	..	0 15 7	1 0 5	1 0 5	0 15 0	1 0 3
1935	..	..	..	1 4 1	1 9 7	1 14 4	2 1 10	2 4 2
1936	..	..	..	1 10 2	1 10 8	1 14 9	2 0 2	2 0 7
1937	..	..	..	1 13 2	1 12 9	1 13 10	1 15 3	1 14 6
1938	..	..	..	1 13 3	1 11 5	1 11 5	1 10 6	1 9 7
1939	..	..	..	1 12 0	1 13 3	1 12 9	1 12 6	1 13 6
1940	..	..	..	2 3 8	2 3 8	2 4 11	2 5 2	..



## APPENDIX

## Comparative prices of Ngasein paddy and Small

			January.	February.	March.	April.	May.	June.
			Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
<b>1934.</b>								
<i>Ngasein paddy</i>	..	..	1 0 0	0 15 0	0 15 0	0 15 0	1 1 0	1 3 0
<i>Small Mills Special</i>	..	..	1 10 0	1 10 0	1 9 0	1 8 0	1 10 0	1 13 0
<b>1935.</b>								
<i>Ngasein paddy</i>	..	..	1 5 0	1 8 0	1 9 0	1 11 0	1 13 0	1 13 0
<i>Small Mills Special</i>	..	..	2 2 0	2 4 0	2 5 0	2 9 0	2 11 0	2 11 0
<b>1936.</b>								
<i>Ngasein paddy</i>	..	..	1 7 0	1 8 0	1 10 0	1 10 0	1 10 0	1 10 0
<i>Small Mills Special</i>	..	..	2 2 0	2 4 0	2 7 0	2 8 0	2 8 0	2 7 0
<b>1937.</b>								
<i>Ngasein paddy</i>	..	..	1 11 0	1 10 0	1 10 0	1 11 0	1 11 0	1 11 0
<i>Small Mills Special</i>	..	..	2 10 0	2 9 0	2 8 0	2 9 0	2 8 0	2 7 0
<b>1938.</b>								
<i>Ngasein paddy</i>	..	..	1 8 0	1 7 0	1 7 0	1 8 0	1 13 0	1 11 0
<i>Small Mills Special</i>	..	..	2 4 0	2 4 0	2 5 0	2 6 0	2 8 0	2 9 0
<b>1939.</b>								
<i>Ngasein paddy</i>	..	..	1 7 0	1 8 0	1 10 0	1 11 0	1 13 6	1 12 0
<i>Small Mills Special</i>	..	..	2 2 0	2 2 0	2 5 0	2 8 0	2 9 0	2 8 0

L.

## Mills Specials rice at Rangoon (1934—39).

July.	August.	September.	October.	November.	December.	Average.	Difference.	Price of paddy expressed as a proportion of that of rice.
Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Per cent.
1 7 0	1 11 0	1 11 0	1 9 0	1 6 0	1 8 0	1 4 0	} 0 11 0	64.5
2 2 0	2 8 0	2 6 0	2 6 0	2 1 0	1 15 0	1 15 0		
1 13 0	1 10 0	1 11 0	1 14 0	1 13 0	1 10 0	1 11 0	} 0 14 0	65.9
2 11 0	2 8 0	2 9 0	2 12 0	2 11 0	2 12 0	2 9 0		
1 10 0	1 12 0	1 12 0	1 10 0	1 10 0	1 11 0	1 10 0	} 0 13 0	66.7
2 7 0	2 9 0	2 8 0	2 6 0	2 8 0	2 11 0	2 7 0		
1 11 0	1 13 0	1 14 0	2 0 0	1 12 0	1 8 0	1 12 0	} 0 13 0	68.2
2 8 0	2 10 0	2 11 0	2 13 0	2 10 0	2 8 0	2 9 0		
1 12 0	1 13 0	1 15 0	1 15 0	1 10 0	1 7 0	1 11 0	} 0 12 0	69.2
2 9 0	2 9 0	2 8 0	2 9 0	2 6 0	2 3 0	2 7 0		
1 12 0	1 11 0	1 15 0	2 1 0	1 12 0	1 14 0	1 12 0	} 0 13 0	68.2
2 7 0	2 8 0	2 13 0	2 14 0	2 14 0	2 14 0	2 9 0		

## APPENDIX

*Comparison between the price of*

*Note.*—Except where otherwise stated prices are per standard maund of 82 2/7 lb. the values quoted up to May represent the April-May hedge contract and the

	Rice.			Paddy.	
	Calcutta Small Mills Specials.	Calcutta Patna Boiled.	Kumbako- nam (Mad- ras) Nellore Samba (coarse).	Calcutta Patnai.	Calcutta Mota.
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
Average August 1939 .. ..	3 1 9	3 15 3	3 0 9†	2 11 0	2 5 0
„ September 1939 .. ..	3 6 6	4 9 0	3 2 3	2 15 0*	2 8 0*
„ October 1939 .. ..	3 11 0	4 13 0	3 2 3	2 12 3	2 5 0
„ November 1939 .. ..	3 7 0	4 8 0	3 2 6	2 13 6	2 1 0
„ December 1939 .. ..	3 13 0	4 9 0	3 4 3	2 10 0	2 7 0
„ January 1940 .. ..	3 11 0	4 6 0	3 3 3	2 15 0	2 8 0
„ February 1940 .. ..	3 11 0	4 9 0	3 4 9	3 1 0	2 10 0
„ March 1940 .. ..	3 10 0	4 10 0	3 4 0	2 14 0	2 9 0
„ April 1940 .. ..	3 11 0	4 13 6	3 3 3	3 2 0	2 10 6
„ May 1940 .. ..	3 12 3	4 14 0	3 4 6	3 3 0	2 10 0
„ June 1940 .. ..	3 12 3	4 14 0	3 6 0	3 3 0	2 12 6
„ July 1940 .. ..	3 14 6	4 12 6	3 6 6	3 0 3	2 12 9
„ August 1940 .. ..	4 2 9	4 15 0	3 7 9	3 0 6	2 12 6
Difference between January 1940 and August 1939 quotations.	+18%	+11%	+5%	+9%	+8%
Difference between August 1940 and August 1939 quotations.	+34%	+25%	+14%	+13%	+20%

\* From September 1939, the figure shown in this column represents

† Represents average for the second half

‡ New

§ Normal.

## LI.

certain staple agricultural commodities.

All quotations are for ready or near delivery except in the case of cotton for which subsequent values the July-August contract.

		Wheat.		Gram.	Linseed.	Groundnut.	Jute.	Cotton.
Kumbakonam (Madras) Nellore Samba (Coarse).	Coconada (Madras) Punasa.	Lyallpur.	Hapur.	Calcutta Small Linseed.	Bombay Bold (per 112 lb.).	Calcutta Firsts (per bale of 400 lb.).	Bombay. F.G. M.G. (Broach per candy of 784 lb.).	
Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	
2 4 9†	2 5 6	2 2 6	2 15 6	5 0 3	6 5 0	37 14 6	155 12 0	
2 7 0‡	2 5 6	2 8 9	3 4 6	5 7 0	6 12 0	49 4 0	193 4 0	
2 7 6	2 7 6	2 9 9	3 7 0	5 12 0	6 12 0	51 8 9	196 12 0	
2 7 6	2 7 9	2 15 9	3 10 0	6 8 0	7 8 3	79 7 0	230 0 0	
2 7 6	2 8 9	3 9 0	4 2 3	8 1 6	8 1 3	96 8 0	305 12 0	
2 6 0	2 4 0‡	3 5 0	3 11 3	7 10 0	7 9 9	95 12 0	298 8 0	
2 1 3‡	2 7 3	3 4 0	3 9 3	7 0 0	7 4 3	82 13 0	266 4 0	
2 2 6	2 12 0	3 2 3	3 9 6	6 9 3	7 7 3	77 8 0	257 3 3	
2 4 3	2 12 6	3 2 3	3 3 3	6 15 9	7 10 0	66 7 3	245 5 3	
2 7 6	2 14 0	2 12 9	3 4 0	6 11 0	7 7 6	66 15 0	221 6 6	
2 8 6	2 13 9	2 8 3	3 0 6	5 9 3	6 7 3	55 12 0	170 4 0	
2 8 6	2 13 6	2 11 0	3 2 6	5 9 3	6 4 0	45 3 3	170 0 0	
2 9 3	2 15 3	2 12 3	3 3 0	5 8 0	5 7 3	39 4 0	179 3 3	
+ 3%	..	+54%	+25%	+52%	+21%	+153%	+92%	
+12%	+26%	+28%	+10%	-14%	+ 4%	+15%	+12%	

closing quotation for the last week of the respective month.  
of the month.  
crop.

## APPENDIX LII.

*Effect of harvesting practices on breakage of the rice kernel during hulling in the rice research station at Hmawbi, Burma.*

*Investigation into the causes of breakage in milling.—To determine the effect of different methods of drying paddy after harvest on breakage in milling, a test was carried out with five pure strains as shown in the following table.*

Strain No. (1)	Method of drying. (2)	Average out- turn of whole rice in hulling in percentage. (3)	Percentage of sun cracked grains. (4)
		Per cent.	Per cent.
A16-34 ..	7 days in shade .. ..	30.3	24.9
	14 days in shade .. ..	35.6	24.7
	21 days in shade .. ..	32.6	29.6
	28 days in shade .. ..	29.3	30.7
	7 days in sun .. ..	26.4	29.0
	14 days in sun .. ..	16.2	49.0
	21 days in sun .. ..	9.4	75.3
	28 days in sun .. ..	6.5	83.8
C19-26 ..	7 days in shade .. ..	25.4	34.6
	14 days in shade .. ..	23.3	35.0
	21 days in shade .. ..	23.0	34.7
	28 days in shade .. ..	19.3	37.8
	7 days in sun .. ..	8.9	63.4
	14 days in sun .. ..	8.7	69.8
	21 days in sun .. ..	7.3	76.0
	28 days in sun .. ..	5.6	84.3
C14-8 ..	7 days in shade .. ..	41.65	11.0
	14 days in shade .. ..	37.48	8.0
	21 days in shade .. ..	36.41	7.0
	28 days in shade .. ..	30.5	16.8
	7 days in sun .. ..	30.4	18.9
	14 days in sun .. ..	30.4	22.0
	21 days in sun .. ..	25.68	31.0
	28 days in sun .. ..	21.7	44.5



## APPENDIX LII—contd.

*Effect of harvesting practices on breakage of the rice kernel during hulling in the rice research station at Hmaubi, Burma—contd.*

Strain No. (1)	Method of drying. (2)	Average out- turn of whole rice in hulling in percentage. (3)	Percentage of sun cracked grains. (4)
		Per cent.	Per cent.
C15-10 ..	7 days in shade .. ..	40.7	12.3
	14 days in shade . . . .	40.6	10.4
	21 days in shade .. ..	40.2	10.0
	28 days in shade .. ..	38.4	18.1
	7 days in sun .. .. .	22.1	33.5
	14 days in sun .. .. .	17.6	56.0
	21 days in sun .. .. .	11.9	70.0
	28 days in sun .. .. .	11.9	74.0
D17-88 ..	7 days in shade .. ..	41.7	40.0
	14 days in shade .. ..	41.3	41.0
	21 days in shade .. ..	39.1	41.2
	28 days in shade .. ..	35.6	43.0
	7 days in sun .. .. .	29.0	60.0
	14 days in sun .. .. .	21.5	66.6
	21 days in sun .. .. .	20.6	67.3
	28 days in sun .. .. .	18.4	70.3

The samples were dried in sheaves immediately after reaping under shade and in the sun for different periods as shown above. The samples dried in the sun were exposed to the sun during the day, and at night they were exposed to heavy dew and mist which are common at that time of the year, while the samples dried in shade were protected by a light bamboo matting roof and closed on three sides, ample provision having been made for ventilation. The samples dried under shade had to be turned over two or three times to accelerate drying out of the straw.

All samples were threshed after drying and stored (in the laboratory) till the end of February when hulling tests were carried out, as this is about the time the milling of the main crop (of the Province) begins in Burma.

In all cases the paddy dried under shade gave the highest outturn of whole rice in hulling. With sun drying the breakage was increased greatly in all strains, and the breakage increased as the period of drying increased.

There was not much difference in the moisture contents of the different samples, and it appeared that this was not one of the main causes of the differences in hulling.

APPENDIX LII—*concl'd.*

The data, however, showed that there is a very close relationship between breakage in milling and sun cracking in the sample of grain. The term "sun cracking" is applied to the fine transverse cracking that can often be observed in the grain of husked rice.

Sun cracking was observed in the samples dried in shade as well as those dried in the sun, but in all cases the percentage of sun cracked grain was greater in the sun dried samples and it increased in varying degrees as the period of exposure to the sun and dew increased. Dr. Stahel who did some work on this subject in Dutch Guiana concluded, as a result of experiment, that sun cracking was not caused by exposure to the sun, but by exposure to dew and mist and to subsequent exposure and drying in the sun. He was also of opinion that sun cracking can take place in the field before harvest if the crop is over-ripe before it is reaped.

## APPENDIX LIII.

*Form of standard contract used in Calcutta for rice imported from Burma.*

## THE CALCUTTA RICE MERCHANTS' ASSOCIATION.

## Bought Note.

Contract No. \_\_\_\_\_

Calcutta, \_\_\_\_\_ 19 \_\_\_\_\_

Messrs. \_\_\_\_\_  
 \_\_\_\_\_

DEAR SIRS,

1. We have this day BOUGHT from you the undermentioned goods of the following description at the rates and on the terms hereinafter stated through Broker \_\_\_\_\_  
 \_\_\_\_\_

Tons or Bags \_\_\_\_\_

Rangoon \_\_\_\_\_ Mill \_\_\_\_\_

Straits average quality of the Season procurable at the time of milling at Rs \_\_\_\_\_

Rupees \_\_\_\_\_

\_\_\_\_\_ per \_\_\_\_\_ Bazar mds. net (Dhalta according to Bazar  
 Bags of 2 mds.

Dustoor) and empty gunny bags for packing the said rice at Rs. 25/- per 100 bags, and paddy including gunny bags.

2. Delivery and or Shipment } \_\_\_\_\_  
 \_\_\_\_\_

## 3. TERMS OF PAYMENT :—

- (a) Payment to be made at Sellers' Office within 4 days after receipt of the delivery notice, from the Seller against their delivery order or orders for the purpose of such payment each bag of rice shall be deemed to weigh two Bazar maunds and paddy 1 md. 39 srs.
- (b) In case of part payment 95 per cent of the bills value payment to be made on the nett weight of the goods.
- (c) Payments of the delivery notice served after 25th instant to be made on the due date.

4. No complaint as regards quality, weight or condition of  $\frac{\text{rice}}{\text{paddy}}$  will be admitted unless the same is made within 3 days after receipt of the delivery notice.

APPENDIX LIII—*contd.*

5. The goods to be weighed within 10 days after receipt of the delivery notice from the sellers failing which the buyers agree to pay according to Rangoon invoice weight.

(a) The seller agrees to give full weight of the contract goods if the delivery to be given at places except Port Commissioner's godown. If the delivery of the contract goods to be given from Port Commissioner's godown, the buyer agrees to take delivery of the goods according to weight system of the Port Commissioner.

6. Earnest money Ra. \_\_\_\_\_ Rupees \_\_\_\_\_  
to be paid by the buyers.

7. Delivery to be taken and given from K. P. Docks and or Kantapooker or Railway, Godowns, Jetties or from sellers' boats from any ghat in the river on either side within the limits of the Port of Calcutta at sellers' option and at the buyers' cost and expense. The usual canal fee to be paid by buyers. The buyers agree to remove the goods or to take delivery of or to discharge the said boats within 24 hours from the time of their arrival at the place of discharge, failing which, the buyers shall pay all demurrages, charges, losses etc.

8. It is hereby further agreed that should the goods not be cleared and removed within the time stipulated above the said goods shall be landed and warehoused on Buyers' account and risk and in such case Godown rent is to be charged at the rate charged by the Bengal Bonded Warehouse, and interest at the rate of twelve per cent per annum on the purchase money and all charges until delivery and payment are completed. If the goods be not cleared and removed within due time, sellers will have the option of re-selling the said goods at such time as may be convenient by public auction or private contract and it is hereby further agreed that in the event of such re-sale being made on buyers' account and risk, buyers shall have no claim whatsoever to any profit therefrom and shall also forfeit the earnest money aforesaid and shall besides be liable and responsible to satisfy and to make good any loss or deficiency and all costs, charges, damages and expenses which may arise from such re-sale in consequence of breach of the Contract.

9. Any dispute whatsoever arising on or out of this contract shall be referred to arbitration under the Rules of CALCUTTA RICE MERCHANTS' ASSOCIATION applicable for the time being for decision and such decision shall be binding on both parties to this contract. The award may at the instance of either party and without any notice to the either of them be made a Rule of High Court of Judicature at Fort William.

10. In the event of sea damage or total wreck or any other damage which would constitute claim on the underwriters it shall be optional to the sellers to deliver the goods to the buyers with an allowance or to sell them on the sellers' account and to claim on the underwriters under the policy if any and in such case the buyers shall have no claim or right to damages against the sellers for non-delivery or non-performance of the contract. Further in case of the goods being delayed by reason of war or the non-arrival in time of the steamer carrying the goods on account of the shallowness of waters at Diamond Harbour, damage to the steam engine, accident of sea and other causes not under human control, the buyers can on no account cancel the contract or have the right of claiming any allowance for the non-delivery or non-performance of the contract in due time.

11. The sellers have the option to make part tenders within the contract time.

12. Each month's delivery to be considered as a separate contract.

13. Brokerage is to be paid by sellers on actual deliveries.

14. In the event of any Duty of any kind being imposed, the same and any increase or decrease thereof and also any increase or decrease in the War Risk shall be on account of and shall be borne and paid by the Buyers.

\_\_\_\_\_  
\_\_\_\_\_

Broker.

\_\_\_\_\_  
\_\_\_\_\_

Buyers.

## APPENDIX LIV.

SUBJECT TO THE RULES OF THE LONDON RICE BROKERS' ASSOCIATION.

*Bengal Rice Contract—ex-ship.*

Copy

London,

.....for account of Messrs.....Calcutta-----per.....  
 Messrs.....London-----to Messrs.....London,  
 .....ONE HUNDRED.....tons, (five per  
 cent., more or less) nett shipping weight, in bags new singles (not inferior to 'C' gunnies)  
 .....WHITE SEETA.....Rice  
 as per sample marked "SUPEX" in the custody of the Selling Brokers, new crop.....  
 or such portion thereof as may arrive by the vessel or vessels (steam or motor), to be shipped at  
 CALCUTTA for LONDON direct or indirect, with or without transhipment, per vessel or vessels  
 (steam or motor) during the months of.....on the following conditions:—

1.—Shipment or shipments made to be declared by Sellers not later than twenty-one days after clearance of the vessel (steam or motor) at Loading Port, subject to confirmation by mail.

2.—The price to be.....with customary draft of 1 lb. per bag ..... per cwt., nett delivered weight ex-ship.

3.—Payment to be made for amount of provisional invoice made out at shipping weight less five per cent. (Section a) By Cash in London against documents on arrival of vessel at LONDON. (Section b) By sellers' or their assignees' drafts with documents attached at.....sight on ..... or other approved London Bank or Bankers under a confirmed irrevocable credit to be handed to Sellers without delay but said drafts to be always for Buyers' account and risk.

The documents to be given up in exchange for Cash (Section a) or in exchange for the drafts duly accepted (Section b) are to consist of on board Bills of Lading or Delivery Order (and/or Freight Release authorising delivery if Sellers pay freight) and recognised Policies and/or Certificates and/or Letters of Insurance covering risk from shore to shore including all lighterage (discharge on the quay for the convenience of the vessel not to count as landing) and War Risk for full shipping invoice amount including freight, duly in order. The Policies are to be for the benefit of Sellers and are to be returned to them on final settlement of invoice. The balance of final invoice to be paid by Cash in London within 7 days of receipt of same.

Certificate of Origin to be furnished by Sellers where required.

4.—Sellers to deliver the Rice overside, including Loose Rice and Allotted Sweepings in bags paying all charges incurred for filling and repairing of same. Buyers to take the Rice in accordance with conditions of Charter Party or Bill of Lading from ship's side, paying all expenses therefrom, weighing and sampling included and Import Duties and Taxes levied at Port of Discharge and Port Dues (if incurred). The Sellers may appoint an Agent to look after the weighing, discharging and sampling of the Rice.

5.—If delivered on the Continent, the weight to be reduced at the rate of 1,016 Kilogrammes to the ton of 2,240 lbs. English. The turn of the scale to be ascertained by the half kilogramme.

6.—The Rice is not to be rejected on account of inferior quality, but Buyers are to be entitled to an allowance on the Contract price should the sound portion turn out inferior to the above guarantee, such allowance to be settled, if necessary, by Arbitration as provided for in clause No. 8. Any inferiority in colour exceeding 1½d. per cwt. to be for Sellers' account.

APPENDIX LIV—*contd.*

Any Loose Rice, Sweepings, sea or ship damage to be taken at the customary allowances in operation at the Port of Discharge.....

Samples for arbitration purposes sealed conjointly by Sellers and Buyers representatives to be forwarded by Buyers to the selling Brokers in London within seven days of final discharge.

7.—Where payment is to be made in accordance with Clause 3, Section (a), Contract to be void for such portion of the goods shipped under this Contract as may fail to arrive at Port of Discharge through loss of vessel or other unavoidable cause.

8.—Any dispute arising on this Contract shall be referred for settlement to the Arbitration of two Members of this Association or their Umpire, being also a Member of this Association. Each party to appoint one Arbitrator and having the right of rejecting one nominee (the term Member to include Associate Member). In the event of any party omitting to nominate an Arbitrator within ten days of receipt of notice of appointment of an Arbitrator by the other party or of the Arbitrators failing to agree on the appointment of an Umpire, the Committee of the London Rice Brokers' Association, in either case, shall have power to appoint one forthwith, who shall act on behalf of (and as if nominated by the party or parties in default. Arbitration on quality shall be claimed and the Claimant's Arbitrator shall be nominated within 7 days of receipt in London by the Selling Broker of the Arbitration sample or samples and held without delay. Claims for Arbitration other than Arbitration on quality shall be made and the Claimant's Arbitrator shall be nominated without undue delay. No claims can be entertained unless made and Arbitrator nominated within six months after the arrival of the vessel or within six months of the date of any breach or default complained of, whichever is the later date. The Buyers and Sellers shall have the right of appealing against any Award (except on questions of law, as per Rule XX.) within five clear working days, to the London Rice Brokers' Association whose decision shall be final. Any payments arising out of the Award are to be made within one week of the date thereof.

9.—Should this Rice have been previously sold on similar conditions to the above, the parties to this Contract to be bound by any award made under the first Contract.

10.—Should the Shipment of the Rice sold under this Contract be prevented by reason of Strikes, Riots or Lock-outs at Port of Shipment or on any Railways feeding such Port, Shippers shall be entitled at the termination of such Riot, Strike or Lock-out, to an extension of time for shipment of as much time as was left for shipment prior to the outbreak of such Riot, Strike or Lock-out.

In case of non-fulfilment under the above conditions, recourse to be had to Arbitration immediately to decide the allowance to be made for such non-fulfilment or default.

Shippers shall give notice by cable as soon as possible after the period of suspension commences and on the conclusion of same and also shall further give notice by cable within two days after the last day for shipment if they claim an extension of time for shipment.

Sellers to furnish a Certificate of the Chamber of Commerce attesting to any such Strike, etc.

This contract is to be void if Shipment or Delivery be prevented by Embargo, Hostilities, Prohibition of Export or Blockade.

(1) Any expense for covering War Risk Insurance exceeding one half of one per cent. to be for account of Buyers. Rate of Insurance to be approximately that ruling in London.

*Brokers.*

(2) Notwithstanding anything herein to the contrary, the Insurance covering War Risk is to be provided only if such risk is insurable in accordance with the Rules and Regulations of the Marine Underwriters, Members of Lloyd's Underwriters' Association and/or of the Institute of London Underwriters, and shall in any case be limited to their terms and conditions in force and obtainable at time of shipment.

Brokerage.—ONE AND ONE-HALF percent to.....

*Brokers.*

## APPENDIX LV.

## AGRICULTURAL PRODUCE (GRADING AND MARKING) ACT, 1937.

## Act No. I of 1937.

*An Act to provide for the grading and marking of agricultural produce.*

**W**HEREAS it is expedient to provide for the grading and marking of agricultural produce; It is hereby enacted as follows:—

1. (1) This Act may be called the Agricultural Produce (Grading and Marking) Act, 1937. Short title and extent.

(2) It extends to the whole of British India, including British Baluchistan and the Sonthal Parganas but excluding Burma.

2. In this Act, unless the contrary appears from the subject or context,— Explanations.

- (a) "agricultural produce" includes all produce of agriculture or horticulture and all articles of food or drink wholly or partly manufactured from any such produce, and fleeces and the skins of animals;
- (b) "counterfeit" has the meaning assigned to that word by section 28 of the Indian Penal Code; XLV of 1860.
- (c) "covering" includes any vessel, box, crate, wrapper, tray or other container;
- (d) "grade designation" means a designation prescribed as indicative of the quality of any scheduled article;
- (e) "grade designation mark" means a mark prescribed as representing a particular grade designation;
- (f) "quality", in relation to any article, includes the state and condition of the article;
- (g) "prescribed" means prescribed by rules made under this Act;
- (h) "scheduled article" means an article included in the Schedule; and
- (i) an article is said to be marked with a grade designation mark, if the article itself is marked with a grade designation mark or any covering containing or label attached to such article is so marked.

3. The Central Government may, after previous publication by notification in the Official Gazette, make rules— Prescription of grade designations.

- (a) fixing grade designations to indicate the quality of any scheduled article;
- (b) defining the quality indicated by every grade designation;
- (c) specifying grade designation marks to represent particular grade designations;
- (d) authorising a person or a body of persons, subject to any prescribed conditions, to mark with a grade designation mark any article in respect of which such mark has been prescribed or any covering containing or label attached to any such article;

## APPENDIX LV—contd.

- (e) specifying the conditions referred to in clause (d) including in respect of any article conditions as to the manner of marking, the manner in which the article shall be packed, the type of covering to be used, and the quantity by weight, number or otherwise to be included in each covering ;
- (f) providing for the payment of any expenses incurred in connection with the manufacture or use of any implement necessary for the reproduction of a grade designation mark or with the manufacture or use of any covering or label marked with a grade designation mark ; and
- (g) providing for the confiscation and disposal of produce marked otherwise than in accordance with the prescribed conditions with a grade designation mark.

Penalty for unauthorised marking with grade designation mark.

4. Whoever marks any scheduled article with a grade designation mark, not being authorised to do so by rule made under section 3, shall be punishable with fine which may extend to five hundred rupees.

Penalty for counterfeiting grade designation mark.

5. Whoever counterfeits any grade designation mark or has in his possession any die, plate or other instrument for the purpose of counterfeiting a grade designation mark shall be punishable with imprisonment which may extend to two years, or with fine, or with both.

Extension of application of Act.

6. The Central Government, after such consultation as it thinks fit of the interests likely to be affected, may by notification in the Official Gazette declare that the provisions of this Act shall apply to an article of agricultural produce not included in the Schedule, and on the publication of such notification such article shall be deemed to be included in the Schedule.

## THE SCHEDULE.

(See section 2.)

1. Fruit.
2. Vegetables.
3. Eggs.
4. Dairy produce.
5. Tobacco.
6. Coffee.
7. Hides and Skins.
8. Fruit products.
9. *Ata*.
10. Oilseeds.
11. Vegetable oils (including hydrogenated oils and vegetable fats).
12. Cotton.
13. Rice.
14. Lac.

Authority :—Govt. of India, Deptt. of Education, Health and Lands Notification No. F. 57-3/39-A., dated the 23rd March 1939.

Authority :—Govt. of India, Deptt. of Education, Health and Lands Notification No. F. 57-18/39-A., dated 10th October 1939.



## APPENDIX LV—contd.

**Agricultural Produce (Grading and Marking) (GENERAL) Rules.**

1. These rules may be called the Agricultural Produce (Grading and Marking) (General) Rules, 1937.

2. Any person or body of persons desirous of being authorised to mark any article with a grade designation mark shall apply to the—

Agricultural Marketing Adviser  
to the Government of India,  
Old Secretariat Buildings, Delhi.

3. (1) If after due enquiry the Agricultural Marketing Adviser is satisfied that it is expedient in the interests of better marketing that the authorisation be granted and that the applicant is a fit and proper person to receive a Certificate of Authorisation, he shall issue such a certificate to the applicant.

(2) Each certificate shall state—

- (a) the name and address of the authorised person or body of persons ;
- (b) the articles to which grade designation marks may, under the certificate, be applied ;
- (c) the period for which the certificate is valid ; and
- (d) the premises at which alone the grade designation marks may be applied.

4. It shall be a condition of every certificate of authorisation—

- (a) that grade designation marks shall only be applied to the articles mentioned in the certificate of authorisation and at the premises therein mentioned ;
- (b) that during the operation of the certificate the holder thereof shall, at all reasonable times, give access to the premises named therein to any person duly authorised by the Agricultural Marketing Adviser or by the Central Government and shall afford him facilities for ascertaining that marking is being correctly performed ;
- (c) that the holder of the certificate will keep a record of the number of packages marked with each grade designation mark and will permit any person duly authorised by the Agricultural Marketing Adviser or by the Central Government to examine the record ;
- (d) that the holder of the certificate will permit any duly authorised person to take samples of any graded produce or to open and inspect any package bearing a grade designation mark, provided that all samples shall be paid for ;
- (e) that any person authorised in this behalf by the Agricultural Marketing Adviser or by the Central Government may cancel or remove a grade designation mark from any produce which is the property of the holder of the certificate in the possession of the holder of the certificate or of his agent, should such produce be found by such person not to comply with the definition of quality prescribed for that article ;
- (f) that all rules made under the Agricultural Produce (Grading and Marking) Act shall be observed ;
- (g) that any certificate of authorisation may be cancelled, revoked, modified or suspended by the Agricultural Marketing Adviser or by any other person authorised by the Central Government in that behalf, provided that 14 days' notice in writing shall be given to the certificate holder at the address stated on the certificate and an opportunity given him for showing cause why his certificate should not be cancelled, revoked, modified or suspended ;

APPENDIX LV—*concl'd.*

- (h) that any holder of a certificate of authorisation may, with the written consent of the Agricultural Marketing Adviser, use a replica of the AGMARK design on his business papers and catalogues ; and
- (i) that any stencil, rubber stamp, punch or other instrument or label required for marking produce in the prescribed manner shall only be obtained from the Agricultural Marketing Adviser or a person authorised by him on payment of such charges as the Central Government may from time to time fix in this behalf, shall be kept in safe custody by the holder of the certificate and shall, so far as may be, be returned to the Agricultural Marketing Adviser or such authorised person when the certificate ceases to be valid.
-

## APPENDIX LVI

## Rice Bought Note.

No. \_\_\_\_\_ Rangoon, \_\_\_\_\_ 19 .

1.  $\frac{I}{We}$  have this day bought through \_\_\_\_\_ Broker

From Messrs. \_\_\_\_\_

the undernoted rice of the description and on the terms and conditions as follows:—

2. \_\_\_\_\_ bags each weighing net 225|163 lb. at  
Rs. \_\_\_\_\_ per 100 baskets of \_\_\_\_\_ lb each.

3. *Description and quality of rice.*—Ngatsain and/or Ngatkyouk, at seller's option \_\_\_\_\_ Quality Cleaned rice. The grain to be fair average of the quality procurable at the time of milling.

4. Gunnies and twine to be supplied by  $\frac{buyer}{buyers}$  or if seller's gunnies are used, owing to late arrival at mill of  $\frac{buyer's}{buyers'}$  gunnies or other causes. Rs. 75 per 100 gunnies and if sellers' twine is used Rs. 2 per 100 bags of the same will be charged.

5. Bagging, sewing and shipping at Rs. 8-4-0 per 100 bags.

6. Landing and receiving gunnies at Mill at Rs. 1-8-0 per 1,000 bags.

7. The rice is to be milled by day and/or night at sellers' option.

8. Delivery to be taken *ex-hopper* \_\_\_\_\_

date all sellers' option and payment to be made in cash before any rice is removed, but not in any case later than immediately after milling. Payment in cash on completing of the milling of each 1,000 bags if required.

9. If the market price of the above-mentioned rice declines prior to milling sellers shall have the right of requiring  $\frac{buyer's}{buyers'}$  to deposit with sellers the margin between contract price of the day on which such milling notice is issued for the rice deliverable under this contract. Failing the deposit of such margin as stated prior to time fixed for commencement of milling sellers shall have the right of cancelling this contract and of claiming on  $\frac{buyer}{buyers}$  for any difference between sale price and market price of the day on which milling notice is issued for rice deliverable under this contract.

10. Sellers have the right of disposing of any rice milled against this contract by private or public sale on  $\frac{buyer's}{buyers'}$  account should  $\frac{he}{they}$  fail to pay for it within 24 hours of presentation of the bill. Where gunnies have been sent by the original buyer, sellers shall have the right of appropriating the proceeds of the gunnies and twine towards any loss sustained on the resale.

11. All risk of fire, damage by rats, and other contingencies to be borne by  $\frac{buyer}{buyers}$  from the time the rice is milled.

12. Godown rent at the rate of Rs. 5 per 100 bags per week will be charged to  $\frac{buyer}{buyers}$  on giving  $\frac{him}{them}$  written notice to that effect should  $\frac{he}{they}$  fail to remove the rice on or before 15 days after milling.

APPENDIX LVI—*contd.*

13. Buyer  
Buyers cannot claim the right of leaving the rice in sellers' godown after the 15 days allowed for removal have elapsed.

14. On expiry of the 15 days sellers have the right of removing the rice to other than Mill Godowns at risk and expense of buyer  
buyers after 24 hours' notice has been given.

15. Seller to have a lien on the rice and  
or gunnies and  
or the twine used in packing the rice, until the rice has been paid for as above and until all godown rent and other charges are paid.

16. Accidents to machinery, strikes or sickness of mill hands or coolies, always excepted.

17. No claim whatever to be made by buyer  
buyers after delivery of the rice has been taken *ex-hopper*.

18. In the event of buyer  
buyers rejecting the rice on account of quality the matter shall be referred to the arbitration of two members of the Rangoon Rice Brokers' Association, one nominated by the sellers and the other by the buyer  
buyers each party to have the right of rejecting one nominee or if the arbitrators disagree, to an Umpire to be nominated by the President of the Rangoon Rice Brokers' Association from his Committee and the decision of arbitrators or Umpire shall be final and binding. Should either buyer  
buyers or seller omit to nominate an arbitrator within 48 hours of the rejection, the President of the Rangoon Rice Brokers' Association shall have the power to appoint an arbitrator on behalf of the party in default. All expenses of such arbitration to be borne by the losing party, and this clause shall be deemed to be submission to arbitration within the meaning of the Indian Arbitration Act (IX of 1899).

19. The milling notice under this contract shall be tenderable to buyer  
buyers between 1-30 P.M. and 2 P.M. at the office of the Burma Rice Merchants' Association at which time and place representatives both of the buyer  
buyers and of the sellers shall be present on all working days except Saturdays, on which days the time will be 11-30 A.M. to 12 NOON.

20. Should buyer  
buyers fail to be represented at the time and place stated in clause 19 to receive the milling notice from the sellers, it shall be lodged with the Secretary of the Association who shall forward it to buyer  
buyers at his|their office and such milling notice shall be legal tender for the purpose of this contract.

21. Any increase or decrease by the mills in the rates of charges mentioned in clauses 4, 5, 6 and 12 above, shall be on buyer's  
buyers' account.

22. This contract shall be subject to the Rules and Bye-laws of the Burma Rice Merchants' Association for the time being in force and not inconsistent with any of the above clauses.

23. Brokerage at  $\frac{1}{2}$  per cent is due to buyer  
buyers on the signing of this contract.

Broker, by the

## APPENDIX LVII

## Rice Bought Note

No. \_\_\_\_\_

Rangoon, \_\_\_\_\_ 19 .

1. We have this day bought from the undernoted rice of the description and on terms and conditions as follows :—

2. \_\_\_\_\_ bags each weighing net \_\_\_\_\_ lb. at  
Rs. \_\_\_\_\_ per 100 baskets of \_\_\_\_\_ lb. each

Ngatsain and Ngatkyouk, at sellers' option,

3. Description and quality of rice.

Straits Quality Cleaned rice. The grain to be fair average of the Quality procurable at time of milling.

4. Gunnies and twine to be supplied by  $\frac{\text{buyer}}{\text{buyers}}$  or if sellers' gunnies are used, owing to late arrival at mill of  $\frac{\text{buyer's}}{\text{buyers'}}$  gunnies, or other cause Rs. 7½ per 100 gunnies and if sellers' twine is used Rs. 2 per 100 bags for the same will be charged.

5. Bagging, sewing and shipping at Rs. \_\_\_\_\_ per 100 bags excluding twine.

6. Landing and receiving gunnies at mill at Rs. 1-8-0 per 1,000 bags.

7. The rice is to be milled by day  $\frac{\text{and}}{\text{or}}$  night at sellers' option.

8. Delivery to be taken ex-hopper \_\_\_\_\_  
Date at sellers' option and payment to be made in cash, before any rice is removed, but not in any case later than immediately after milling. Payment in cash on completion of the milling of each 1,000 bags, if required.

9. If the market price of the above-mentioned rice declines prior to milling, sellers shall have the right of requiring  $\frac{\text{buyer}}{\text{buyers}}$  to deposit with sellers the margin between contract price and market price of the day, on which such milling notice is issued, for the rice deliverable under this contract. Failing the deposit of such margin as stated prior to time fixed for commencement of milling sellers shall have the right of cancelling this contract and of claiming on buyers, for any differences between sale price and market-price of the day, on which milling notice is issued, for rice deliverable under this contract.

10. Sellers have the right of disposing of any rice milled against this contract, by private or public sale on  $\frac{\text{buyer's}}{\text{buyers'}}$  account should  $\frac{\text{he}}{\text{they}}$  fail to pay for it within 24 hours of presentation of bill. Where gunnies have been sent by the original buyers, sellers shall have the right of appropriating the proceeds of the gunnies and twine towards loss sustained on the resale.

11. All risk of fire, damage by rats, and other contingencies to be borne by  $\frac{\text{buyer}}{\text{buyers}}$  from the time the rice is milled.

APPENDIX LVII—*contd.*

12. Godown rent at the rate of Rs. 5 per 100 bags per week will be charged to buyer should he fail to remove the rice on or before 15 days, after milling. buyers they

13. Buyer cannot claim the right of leaving the rice in sellers' godown after the 15 days allowed for removal have elapsed. Buyers

14. On expiry of the 15 days, sellers have the right of removing the rice, to other than mill godowns at risk and expense of buyer after 24 hours' notice buyers have been given.

15. Sellers to have the lien on the rice and or gunnies and or twine used for packing the rice, until the rice has been paid for as above, and until all godown rent and other charges are paid.

16. Accidents to machinery, strikes or sickness of mill hands or coolies, always excepted.

17. No claim whatever to be made by buyer after delivery of the rice buyers has been taken *ex-hopper*.

18. In the event of buyer rejecting the rice on account of quality the buyers matter shall be referred to the arbitration of two members of the Rangoon Rice Brokers' Association, one nominated by the sellers and the other by the buyer buyers each party to have the right of rejecting one nominee or if the arbitrators disagree, to an Umpire to be nominated by the President of the Rangoon Rice Brokers' Association from his Committee and the decision of buyer arbitrator or Umpire shall be final and binding. Should either buyers or sellers omit to nominate an arbitrator within 48 hours of the rejection, the President of the Rangoon Rice Brokers' Association shall have the power to appoint an arbitrator on behalf of the party in default. All expenses of such arbitration to be borne by the losing party, and this clause shall be deemed to be submission to arbitration within the meaning of the Indian Arbitration Act (Act IX of 1899).

19. Sellers to have the right of delivering under the contract the milling of Messrs. Bulloch Bros. & Co., Ltd., and or Steel Bros. & Co., Ltd., and or The Burma Co., Ltd., and or Ellerman's Arracan Rice and Trading Co., Ltd., and or The Anglo-Burma Rice Co., Ltd., and or Joseph Heap & Sons, Ltd.

20. In the event of Special Quality Straits Rice being sold under this contract, sellers have the option of delivering the milling of Messrs. Bulloch Bros. & Co., Ltd.'s Elephant Head and or The Anglo-Burma Rice Co., Ltd.'s Pagoda, and or Steel Bros. & Co., Ltd.'s Stork and or Ellerman's Arracan Rice and Trading Co., Ltd.'s Bull and or The Burma Co., Ltd.'s Royal Barge and or Joseph Heap and Sons, Ltd.'s Peacock.

Broker Messrs. \_\_\_\_\_

585.

APPENDIX LVIII.

\_\_\_\_\_ & Co., LTD.

No. \_\_\_\_\_

Rangoon, \_\_\_\_\_ 19 .

*Milling Notice.*

Messrs. \_\_\_\_\_

Sale Note No. W. \_\_\_\_\_

Dear Sirs,

This is to give you notice that we intend to commence milling for you at our \_\_\_\_\_ Mill, on the \_\_\_\_\_ at \_\_\_\_\_ against above sale.

Please arrange that gunnies and twine are at our mill in good time and that you have a representative there to pass the rice during milling.

If gunnies are not sent to our mill we will charge 75 per cent.

This notice must be presented at our mill by the person appointed by you to pass the rice.

Yours faithfully,

APPENDIX LIX.

*Number, location and estimated outturn of rice mills in the Madras Presidency.*

District.	Number of mills in			Driven by					Estimated total quantity of rice milled.	Average output per mill per year.	Average production of rice in each district.
	Villages.	Towns.	Total.	Oil engines.	Steam engines.	Electricity.	Steam and oil engines.	Unclassified.			
									(Thousand tons).	(Thousand tons).	(Thousand tons).
Ganjam ..	30	10	40	22	16	..	2	..	78	1.98	327
Vizagapatam ..	51	112	163	151	12	..	..	..	167	1.04	341
East Godavari ..	91	11	102	96	6	..	..	..	222	2.22	308
West Godavari ..	117	88	205	171	34	..	..	..	335	1.66	355
Kistna ..	90	49	139	86	49	..	4	..	325	2.38	266
Guntur ..	75	41	116	69	41	..	6	..	166	1.45	182
Nellore ..	72	33	105	67	36	..	..	2	125	1.21	168
Bellary ..	2	18	20	16	..	4	..	..	9	0.45	14
Anantapur ..	5	9	14	2	12	..	..	..	2	0.14	37



Cuddapah ..	8	5	13	6	7	..	..	..	5	0.38	42
Kurnool ..	..	3	3	2	1	..	..	..	3	1.00	23
Madras ..	..	10	10	10	..	..	..	..	8	0.80	..
Chittoor ..	54	36	90	61	28	..	..	1	39	0.43	89
Chingleput ..	202	51	253	241	8	1	..	3	215	0.87	262
North Arcot ..	206	95	301	297	3	..	..	1	162	0.54	224
South Arcot ..	192	56	248	231	2	1	12	2	146	0.60	271
Tanjore ..	601	132	733	687	32	12	2	..	275	0.38	500
Trichinopoly ..	150	82	232	185	..	46	..	1	137	0.60	122
Madura ..	137	86	223	209	9	5	..	..	101	0.40	164
Ramnad ..	73	62	135	134	1	..	..	..	51	0.30	136
Tinnevely ..	50	48	98	96	1	1	..	..	43	0.44	192
Salem ..	82	62	144	133	9	2	..	..	70	0.40	52
Coimbatore ..	44	102	146	95	..	51	..	..	168	1.19	52
Malabar ..	22	6	28	25	2	..	..	..	27	0.96	213
South Kanara ..	8	..	8	8	..	..	..	..	4	0.50	224
Nilgiris ..	..	..	..	..	..	..	..	..	..	..	9
<b>Total ..</b>	<b>2,362</b>	<b>1,207</b>	<b>3,569</b>	<b>3,100</b>	<b>310</b>	<b>123</b>	<b>26</b>	<b>10</b>	<b>2,883</b>	<b>0.81</b>	<b>4,673</b>

APPENDIX LX.

Percentage outturns from Nagasin/N gachauk paddy.

Milling outturns.—			
Rice	.. ..	71.61	New crop, 18th February 1935.
	.. ..	71.33	Dry season, 17th April 1935.
	.. ..	71.44	Wet season, 4th September 1935.
	.. ..	70.78	Old crop, 18th November 1935.
Milling outturns.—	.. ..	62.84	New crop, 6th February 1935.
	.. ..	61.19	Dry season, 10th April 1935.
	.. ..	62.45	Wet season, 18th July 1935.
	.. ..	64.36	Old crop, 27th November 1935.
Milling outturns.—	.. ..	54.07	New crop, 5th February 1935.
	.. ..	47.61	Dry season, 3rd April 1935.
	.. ..	47.41	Wet season, 10th July 1935.
	.. ..	48.57	Old crop, 19th November 1935.
Milling outturns.—	.. ..	42.04	New crop, 15th January 1935.
	.. ..	39.37	Dry season, 3rd April 1935.
	.. ..	40.22	Wet season, 22nd August 1935.
Milling outturns.—	.. ..	28.20	New crop, 12th February 1935.
	.. ..	1.16	
Milling outturns.—	.. ..	10.74	
	.. ..	11.60	

Broken rice.	A2	..	..	..	..	..	..	..	..	4.22	4.21	3.87	5.74	4.30	4.08	5.78	4.00	
	A3	..	..	..	..	..	..	..	..	1.34	3.61	1.87	2.02	1.60	4.04	0.84	1.90	
	No. 2	..	..	..	..	0.10	0.88	0.85	..	..	..	..	..	..	..	..	..	
	No. 3	..	..	..	..	2.76	2.93	1.84	2.41	..	..	..	..	..	..	..	..	
	No. 4	..	0.50	0.41	0.68	1.17	1.44	0.74	0.38	0.47	..	..	..	..	..	..	..	
	E4	..	..	..	..	..	..	..	..	..	1.94	0.79	1.20	1.58	1.87	0.99	0.91	2.21
	J5	..	..	..	..	..	..	..	..	..	0.06	0.21	0.19	1.58	0.08	0.30	0.37	0.12
	L5	..	..	..	..	0.19	0.13	0.33	0.86	..	..	..	..	..	..	..	..	..
	N6	..	..	..	..	..	..	..	..	..	1.25	1.14	1.96	1.58	1.26	0.66	0.41	2.46
	O6	..	..	..	..	0.78	1.37	{ 0.26 0.21	0.94	..	..	..	..	..	..	..	..	..
Total		..	0.50	0.41	0.68	1.17	5.27	6.05	3.87	4.68	11.37	16.99	17.53	16.89	21.66	24.75	22.39	34.19
Cargo rice		..	..	..	..	0.59	0.58	0.59	0.19	0.83	0.89	0.67	0.30	0.47	1.20	2.01	0.90	
Bran		..	2.45	2.82	2.46	2.62	5.63	6.31	7.23	4.91	7.87	8.64	8.52	8.41	9.96	8.82	9.50	10.85
Total saleable products		..	74.56	74.56	74.58	74.57	74.13	74.13	74.14	74.14	74.14	74.13	74.13	74.17	74.13	74.14	74.12	74.14

## Approximate disposal of the marketable surplus of the

(Paddy tonnage is expressed

(In thousand

Handled by.	Assam.		Bengal.		Bihar and Orissa.		United Provinces.		Punjab.	
	Quantity.	Per cent.	Quantity.	Per cent.	Quantity.	Per cent.	Quantity.	Per cent.	Quantity.	Per cent.
<b>Paddy—</b>										
Growers .. .. .	3	3	310	8	53.5	4	64	9	68	35
Landlords .. .. .	..	..	..	..	40	3	14	2	..	..
Village merchants .. .. .	10	10	194	5	121	9	92	13	39	20
Cultivators collecting produce of others .. .. .	..	..	..	..	..	..	28	4	..	..
Itinerant merchants .. .. .	20	20	387.7	10	107	8	64	9	77	40
Wholesale merchants .. .. .	22	22	542.8	14	53.5	4	3.5	0.5	4	2
Rice mills .. .. .	5	5	302	7.8	134	10	3.5	0.5	..	..
Co-operative societies .. .. .	..	..	8	0.2	Neg.	..	Neg.	..	2	1
<b>Total</b>	<b>60</b>	<b>60</b>	<b>1,744.5</b>	<b>45</b>	<b>509</b>	<b>38</b>	<b>269</b>	<b>38</b>	<b>190</b>	<b>98</b>
Direct distribution in villages and periodical markets .. .. .	2	2	194	5	27	2	114	16	4	2
<b>Total paddy</b> .. .. .	<b>62</b>	<b>62</b>	<b>1,938.5</b>	<b>50</b>	<b>536</b>	<b>40</b>	<b>383</b>	<b>54</b>	<b>194</b>	<b>100</b>
<b>Rice—</b>										
Growers—										
(a) Hand-pounded rice .. .. .	10	10	349	9	67	5	57	8	..	..
(b) Milled rice .. .. .	..	..	..	..	..	..	..	..	..	..
Landlords—										
(a) Hand-pounded rice .. .. .	..	..	..	..	40	3	7	1	..	..
(b) Milled rice .. .. .	..	..	..	..	..	..	..	..	..	..
Village merchants—										
(a) Hand-pounded rice .. .. .	..	..	291	7.5	241	18	50	7	..	..
(b) Milled rice .. .. .	..	..	..	..	..	..	..	..	..	..
Cultivators collecting produce of others—										
(a) Hand-pounded rice .. .. .	12	12	..	..	..	..	21	3	..	..
(b) Milled rice .. .. .	..	..	..	..	..	..	..	..	..	..
Itinerant merchants—										
(a) Hand-pounded rice .. .. .	..	..	445.8	11.5	241	18	21	3	..	..
(b) Milled rice .. .. .	..	..	..	..	..	..	..	..	..	..
Professional dehuskers—										
Hand-pounded rice .. .. .	6	6	194	5	53.5	4	92	13	..	..
Wholesale merchants—										
Hand-pounded rice .. .. .	..	..	387.7	10	53.5	4	21	3	..	..
<b>Total</b>	<b>28</b>	<b>28</b>	<b>1,667.5</b>	<b>43</b>	<b>696</b>	<b>52</b>	<b>269</b>	<b>38</b>	<b>..</b>	<b>..</b>
Direct distribution in villages and periodical markets—										
Hand-pounded rice .. .. .	10	10	271	7	107	8	57	8	..	..
<b>Total rice</b> .. .. .	<b>38</b>	<b>38</b>	<b>1,938.5</b>	<b>50</b>	<b>803</b>	<b>60</b>	<b>326</b>	<b>46</b>	<b>..</b>	<b>..</b>
<b>Composition—</b>										
(a) Hand-pounded rice .. .. .	38	38	1,938.5	50	803	60	326	46	..	..
(b) Milled rice .. .. .	..	..	..	..	..	..	..	..	..	..
<b>Grand total. (Marketable surplus)</b> .. .. .	<b>100</b>	<b>100</b>	<b>3,877</b>	<b>100</b>	<b>1,339</b>	<b>100</b>	<b>709</b>	<b>100</b>	<b>194</b>	<b>100</b>

\*Roughly half this quantity is disposed of by growers

†Roughly one-third of this quantity is disposed of by growers themselves, another

## DIX LXL

India rice crop by various agencies.

in terms of rice.)

tons).

Sind.		Bombay.		Central Provinces.		Madras.		Hyderabad.		Myasore.		Travancore.		Total.		Total India.
Quantity.	Per cent.	Quantity.	Per cent.	Quantity.	Per cent.	Quantity.	Per cent.	Quantity.	Per cent.	Quantity.	Per cent.	Quantity.	Per cent.	Quantity.	Per cent.	
14	5	23	8	46	8	126	4	25	13	..	..	1	3	733.5	6.8	782
41	15	11	4	40	7	471	15	6	3	2.5	2	4	13	629.5	5.8	667
32	8	42	15	..	..	252	8	82	42	5	4	..	..	859.0	7.9	909
..	..	..	..	11	2	94	3	4	2	..	..	..	..	137.0	1.3	150
..	..	..	..	40	7	173	5.5	..	..	8	6	1	3	877.7	8.1	931
110	40	11	4	11	2	755	24	6	3	19	15	..	..	1,537.8	14.1	1,621
83	30	127	44.9	11	2	629	20	24	12	75	60	19	62	1,412.5	13.1	1,497
..	..	1	0.1	..	..	3	0.1	..	..	2.5	2	..	..	16.5	0.1	20
270	98	215	76	159	28	2,503	79.6	147	75	112	89	25	81	6,203.5	57.2	6,577
6	2	..	..	..	..	63	2	..	..	..	..	..	..	410	3.8	*437
276	100	215	76	159	28	2,566	81.6	147	75	112	89	25	81	6,613.5	61.0	7,014
..	..	..	..	23	4	31.5	1	..	..	2.5	2	..	..	540	5.0	575
..	..	..	..	85	15	94	3	9	4.5	..	..	..	..	188	1.8	207
..	..	..	..	..	..	21.5	1	..	..	..	..	..	..	78.5	0.7	81
..	..	23	8	11	2	..	..	2	1	..	..	..	..	36	0.3	34
..	..	..	..	23	4	31.5	1	..	..	4	3	..	..	640.5	5.9	678
..	..	11	4	113	20	..	..	27	14	..	..	4	13	155	1.4	161
..	..	..	..	..	..	31.5	1	..	..	..	..	..	..	64.5	0.6	69
..	..	..	..	17	3	..	..	1	0.5	..	..	..	..	18	0.2	23
..	..	..	..	23	4	..	..	..	..	2.5	2	..	..	733.3	6.8	782
..	..	..	..	56.5	10	..	..	..	..	..	..	..	..	56.5	0.5	58
..	..	..	..	..	..	13	0.4	..	..	..	..	1	3	359.5	3.3	380
..	..	..	..	..	..	94	3	..	..	..	..	..	..	556.2	5.1	586
..	..	34	12	351.5	62	327	10.4	39	20	9	7	5	16	3,426	31.6	3,634
..	..	34	12	56.5	10	252	8	10	5	5	4	1	3	803.5	7.4	†851
..	..	68	24	408	72	579	18.4	49	25	14	11	6	19	4,229.5	39.0	4,485
..	..	34	12	125.5	22	391.0	12.4	10	5	14	11	2	6	3,776.0	34.8	4,002
..	..	34	12	282.5	50	188.0	6	39	20	..	..	4	13	453.5	4.2	483
276	100	283	100	567	100	3,145	100	196	100	126	100	31	100	10,843	100	11,499

themselves and the bulk of the remainder by itinerant merchants.

third by professional dabuskas and the remainder by village and itinerant merchants.

APPENDIX LXII.

*Market charges on paddy (rice in the husk) and rice in certain markets in Bengal.*

(Per 100 rupees).

Item.	Paddy.					Rice.		
	Daspara (Calcutta).	Chetla (Calcutta).	Hili (Dinajpur).	Bayahat (Rajshahi).	Average.	Chapai Nawabganj (Malda).	Boga (Bakarganj).	Average.
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
<i>Payable by seller.</i>								
Handling up to point of weighment or measuring .. .. .	..	..	..	..	..	0 4 9	..	0 4 9
Quantity and weight allowances ( <i>dhalta, karda, etc.</i> ) .. .. .	..	0 13 7	1 14 0	1 4 0	1 5 2	..	..	..
Commission .. .. .	2 5 6	1 9 0	..	0 12 6	1 3 8	1 0 0	..	1 0 0
Brokerage .. .. .	..	..	..	..	..	..	..	..
Charities .. .. .	0 10 6	..	0 1 6	0 0 8	0 4 3	0 1 0	0 2 0	0 1 6
Miscellaneous .. .. .	1 0 0	0 12 6	..	0 5 0	0 11 2	0 2 0	..	0 2 0
<b>Total payable by seller ..</b>	<b>4 0 0</b>	<b>3 3 1</b>	<b>1 15 6</b>	<b>2 6 2</b>	<b>3 8 3</b>	<b>1 7 9</b>	<b>0 2 0</b>	<b>1 8 3</b>

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*Payable by buyer.*

Handling from the point of weighment up to buyer's godown ..	0 12 6	0 6 3	0 7 0	0 2 6	0 7 1	..	0 15 0	0 15 0
Commission .. ..	..	..	..	..	..	..	0 5 0	0 5 0
Brokerage .. ..	..	..	..	..	..	..	..	..
Charities .. ..	..	0 1 3	0 12 0	..	0 6 8	0 1 0	0 4 0	0 2 6
Miscellaneous .. ..	..	..	..	..	..	..	..	..
<b>Total payable by buyer ..</b>	<b>0 12 6</b>	<b>0 7 6</b>	<b>1 3 0</b>	<b>0 2 6</b>	<b>0 13 9</b>	<b>0 1 0</b>	<b>1 8 0</b>	<b>1 6 6</b>
<b>Grand total ..</b>	<b>4 12 6</b>	<b>3 10 7</b>	<b>3 2 6</b>	<b>2 8 8</b>	<b>4 6 0</b>	<b>1 8 9</b>	<b>1 10 0</b>	<b>2 14 9</b>
Municipal tolls, taxes, etc. ..	..	..	..	..	..	..	1 0 8	1 0 6

APPENDIX LXIII.

Market charges on paddy (rice in the husk) and rice in certain markets in Bihar.

(Per 100 rupees).

Item.	Paddy.					Rice.					
	Purulia.	Nirmali.	Raxaul.	Motihari.	Average.	Motihari.	Muzaffar- pur.	Dinapur.	Chapra.	Purulia.	Average.
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
<i>Payable by seller.</i>											
Handling up to the point of weighing .. ..	0 5 9	..	0 6 6	0 7 1	0 6 5	0 7 1	..	0 2 0	0 2 0	0 5 9	0 4 3
Quantity and weight allowances ( <i>dhalta, karda, etc.</i> ) ..	0 9 0	..	..	1 4 0	0 14 6	1 4 0	0 1 0	..	..	0 9 0	0 10 0
Commission ..	0 14 0	2 8 0	0 13 6	..	1 6 6	..	1 9 0	0 12 0	0 8 0	0 14 0	0 14 9
Brokerage ..	..	..	..	..	..	..	..	..	..	..	..
Charities ..	0 2 0	0 1 0	0 1 6	0 1 10	0 1 7	0 1 10	0 2 0	..	0 1 0	0 2 0	0 1 9
Miscellaneous ..	..	..	0 3 7	0 9 2	0 6 5	..	1 10 0	0 8 8	..	..	1 1 4
<b>Total payable seller ..</b>	<b>1 14 9</b>	<b>2 9 0</b>	<b>1 9 1</b>	<b>2 6 1</b>	<b>3 3 5</b>	<b>1 12 11</b>	<b>3 6 0</b>	<b>1 6 8</b>	<b>0 11 0</b>	<b>1 14 9</b>	<b>3 0 1</b>



<i>Payable by buyer.</i>												
Handling from the point of weightment up to buyer's godown .. ..	..	..	..	..	..	..	..	..	..	..	..	1
Commission .. ..	..	..	..	..	..	..	..	..	..	..	..	1
Brokerage .. ..	..	..	..	..	..	..	..	..	..	..	..	1
Charities .. ..	..	..	..	..	..	..	..	..	..	..	..	1
Miscellaneous .. ..	..	..	..	..	..	..	..	..	..	..	..	1
<b>Total payable by buyer .. ..</b>	..	..	..	..	..	..	..	..	..	..	..	..
<b>Grand total ..</b>	<b>1 14 9</b>	<b>2 9 0</b>	<b>1 9 1</b>	<b>2 6 1</b>	<b>3 3 5</b>	<b>1 12 11</b>	<b>3 6 0</b>	<b>1 6 8</b>	<b>0 11 0</b>	<b>1 14 9</b>	<b>3 0 1</b>	
Municipal tolls, taxes, etc. .. ..	..	..	..	..	..	0 9 2	..	..	..	..	0 9 2	

APPENDIX LXIV.

Market charges on paddy (rice in the husk) and rice in certain markets in Madras and Orissa.

(Per 100 rupees).

Item.	Madras.							Orissa.	
	Paddy.							Paddy.	Rice.
	Bhimava- ram.	Nellore.	Kumbako- nam.	Coconada.	Madura.	Trichinopoly.	Average.	Balasore.	Cuttack.
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
<i>Payable by seller.</i>									
Handling up to the point of weighment or mea- suring .. ..	1 3 8	1 3 8	1 3 10	0 10 0	0 14 10	1 3 8	1 1 3	0 3 9	0 10 8
Quantity and weight allow- ances, ( <i>dhalta, karda,</i> <i>etc.</i> ) .. ..	..	..	..	..	..	..	..	..	..
Commission .. ..	..	..	..	..	..	..	..	..	0 14 0.
Brokerage .. ..	0 9 10	0 10 0	1 4 0	0 9 10	1 3 9	1 4 0	0 14 11	..	..
Charities .. ..	..	..	0 9 10	..	0 5 0	0 5 0	0 6 7	0 5 7	0 1 9
Miscellaneous .. ..	..	..	..	..	..	..	..	0 4 0	..
Total payable by seller ..	1 13 6	1 13 8	3 1 8	1 3 10	2 7 7	2 12 8	2 6 9	0 13 4	1 10 5

<i>Payable by buyer.</i>									
Handling from the point of weighment up to buyer's godown	0 9 10	0 9 10	0 10 0	..	..	..	0 9 11	0 12 3	..
Commission .. ..	0 9 10	..	..	..	..	..	0 9 10	..	..
Brokerage .. ..	..	0 10 0	..	0 9 10	..	..	0 9 11	..	..
Charities .. ..	0 9 10	..	0 9 10	..	..	..	0 9 10	..	..
Miscellaneous .. ..	..	..	..	..	..	..	..	..	..
<b>Total payable by buyer</b>	<b>1 13 6</b>	<b>1 3 10</b>	<b>1 3 10</b>	<b>0 9 10</b>	<b>..</b>	<b>..</b>	<b>2 7 6</b>	<b>0 12 3</b>	<b>..</b>
<b>Grand total ..</b>	<b>3 11 0</b>	<b>3 1 6</b>	<b>4 5 6</b>	<b>1 13 8</b>	<b>2 7 7</b>	<b>2 12 8</b>	<b>4 14 3</b>	<b>1 9 7</b>	<b>1 10 5</b>
Municipal tolls, taxes, etc.	..	..	..	..	..	..	..	..	..

APPENDIX LXV.

Market charges on paddy (rice in the husk) and rice in certain markets in Hyderabad.

(Per 100 rupees).

Item.	Paddy.		Rice.							
	Regulated market.	Unregulated market.	Regulated Markets.				Unregulated Markets.			
			Warangal.	Nizama- bad.	Bhainsa.	Average.	Mahbub- nagar.	Hydera- bad.	Nirmal.	Average.
	Warangal.	Jangaon.								
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
<i>Payable by seller.</i>										
Handling up to point of weighing or measuring .. ..	2 3 1	1 7 0	1 11 0	1 0 3	0 14 9	1 3 4	1 0 3	1 12 9	0 12 0	1 3 0
Quantity and weight allowances (dhalia, karda, etc.) .. ..	..	..	..	..	..	..	..	0 13 3	..	0 13 3
Commission .. ..	1 4 0	0 12 0	1 4 0	1 8 0	1 0 0	1 4 0	1 0 0	2 4 0	1 0 0	1 6 8
Brokerage .. ..	..	..	..	..	..	..	..	..	..	..
Charities .. ..	..	0 15 10	..	0 1 0	0 1 0	0 1 0	0 2 0	0 1 9	0 1 0	0 1 7
Miscellaneous .. ..	..	..	..	..	..	..	..	..	..	..
Total payable by seller ..	3 7 1	3 2 10	2 15 0	2 9 3	1 15 9	2 8 4	2 2 3	4 15 9	1 13 0	3 8 6

<i>Payable by buyer.</i>										
Handling from the point of weighing up to buyer's godown ..	..	0 14 9	..	0 7 3	0 7 3	0 7 3	0 7 3	0 7 3	0 7 3	0 7 3
Commission .. ..	..	..	..	..	..	..	..	..	..	..
Brokerage .. ..	..	..	..	..	..	..	..	..	..	..
Charities .. ..	..	..	..	..	..	..	0 6 0	..	..	0 6 0
Miscellaneous .. ..	..	..	..	..	..	..	..	..	..	..
<b>Total payable by buyer ..</b>	..	<b>0 14 9</b>	..	<b>0 7 3</b>	<b>0 7 3</b>	<b>0 7 3</b>	<b>0 13 3</b>	<b>0 7 3</b>	<b>0 7 3</b>	<b>0 13 3</b>
<b>Grand total ..</b>	<b>3 7 1</b>	<b>4 1 7</b>	<b>2 15 0</b>	<b>3 0 6</b>	<b>2 7 0</b>	<b>2 15 7</b>	<b>2 15 6</b>	<b>5 7 0</b>	<b>2 4 3</b>	<b>4 5 9</b>
<b>Municipal tolls, taxes, etc. ..</b>	<b>0 8 4</b>	<b>0 8 4</b>	<b>0 6 3</b>	<b>0 6 3</b>	<b>0 5 3</b>	<b>0 5 11</b>	<b>0 5 3</b>	..	<b>0 4 3</b>	<b>0 4 9</b>

APPENDIX LXVI.

Market charges on paddy (rice in the husk) and rice in certain markets in the Central Provinces, Bombay and the Punjab.

(Per 100 rupees).

Item.	Central Provinces.					Bombay.	Punjab.				
	Rice.					Rice.	Paddy.				
	Raipur.	Drug.	Gondia.	Damoh.	Average.	Alur.	Gujranwala.	Hafizabad.	Kamoke.	Sheikhpura.	Average.
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
<i>Payable by seller.</i>											
Handling up to point of weighment or measuring ..	0 9 4	..	0 5 10	0 7 9	0 7 8	0 3 1	0 6 9	1 1 8	0 12 5	0 3 6	0 10 1
Quantity and weight allowances ( <i>dhalta, karda, etc.</i> ) ..	..	..	..	..	..	..	0 10 0	1 8 0	0 10 0	1 0 0	0 15 0
Commission ..	..	..	0 15 3	1 7 3	1 3 3	1 8 0	1 9 0	1 0 0	1 9 0	1 9 0	1 6 9
Brokerage ..	..	..	..	..	..	..	..	0 2 6	..	0 1 6	0 2 0
Charities ..	..	..	..	0 7 9	0 7 9	..	..	..	..	0 1 0	0 1 0
Miscellaneous ..	..	..	..	..	..	..	..	..	..	1 1 0	1 1 0
Total payable by seller ..	0 9 4	..	1 5 1	2 6 9	2 2 8	1 11 1	2 12 9	3 12 0	2 15 5	4 0 0	4 3 10

<i>Payable by buyer.</i> Handling from the point of weighment up to buyer's godown.	0 12 0	0 12 0	0 9 6	3 11 0	1 7 2	0 12 4	..	0 6 9	0 6 9	..	0 6 9
Commission ..	..	..	..	..	..	1 8 0	..	0 12 0	0 12 0	..	0 12 0
Brokerage ..	..	0 5 4	..	..	0 5 4	..	..	0 2 6	..	..	0 2 6
Charities ..	..	..	..	..	..	..	..	..	..	..	..
Miscellaneous ..	..	..	..	..	..	..	..	..	..	..	..
Total payable by buyer ..	0 12 0	1 1 4	0 9 6	3 11 0	1 12 6	2 4 4	..	1 5 3	1 2 9	..	1 5 3
Grand total	1 5 4	1 1 4	1 14 7	6 1 9	3 15 2	4 1 5	2 12 9	5 1 3	4 2 2	4 0 0	5 9 1
Municipal tolls, taxes, etc.	0 8 0(S) 0 8 0(B)	0 6 8	0 3 7	0 10 3	0 6 10	..	..	..	..	..	..

(S) Paid by seller.  
(B) Paid by buyer.

APPENDIX LXVII.

Market charges on paddy (rice in the husk) and rice in certain markets in the United Provinces.

(Per 100 rupees).

Item.	Paddy.		Rice.					
	Cawnpore.	Gonda.	Naugarh.	Shohratgarh.	Basti.	Cawnpore.	Dehra Dun.	Average.
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
<i>Payable by seller.</i>								
Handling up to the point of weighment or measuring .. .. .	0 3 6	1 0 4	0 2 0	0 2 7	0 10 0	0 7 9	0 5 3	0 7 4
Quantity and weight allowances, (dhalta, karla, etc.) .. .. .	4 13 8	2 0 11	..	0 10 6	..	3 15 0	..	2 3 6
Commission .. .. .	..	..	..	..	..	..	0 12 0	0 12 0
Brokerage .. .. .	1 8 10	..	..	0 4 0	0 3 9	1 10 3	..	0 11 4
Charities .. .. .	0 1 2	0 9 0	0 2 0	..	..	0 1 3	0 1 3	0 3 5
Miscellaneous .. .. .	3 5 2	..	1 9 4	3 5 3	1 10 9	1 15 6	..	2 2 2
Total payable by seller ..	10 0 4	3 10 3	1 13 4	4 6 4	2 8 6	8 1 9	1 2 6	6 7 9



<i>Payable by buyer.</i>									
Handling from the point of weighment up to buyer's godown .. ..	0 12 6	..	0 6 0	..	..	1 9 0	0 2 6	0 11 2	
Commission .. ..	2 5 6	0 8 0	1 0 0	..	0 12 0	0 4 0	4 6 0	1 6 0	
Brokerage .. ..	0 4 0	..	..	..	..	..	..	..	
Charities .. ..	..	0 0 6	..	..	0 1 3	..	0 1 3	0 1 0	
Miscellaneous .. ..	..	..	..	..	0 6 0	..	..	0 6 0	
Total payable by buyer ..	3 6 0	0 8 6	1 6 0	..	1 3 3	1 13 0	4 9 9	2 8 2	
Grand total ..	13 6 0	4 2 9	3 3 4	4 6 4	3 11 9	9 14 9	5 12 3	8 15 11	
Municipal tolls, taxes, etc. ..	0 8 0	0 5 0	0 11 2	0 7 11	0 7 6	0 12 0	0 12 0	0 9 2	

APPENDIX LXVIII.

*Average of market charges on paddy (rice in the husk) and rice in assembling markets in different provinces and States in India.*

(Per 100 rupees).

Item.	Madras. (6 markets). Appendix LXIV.		United Provinces (7 markets). Appendix LXVII.		Orissa (2 markets). Appendix LXIV.		Bihar (9 markets). Appendix LXIII.		Bengal (6 markets). Appendix LXII.	
	Paddy.	Rice.	Paddy.	Rice.	Paddy.	Rice.	Paddy.	Rice.	Paddy.	Rice.
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
<i>Payable by seller.</i>										
Municipal tolls, taxes, etc. ..	..	..	0 8 0	0 9 2	..	..	..	0 9 2	..	1 0 6
Handling up to the point of weighing or measuring ..	1 1 3	..	0 3 6	0 7 4	0 3 9	0 10 8	0 6 5	0 4 3	..	0 4 9
Quantity and weight allowances (dhalta, karda, etc.) ..	..	..	4 13 8	2 3 6	..	..	0 14 6	0 10 0	1 5 2	..
Commission ... ..	..	..	..	0 12 0	..	0 14 0	1 6 6	0 14 9	1 3 8	1 0 0
Brokerage .. ..	0 14 11	..	1 8 10	0 11 4	..	..	..	..	..	..
Charities .. ..	0 6 7	..	0 1 2	0 3 5	0 5 7	0 1 9	0 1 7	0 1 9	0 4 3	0 1 6
Miscellaneous .. ..	..	..	3 5 2	2 2 2	0 4 0	..	0 6 5	1 1 4	0 11 2	0 2 0
<b>Total payable by seller ..</b>	<b>2 6 9</b>	<b>..</b>	<b>10 8 4</b>	<b>7 0 11</b>	<b>0 13 4</b>	<b>1 10 5</b>	<b>3 3 5</b>	<b>3 9 3</b>	<b>3 8 3</b>	<b>2 8 9</b>

<i>Payable by buyer.</i>											
Handling from the point of weighing up to buyer's godown ..	0 9 11	..	0 12 6	0 11 2	0 12 3	..	..	..	0 7 1	0 15 0	
Commission .. ..	0 9 10	..	2 5 6	1 6 0	..	..	..	..	..	0 5 0	
Brokerage .. ..	0 9 11	..	0 4 0	..	..	..	..	..	..	-	
Charities .. ..	0 9 10	..	..	0 1 0	..	..	..	..	0 6 8	0 2 6	
Miscellaneous .. ..	..	..	..	0 6 0	..	..	..	..	..	..	
Total payable by buyer ..	2 7 6	..	3 6 0	2 8 2	0 12 3	..	..	..	0 13 9	1 6 6	
Grand total ..	4 14 3	..	13 14 4	9 9 1	1 9 7	1 10 5	3 3 5	3 9 3	4 6 0	3 15 3	

APPENDIX LXVIII—contd.

Average of market charges on paddy (rice in the husk) and rice in assembling markets in different provinces and States in India.  
(Per 100 rupees).

Item.	Punjab (4 markets). Appendix LXVI.		Central Provinces (4 markets). Appendix LXVI.		Bombay (1 market). Appendix LXVI.		Hyderabad (8 markets). Appendix LXV.			
	Paddy.	Rice.	Paddy.	Rice.	Paddy.	Rice.	Paddy.		Rice.	
							Regulat- ed market.	Unregu- lated market.	Regulat- ed market.	Unregu- lated market.
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
<i>Payable by seller.</i>										
Municipal tolls, taxes, etc. ..	..	..	..	0 6 10	..	..	0 8 4	0 8 4	0 5 11	0 4 9
Handling up to the point of weigh- ment or measuring ..	0 10 1	..	..	0 7 8	..	0 3 1	2 3 1	1 7 0	1 3 4	1 3 0
Quantity and weight allowances ( <i>dhalta, karda, etc.</i> ) ..	0 15 0	..	..	..	..	..	..	..	..	0 13 3
Commission ..	1 6 9	..	..	1 3 3	..	1 8 0	1 4 0	0 12 0	1 4 0	3 6 8
Brokerage ..	0 2 0	..	..	..	..	..	..	..	..	..
Charities ..	0 1 0	..	..	0 7 9	..	..	..	0 15 10	0 1 0	0 1 7
Miscellaneous ..	1 1 0	..	..	..	..	..	..	..	..	..
Total payable by seller ..	4 3 10	..	..	2 9 6	..	1 11 1	3 15 5	3 11 2	2 14 3	5 13 3

<i>Payable by buyer.</i>										
Handling from the point of weighing up to buyer's godown ..	0 6 9	..	..	1 7 2	..	0 12 4	..	0 14 9	0 7 3	0 7 3
Commission .. ..	0 12 0	..	..	} 0 5 4	..	1 8 0	..	..	..	..
Brokerage .. ..	0 2 6	..	..		..	..	..	..	..	..
Charities .. ..	..	..	..	..	..	..	..	..	..	0 6 0
Miscellaneous .. ..	..	..	..	..	..	..	..	..	..	..
<b>Total payable by buyer ..</b>	<b>1 5 3</b>	<b>..</b>	<b>..</b>	<b>1 12 6</b>	<b>..</b>	<b>2 4 4</b>	<b>..</b>	<b>0 14 9</b>	<b>0 7 3</b>	<b>0 13 3</b>
<b>Grand total ..</b>	<b>5 9 1</b>	<b>..</b>	<b>..</b>	<b>4 6 0</b>	<b>..</b>	<b>3 15 5</b>	<b>3 15 5</b>	<b>4 9 11</b>	<b>3 5 6</b>	<b>6 10 6</b>

## APPENDIX LXIX.

THE \* \* \* \* BANK LIMITED.

*Agreement to secure a cash credit on goods deposited.*

No. \_\_\_\_\_

Amount Rs. \_\_\_\_\_

Name \_\_\_\_\_

The \* \* \* Bank Limited (hereinafter called "the Bank") having at the request of Messrs. \_\_\_\_\_ (hereinafter called "the Borrowers") opened or agreed to open in the Books of the Bank at \_\_\_\_\_ a Cash Credit Account to the extent of Rs. \_\_\_\_\_ with the borrowers to remain in force for a period of \_\_\_\_\_ months from the \_\_\_\_\_ day of \_\_\_\_\_ 19\_\_\_\_, and to be secured by goods to be pledged with the Bank.

IT IS HEREBY AGREED between the Bank and the Borrowers (the borrowers agreeing jointly and severally) as follows:—

1st.—That the goods and merchandise mentioned in the Schedule hereto which have been already deposited and the goods and merchandise which shall be hereinafter deposited with the Bank under this agreement (hereinafter called "the Securities") shall remain and be placed in the exclusive possession and under the exclusive control of the Bank and in such a manner that such possession and control shall be apparent and indisputable. Provided that the Bank shall not be responsible for the loss, destruction, or deterioration of the goods deposited by any means.

\* \* \* \* \*

4th.—That all securities as aforesaid shall be insured against the fire risks by the Borrowers in some Insurance Office approved by the Bank to the full extent of the value of such Securities, that the fire-policies shall either be taken out in the name of the Bank or be assigned to the Bank. Should the Borrowers fail to insure, the Bank shall be at liberty to effect such insurance at the expense of the Borrowers.

5th.—That a margin of \_\_\_\_\_ per cent. at least to be fixed by the Bank from time to time in favour of the Bank, shall be always maintained by the Borrowers between the sum (including interest and other customary charges) for the time being due to the Bank on the said Cash Credit Account and the open market value of the Securities either by the deposit of further Security to be approved by the Bank, or by Cash Payment by the Borrowers, immediately on the market value for the time being of the securities becoming less than the amount equal to the balance then due to the Bank as aforesaid and the margin to be fixed and that in default of provision of such margin the whole amount due to the Bank on the said Cash Credit Account shall be immediately paid by the Borrowers if the Bank so requires.

6th.—That the interest at the rate of \_\_\_\_\_ per cent per annum shall be calculated on the daily balance due to the Bank of the said Cash Credit account.

7th.—That on the expiration of the said period of \_\_\_\_\_ months from the \_\_\_\_\_ day of \_\_\_\_\_ 19\_\_\_\_, the Borrowers shall pay to the Bank the balance within the limit hereinbefore mentioned, then outstanding and owing to the Bank on the said Cash Credit Account inclusive of interest at the rate above-mentioned to the date of payment.

8th.—That if when called upon by the Bank to maintain such margin as aforesaid the Borrowers shall fail to do so, such balance of principal and interest monies as may be then due to the Bank, it shall be lawful for the Bank forthwith, or at any time thereafter and without any notice to the Borrowers to sell or otherwise dispose of all or any of the Securities and to apply the net proceeds of such sale towards the liquidation of principal and interest monies due to the Bank, together with all charges to be incurred by the Bank.

9th.—That if the net sum realised by such sale be insufficient to cover the amount so found due, the Borrowers promise and agree forthwith on production to them of the account so to be prepared and signed as aforesaid, to pay any further balance which may appear to be due by the Borrowers thereon.

10th.—Provided also that nothing herein contained shall be deemed to negative, qualify or otherwise prejudicially affect the right of the Bank to recover from all or any of the parties, including the Borrowers liable on all or any of the Bills of Exchange, Drafts, Cheques, Promissory Notes or Bonds which may at any time be held by the Bank as Security or part Security against the said Cash Credit Account.

11th.—And it is hereby agreed that in the event of there being a surplus available after payment of all such principal and interest monies and all charges and expenses of the net proceeds of such sale of Security as aforesaid, it shall be lawful for the Bank to apply the said surplus as far as the same shall extend in or towards payment or liquidation of any and all other monies which shall or may be due from the Borrowers or any one or more of them to the Bank by way of Loans.

\* . . . \* . . . \*

14th.—That the Borrowers shall bear all expenses incurred by the Bank in this connection such as the pay of Godown-keepers and Chowkidars, and the travelling allowance of Inspectors, Managers, Godown-keepers and other officers and all such expenses shall be debited to the Borrowers' account in due course.

15th.—That the Bank will always be at liberty to stop making advances at any time without previous notice and without assigning any reason even though the said limit of Rs. \_\_\_\_\_ has been fully availed of.

In witness hereof the Borrowers have hereunto set their hands this \_\_\_\_\_ day of \_\_\_\_\_ 19 , in the Christian year one Thousand Nine Hundred and \_\_\_\_\_.

## APPENDIX LXX.

## EXTRACTS FROM AN ACCOUNT (BULLETIN NO. 5) PUBLISHED BY THE AGRICULTURAL CREDIT DEPARTMENT, RESERVE BANK OF INDIA, CONCERNING THE SITTANG COLONIES BANKING UNION IN BURMA.

*Foreword.*—This interesting account of a banking union in Burma shows how the co-operative movement in that country is expanding its activities under the stress of economic conditions and the necessity of retrieving past failure. The experience of Burma shows conclusively that so long as the co-operative movement considers that its function is merely to supply cheap credit to the agriculturist without bothering much how the money is spent it is foredoomed to failure, and that if it is to succeed it must aim at improving his whole economic position and putting it on a sound basis. In the Union here described this includes dealing with the agriculturist's output up to the stage of co-operative milling; and, on the other hand, of providing shops from which he can obtain his requirements at reasonable rates and without mortgaging his future. This extension of co-operative activities clearly necessitates energetic and close control under the supervision of some guiding personality, but the principles are not so abstruse or complicated as to be beyond the capacity of men endowed with energy, honesty and commonsense. In any case, the Land and Agriculture Committee which recently reported in Burma seems to consider that the policy is capable of extension in Burma, and if that is so in that country, there seems no reason to doubt that they could be successfully applied in India also.

1. The institution which we propose to describe in the bulletin is the Sittang Colonies Banking Union, Ltd., in Burma. Though it is hardly known outside Burma and even in Burma the extent of the business it undertakes is scarcely realised, it is the largest and soundest co-operative central bank there and is bigger than most central banks in India.

2. In the Sittang Colonies Banking Union the membership is confined to co-operative societies in the area. These societies are of a peculiar type called Tenancy Co-partnership and Credit Societies and have been organised for colonizing cultivable waste land. There are at present 80 such societies with a membership of about 2,500 cultivators and a working capital amounting to over Rs. 30 lakhs.

3. The Union was originally organised to serve as the Central Bank for the societies receiving money from those with surplus funds and giving loans to those in need of finance. During the last few years however it has been functioning as a real central agency, helping the societies in the collective marketing of members' produce and the purchase of supplies, and also undertaking various other activities for the amelioration of the economic condition of its members.

4. Though the colonies were thus started on co-operative principles with finance from Government with the intention of protecting the peasant cultivator against absorption by the capitalist, there were several changes in Government policy and the co-operative ideal was not always kept in view with the result that the scheme did not develop in the manner intended and for a long time the societies were looked upon as failures.

5. The very large Government loans by which the original bringing of the land under cultivation had been financed, weighed heavily on the societies and, when to these was added the catastrophic fall in the price of paddy, they were reduced to a state verging on ruin. It seemed at this stage well-nigh impossible to rescue the societies or recover any of the Government loans which at one time amounted to Rs. 23 lakhs. Fortunately however there was a change in the policy of the State Colonies Department and co-operative principles were revived. The Banking Union which had been registered to function as a Central Bank for the Colony Societies had been throughout helping the societies to keep going though it was itself keeping above water with great difficulty. In 1933 it launched into a new branch of work by purchasing a rice mill; the Sittang Colonies Co-operative Paddy Storage and Rice Milling Society, Ltd., was registered as a branch of the Union, and a system of collection, milling and sale of the produce of the colonies was developed. The next year the Union started on a small scale a department for joint purchase of stores and started issuing part of the loans in kind to prevent misapplication of the loans. A year after it appointed a conciliation board to liquidate the outside debts of its members. As a result of this extension of the activities of the Union under the guidance of the Government Administrator and mainly on account of the increased repayments which became possible under the collective milling and marketing of rice the colonies acquired a new lease of life and the old Government loans which had come to be regarded as lost were repaid with interest. The Union was also in a position to pay off all its outside liabilities and to give fresh finance to societies.

6. It can be imagined that the task of rescuing from financial difficulties societies working under such conditions is far from easy. The degree of success which the Banking Union has achieved is therefore all the more creditable. The turning point in the history of the colonies came with the purchase of the rice mill by the Union. It was realised that so long as repayments were collected in cash they would never amount to much. As Mr. Harper puts it, "A Burman cultivator transacting in cash is like a child carrying water in its cupped hands. . . . There is only one way to handle co-operative in this Province and that is by a firm grip, mobile, but never relaxing, upon the produce of the Agricultural or Tenancy Society member. Cash must be kept out of the Scheme to the utmost possible, and cash upon which there is a lien actual or accruing should never reach the cultivator himself, for if it does it is lost. Only strictly net profit should reach him in cash. There is no lien on it: it is his right and if he wastes it, as in nine cases out of ten he will, he causes loss to himself alone". It was with this idea of avoiding placing in the hands of the colonist any cash other than his balance of annual profit on which there is no lien that the Union undertook the collection, milling and sale of produce. As expected this checked leakages and extravagances, saved



APPENDIX LXX—*contd.*

milling charges and sundry expenses connected therewith and brought higher prices so that the payments increased substantially. In view of the striking results which this part of the Union's activities has given it seems desirable to describe it in detail.

7. As must be clear from the previous discussions the loans outstanding against the members having been mostly for colonisation purposes were for long term or have become so and have to be recovered in dribs and drabs. To ensure maximum possible recoveries the societies assess every year, just before the harvest, their members' crops and fix the amount each member has to pay in kind at one of the depots for the collection of paddy belonging to the Union. This amount is called Sattan. The societies inform the Union of the Sattan fixed and it in turn informs the Superintendent of the State Colonies Department, through the two Managers of the Union. The Superintendent, his Managers and the Committee of the Union act together in checking the fairness of the assessment of Sattan, having regard to the society's various liabilities and its anticipated crop and for this purpose visit the threshing floors as the crops are being harvested. Usually the amount is one-third of the gross outturn and a member who defaults is liable to expulsion. A member is allowed in addition to send down as much paddy as he likes in excess of his Sattan and this is known as "Trust Paddy".

8. The Union owns two rice mills in Rangoon and has three large depots at Kayan, the main collecting centre, and six others situated in various parts of the colonies' seaboard. Each depot is managed by a Lugyi elected from their members by the societies using the depot. Other members of the societies concerned are employed as clerks and coolies, thus helping to keep the wages of the organisation within the membership. The depot Luyis are allowed Rs. 1-8-0 commission for every 100 baskets received in their depots and they are given a weight allowance for shortages.

9. Immediately after the Sattan is fixed, the collection of the produce by the depots commences and until it is completed, the committees of the societies, and of the Union, aided by the Managers and the Superintendent are busily engaged in seeing that paddy comes in to the depots and is not diverted into many of the side tracks awaiting the cartman between the threshing floor and the depot. Inducements have been offered by the Union to encourage early collections in the form of remissions for early payments and the prizes to those who complete their payments first, a silver cup being given to the first society in each tract to complete its repayments.

10. "Trust Paddy" is only received at one of the Kayan depots or at the mill and other outside depots are not allowed to receive it, as it has been found to present difficulties. Receipts are prepared in triplicate for Sattan and in duplicate for "Trust Paddy". The member consigning Sattan is given the third portion of the receipt which is taken by him to the Chairman of his society as proof that he has delivered his Sattan. The second portion is given to the cartman acknowledging cart hire due to him, and may be presented by him to the Kayan Office for cash payment, or it may be used by him for the purchase of goods at any of the co-operative shops, which will in due course adjust the amount with the Kayan Office in settling their own shop accounts. The cart hire receipts, being negotiable within the Union, are serially numbered and signed both by the clerk and the Lugyi of the depot, and are sealed with a depot seal. They are changed slightly in colour and form annually to prevent fraud by the presentation of previous years' receipts. The third copy of the counterfoil is kept by the Depot Lugyi. In regard to the "Trust Paddy" the member has to settle his own cart hire and he receives one copy of the form of receipts for his paddy while the counterfoil is kept by the Depot Lugyi. If he desires the member can obtain a loan for his cart hire from the Union, by mortgaging his receipt with them.

11. Having delivered his receipt for Sattan to his Society Chairman, the member has to wait till the average price is declared by the Union which is invariably higher than the member could obtain elsewhere, and to satisfy himself that his account with his society is credited accordingly.

12. Except at Kayan and the mill there are no godowns, and where there are none, the paddy is sent by boat to the mill at the first opportunity. At the Kayan depots, the depot Lugyi decides which paddy is to be sent at once by boat to the mill, which is to be dried out in the large depot talins and which is to be temporarily stored in the depot godowns.

13. Boats are invariably used to send paddy to Rangoon, as rail charges are prohibitive. The Union makes a contract at the beginning of the season for the water transport required to serve all the depots. The contractor is required to deposit security with the Union, and to ensure against the loss of any of the Union's paddy carried by him. The sums paid for cart hire and boat hire are considerable having amounted to Rs. 86,659-14-0 and Rs. 58,809-10-0 respectively in 1936-37. The cart hire is mostly not lost to the colonies, as the members chiefly employ their families and fellow colonists and villagers to do the work and it has been suggested that the Union should keep its own boats.

14. After arrival of the paddy at the depots the Union Committee of Management take up the responsibility, closely and constantly assisted by the Managers of the colonies. This Committee numbers four and they are selected by the societies from among their own members. Two are posted at Rangoon and two at Kayan. Of the former, one superintends the working of the mill and the other the Banking Office in Edward Street. The Kayan members work in monthly rotation, one working in conjunction with the Managers, supervises the outside depots and superintends the payment of cart hire and labour charges in connection with them, and the other does the same in the Kayan depot, and in addition supervises the working of the Co-operative shops. The latter member is constantly in touch with the Rangoon Banking Office and the mill. The paddy is sent into Rangoon in such a way as to keep the mill constantly supplied with its particular paddy needs.

APPENDIX LXX—*contd.*

15. "Trust Paddy" received in the Kayan Depot or at the mill can be converted into Sattan by a member at any time. Such paddy is transferred from the "Trust Paddy" depot to the Sattan depot by book transfer. If the member does not require to convert his "Trust Paddy" into Sattan, he can cut the price at any time he wishes, and receives the market price on the day of the cut. In other words he can sell his paddy any time he likes and obtain the current market price. This is an advantage because the other big mills limit the periods and times when prices of "Consignment Rice" and "Trust Paddy" can be cut and generally see to it that the transaction is in favour of the firm, as is only natural when profit is the only object. This is a very popular side of the organisation, as the cultivator can obtain a loan up to 75 per cent of the value of the paddy at 10 per cent per annum interest, and he can wait for a rise in the market. Many outside cultivators wish to deposit their paddy in this way, but the mill is not capable of handling much more at present than is provided by members. A few outsiders however who have business connections with the societies are allowed this privilege, provided that members' claims are first satisfied. The Sattan is not quite enough to keep the mill fully occupied and as the societies reduce their debts it will further decrease until in ideal conditions it would only be sufficient to cover the rent and repayment of seasonal loans, etc. The "Trust Paddy" side should increase greatly as time goes on, until the bulk of the produce of the colonies' members is handled through the Rangoon mills as "Trust Paddy" with the considerable advantages which are derived thereby. The paddy is insured throughout, and once it is in the hands of the depots the cultivators' worries are at an end in regard to it. He has his receipt which he can convert into cash or exchange for goods and supplies at any time.

16. When the mill receives the paddy from the boatman it is measured, graded and placed in the godowns until it is required for milling.

17. The Union engages the services of a well-known rice broker of Rangoon, who acts as their house-broker and marketing adviser. He has been employed every year since the commencement of the scheme and has been of great help to the Union. He is a member of the Rangoon Rice Brokers' Association and has recently been appointed their Secretary. The broker gets no brokerage for sales from the Union but recovers it from the buyer, and if his quotations are equal to those of other brokers, preference is to be given to him; if however they are less (which has never yet occurred) the Union would always take his advice as to the standing and reliability of the others. When a sale is made through an outside broker the house-broker claims half brokerage from him this being the custom in Mogul Street.

18. The house-broker, or his partner, is constantly present in the Rice Exchange in Mogul Street and watches every movement of the market, and is in constant touch with the Union Office through the Administrator of the State Colonies Department. Advice is taken from the broker and the Union's Luyis act upon it subject to the approval of the Administrator. The factors regulating the sales are :

- (i) The State of the market,
- (ii) The nature of the paddy supply, and
- (iii) The regular working of the mill.

19. The balancing of these factors in such a way that they do not act antagonistically is a fine art, requiring expert advice and attention. When a decision to sell is arrived at and such decisions have to be taken promptly, the broker is instructed to make the sale. The Union's mill is a member of the Burma Rice Merchants' Association and the sale contract is drawn up according to its bye-laws on the form required and approved by them. The Rangoon office then sends a milling notice to the purchaser. When the milling of the order is completed the mill informs the Union's office in Rangoon and they make out a bill. On receipt of the payment (collected by Rangoon office), almost always by crossed cheque, the Union Office issues a delivery order to the purchaser. Only on the presentation of this delivery order is the purchaser permitted to remove his rice from the mill. Failure to remove the bags within the prescribed time entails extra charges for demurrage, etc. In short the mill is run on the same lines, using the same forms, as are customary with all the "Big Mills" which are members of the Burma Rice Merchants' Association, with whose bye-laws (being a member), it complies. Within this Association there is an inner ring, and the Sittang Colonies Banking Union, Ltd.'s mill has been admitted to it. This gives the mill the advantage of "selling forward" when prices are good, and opportunity for "hedging" when forward prices are low. This is a complicated business, but has been of great advantage to the Union, no firm of any size being able to achieve any large degree of success without it.

20. The Union provides marketing finance by getting cash credits from the joint stock banks of Rangoon. Money required for payment of advances on "Trust Paddy", cart and boat hire, mill expenses, wages, etc., is obtained until the paddy begins to arrive and replaces it.

21. It will thus be seen that collection and assembly, grading, transportation, risk bearing and financing in all stages have been well organised and they are mainly carried out by the members of the societies and their children. The Burma Land and Agriculture Committee have made the following observations on the Union's system of collection and marketing. "In brief the principle is that dues are paid in produce which is marketed by the Union, any balance remaining after deduction of dues (there is normally a balance since the amount required to be deposited is so fixed as to ensure that on sale it will fully cover the dues) being returned to the member concerned. The object is to avoid placing in the hands of the colonist any cash other than his balance of annual profit on which there is no lien. In addition to the compulsory deposit of paddy in payment of dues colonists are encouraged to hand over the rest of their crop to the Union to be

APPENDIX LXX—*concl.*

marketed by it. Colonists realize that this is in their interests as the Union obtain, and make full use of the facilities offered. Their interests are fully safeguarded by a carefully thought-out system of documentary and weighment checks while the produce itself is insured against loss from the time it reaches the Union depots until it passes into the hands of the buyer. The milling of the paddy in the Union mill is carried out in the same way as in privately owned mills and the selling is done in accordance with the rules of the Burma Rice Merchants' Association of which the Union is a member. The Union's system of collecting, milling and marketing produce is conducted on business principles. Experience in the Sittang Colonies has shown that the colonists get a better price for their produce by milling and selling through the Union than they get from millers and rice brokers. We hope that the co-operative marketing of agricultural produce will be one of the most important features of the reconstructed co-operative movement and that the day will come when a large part of the country's produce will be marketed by associations of cultivators.

## APPENDIX

## Price spreads between some producing

		Larkana (Sind) to Karachi. Kangni rice.	Saharanpur (U. P.) to Cawnpore. Basmati rice (parboiled).
1. Producers' price actually received for sufficient paddy to yield 1 maund of cleaned or sifted rice.	Weight (a) Value* (b) ..	182 lb. Rs. A. P. 3 14 0	150 lb. Rs. A. P. 4 10 2
<i>Add—</i>			
2. Market charges paid by seller (assembling) ..		0 1 0	0 2 6
3. Wholesale price of paddy .. ..		3 15 0	4 12 8
4. Market charges paid by buyer (assembling) ..		0 1 3	..
5. Handling and cartage to rice mill .. ..		0 0 9	0 0 11
6. Cost of conversion into rice (parboiling) when done, hulling, sifting and other incidental charges ..		0 6 9	0 7 4
		4 7 9	5 4 11
<i>Deduct—</i>			
7. Sale proceeds of by-products (brokens and bran) ..		1 8 0	0 5 2
8. Cost of 1 maund of rice at the mill .. ..		2 15 9	4 15 9
<i>Add—</i>			
9. Profit margin on hulling .. ..		0 3 0	0 3 0
10. Wholesale price of rice at the mill .. ..		3 2 9	5 2 9
<i>Add—</i>			
11. Expenses to f. o. r. including bagging cartage and market charges (if any) .. ..		0 2 0	0 1 9
12. Railway freight .. ..		0 8 6	0 6 11
13. Expenses at destination including transportation to buyer's godown, handling, municipal tolls and commission .. ..		0 2 6	0 1 9
14. Wholesale margin .. ..		0 1 9	0 2 7
15. Wholesale price at destination .. ..		4 1 6	5 15 9
<i>Add—</i>			
16. Retailing cost and retail margin .. ..		0 6 0	0 10 0
17. Price paid by consumer for 1 maund of rice ..		4 7 6	6 9 9
<i>Add—</i>			
†18. Sale proceeds of by-products (at item 7) ..		1 8 0	0 5 2
19. Total value realised of the saleable products resulting from the conversion of the quantity of paddy stated opposite 1(a) .. ..		5 15 6	6 14 11

\*Inclusive of transportation charges

†Hulling charges are low due to the

‡It has been assumed for the sake locally, although in actual practice to consuming centres in the same

§Out of this the cultivator gets

## LXXI (a).

and consuming centres.

Raipur (C. P.) to Nagpur. <i>Hansa</i> rice.		Cuttack. <i>Punchkulia</i> (mixture) local distri- bution.	Bolepur (Bengal) to Delhi. <i>Dudhkalma</i> rice (parboiled).	Tadepalli - gudam (West Godavary) to Madras. <i>Akkulu</i> rice.	Warangal (Hydera- bad State) to Hyder- abad. <i>Khichidi</i> rice.	Kalyan (Bombay Presi- dency) to Bombay. <i>Kolamba</i> rice.
A.	B.					
Cultivator selling paddy to merchant and the latter milling on hire.	Cultivator milling his paddy on hire and selling rice.					
137 lb. Rs. A. P. 2 13 6	137 lb. Rs. A. P. ..	137 lb. Rs. A. P. 3 6 6	124 lb. Rs. A. P. 2 15 0	125 lb. Rs. A. P. 2 6 5	137 lb. Rs. A. P. 3 12 11	150 lb. Rs. A. P. 5 9 7
0 1 3	..	0 0 8	0 0 9	0 0 10	0 2 4	0 1 8
2 14 9	..	3 7 2	2 15 9	2 7 3	3 15 3	5 11 3
0 0 9	..	0 0 4	0 0 3	0 0 3	..	0 1 3
0 2 3†	0 2 3	0 5 0	0 0 9	0 0 6	0 0 6	..
0 2 3†	0 2 3	0 5 0	0 6 0	0 4 0	0 5 0	0 5 6
3 1 9	..	3 12 6	3 6 9	2 12 0	4 4 9	6 2 0
0 1 0	..	0 5 0	0 3 6	0 3 0	0 7 8	0 13 0
3 0 9	..	3 7 6	3 3 3	2 9 0	3 13 1	5 5 0
0 6 3	..	0 3 0	0 6 3	0 2 0	0 1 11	0 4 0
3 7 0	3 7 0	3 10 6	3 9 6	2 11 0	3 15 0	5 9 0
0 3 3	0 3 3	} Disposed of locally. 0 2 0	0 2 0	0 2 8	0 2 6	0 2 10
0 6 3	0 6 3		0 10 9	0 6 1	0 4 3	0 1 9
0 2 9	0 2 9		0 2 6	0 1 0	0 0 6	0 2 9
0 5 9	0 5 9		0 2 0	0 2 0	0 1 9	0 4 0
4 9 0	4 9 0	3 12 6	4 10 9	3 6 9	4 8 0	6 4 4
0 5 0	0 5 0	0 4 6	0 3 0	0 3 0	0 8 0	0 5 0
4 14 0	4 14 0	4 1 0	4 13 9	3 9 9	5 0 0	6 9 4
0 1 0	0 1 0	0 5 0	0 3 6	0 3 0	0 7 8	0 13 0
4 15 0	4 15 0‡	4 6 0	5 1 3	3 12 9	5 7 8	7 6 4

borne by the seller.

fact that bran and husk are retained by the mill.  
of simplicity, that the by-products are disposed of  
considerable quantities of broken rice are railed  
manner as the main product (rice).

Rs. 3-8-0 (Items 10 and 18) less Rs. 0-2-9 (milling hire and market charges).

## APPENDIX LXXI (b).

Price spreads relating to machine-milled rice distributed locally.

	Cuttack (Orissa). <i>Punchkulia</i> rice (mixture).	Larkana (Sind). <i>Kangni</i> rice.	Saharanpur (U. P.). <i>Basmati</i> rice (parboiled).	Raipur (C. P.). <i>Hansa</i> rice.
1. Producers' price for sufficient paddy to yield 1 maund of cleaned or sifted rice.	137 lb. Rs. A. P. 3 6 6 (76·2%)	182 lb. Rs. A. P. 3 14 0 (77·0%)	150 lb. Rs. A. P. 4 10 2 (77·4%)	137 lb. Rs. A. P. 2 13 6 (71·1%)
2. Expenses up to the completion of milling .. ..	0 6 0	0 8 6	0 10 9	0 4 3
3. Profit margin on hulling ..	0 3 0	0 3 0	0 3 0	0 6 3
4. Wholesale distribution costs (handling, bagging, brokerage, etc.) and wholesaler's margin.	0 3 6	0 3 0	0 3 0	0 4 0
5. Retailing costs and retail margin .. ..	0 4 6	0 4 0	0 5 0	0 4 0
	4 7 6 (100)	5 0 6 (100)	5 15 11 (100)	4 0 0 (100)

\*Inclusive of transportation charges borne by the seller.

APPENDIX LXXII.

Grade designations and definition of quality of the variety of parboiled milled rice known commercially as Muthusamba or Kothamalli Samba or White Sirumani grown in the Tanjore district of the Madras Presidency.

(See Rules 2 and 3.)

Grade designation	Special characteristics.											
	Maximum limits of tolerance.								1,000 kernel weight.	Size of grain.		General characteristics.
	Foreign matter other than rice.	Broken grains.	Fragments.	Other rices including red grain.	Damaged or discoloured grain.	Weevilled grains.	Chalky grains.	Total.		Length.	Breadth.	
1	2	3	4	5	6	7	8	9	10	11	12	13
Special	Per cent. Slight trace only.	Per cent. 3.0	Per cent. Nil	Per cent. 1.0	Per cent. 0.25	Per cent. Reasonably free having regard to the age of the rice.	Per cent. Nil	Per cent. 4.5	Grammes. Within the limits of 11.5 and 12.0.	Millimetres. Within the limits of 3.7 and 3.9.	Millimetres. Within the limits of 2.3 and 2.5.	(1) The grain shall be small, round, reasonably uniform in size, of white colour and translucent (not chalky). (2) The rice— (a) shall have ordinarily received one polish; (b) shall be free from musty or obnoxious odour and shall carry no signs of mould or contain webs; (c) shall not have been artificially coloured and shall be free from polishing agents.
A	0.25	5.0	1.0	2.0	1.00	Do.	Nil	10	Do.	Do.	Do.	
B	0.25	10.0	1.0	2.0	1.00	Do.	Nil	15	Do.	Do.	Do.	

*Basis of quantitative determinations.*—All determinations and percentages shall be reckoned on the basis of the total weight of a representative sample.

*Broken grains.*—Broken grains shall include pieces of kernel which are less than three-fourths of a whole kernel.

*Fragments.*—Fragments shall include pieces of kernel smaller than one-fourth of the whole kernel.

*Chalky grains.*—A chalky grain shall be a grain of rice one-half or more of which is chalky.

For accidental errors, a tolerance is permissible up to 1, 1½ and 2 per cent in excess of the tolerance specified in column 3 for Special, A and B grades respectively, and a tolerance up to 0.25 per cent in excess of the specified tolerance in each of the columns 2, 4, 5, 6 and 7 uniformly for the three grades, provided the total is not in excess of the total refraction specified in column 9.

**APPENDIX LXXIII.**

*Grade designations and definition of quality of the variety of parboiled milled rice known commercially as Sirumani or Red Sirumani grown in the Tanjore district of the Madras Presidency.  
(See Rules 2 and 3.)*

Grade designation	Special characteristics.											General characteristics.
	Maximum limits of tolerance.								1,000 kernel weight.	Size of grain.		
	Foreign matter other than rice.	Broken grains.	Fragments.	Other rices including red grains.	Damaged or discoloured grains.	Weevilled grains.	Chalky grains.	Total.		Length.	Breadth.	
1	2	3	4	5	6	7	8	9	10	11	12	13
Special	Per cent. Slight trace only.	Per cent. 3.0	Per cent. Nil	Per cent. 1.0	Per cent. 0.25	Per cent. Reasonably free having regard to the age of the rice.	Per cent. Nil	Per cent. 4.5	Grammes. Within the limits of 15.0 and 15.5.	Millimetres. Within the limits of 4.2 and 4.5	Millimetres. Within the limits of 2.4 and 2.7	(1) The grains shall be small, round, reasonably uniform in size, of white or greyish colour and translucent (not chalky). (2) The rice— (a) shall have ordinarily received one polish; (b) shall be free from musty, sour, or other obnoxious odour and shall carry no signs of mould or contain webs; (c) shall not have been artificially coloured and shall be free from polishing agents.
A	0.25	5.0	1.0	2.0	1.00	Do.	Nil	10	Do.	Do.	Do.	
B	0.25	10.0	1.0	2.0	1.00	Do.	Nil	15	Do.	Do.	Do.	

*Basis of quantitative determinations.*—All determinations and percentages shall be reckoned on the basis of the total weight of a representative sample.

*Broken grains.*—Broken grains shall include pieces of kernel which are less than three-fourths of a whole kernel.

*Fragments.*—Fragments shall include pieces of kernel smaller than one-fourth of the whole kernel.

*Chalky grains.*—A chalky grain shall be a grain of rice one-half or more of which is chalky.

For accidental errors, a tolerance is permissible up to 1, 1½ and 2 per cent in excess of the tolerance specified in column 3 for Special, A and B grades respectively, and a tolerance up to 0.25 per cent in excess of the specified tolerance in each of the columns 2, 4, 5, 6, and 7 uniformly for the three grades provided the total is not in excess of the total refraction specified in column 9.



APPENDIX LXXIV.

Grade designations and definition of quality of the variety of raw milled rice known commercially as Nellore rice or Molagolukulu grown in the Nellore district of the Madras Presidency.

(See Rules 2 and 3.)

Grade designation	Special characteristics.											General characteristics.
	Maximum limits of tolerance.								1,000 kernel weight.	Size of grain.		
	Foreign matter other than rice.	Broken grains.	Fragments.	Other rices including red grains.	Damaged or discoloured grains.	Weevilled grains.	Chalky grains.	Total.		Length.	Breadth.	
1	2	3	4	5	6	7	8	9	10	11	12	13
Special	Per cent. Slight trace only.	Per cent. 5.0	Per cent. 1.0	Per cent. 1.0	Per cent. 0.5	Per cent. Reasonably free having regard to the age of the rice.	Per cent. 1.5	Per cent. 9.5	Grammes. Within the limits of 15.5 and 16.0.	Millimetres. Within the limits of 5.2 and 5.3.	Millimetres. Within the limits of 2.3 and 2.4.	(1) The grains shall be reasonably uniform in size, of white or creamy colour. (2) The rice— (a) shall have ordinarily received two polishes; (b) shall be free from musty, sour, or other obnoxious odour and shall carry no signs of mould or contain webs; (c) shall not have been artificially coloured and shall be free from polishing agents.
A	0.5	10.0	1.5	1.5	1.0	Do.	3.5	19	Do.	Do.	Do.	
B	0.5	20.0	1.5	1.5	1.0	Do.	5.5	31	Do.	Do.	Do.	

*Basis of quantitative determinations.*—All determinations and percentages shall be reckoned on the basis of the total weight of a representative sample.

*Broken grains.*—Broken grains shall include pieces of kernel which are less than three-fourths of a whole kernel.

*Fragments.*—Fragments shall include pieces of kernel smaller than one-fourth of the whole kernel.

*Chalky grains.*—A chalky grain shall be a grain of rice one-half or more of which is chalky.

For accidental errors, a tolerance is permissible up to 1, 1½ and 2 per cent in excess of the tolerance specified in column 3 for Special, A and B grades respectively, and a tolerance up to 0.25 per cent in excess of the specified tolerance in each of the columns 2, 4, 5, 6, 7 and 8 uniformly for the three grades provided the total is not in excess of the total refraction specified in column 9.

## APPENDIX LXXV.

*Quantities of paddy (rice in the husk) and rice handled by the major railway systems in India.*

(Thousand tons).

Name of railway.	Paddy.					Rice.				
	1935-36.	1936-37.	1937-38.	1938-39.	Average.	1935-36.	1936-37.	1937-38.	1938-39.	Average.
Assam Bengal .. ..	31	37	39	47	39	65	82	81	144	93
Bengal Nagpur .. ..	173	151	116	121	140	531	606	672	690	625
Bengal and North Western	52	49	35	48	46	297	356	368	350	343
Bombay, Baroda and Central India.	11	9	8	8	9	138	216	229	225	202
Eastern Bengal .. ..	212	142	86	130	143	243	286	238	387	288
East India .. ..	82	83	119	162	112	329	479	469	445	430
Great Indian Peninsula ..	6	7	5	6	6	267	283	276	252	269
Jodhpur State .. ..	2	1	1	1	1	25	25	25	23	25
Madras and Southern Maharashtra.	70	58	73	69	67	512	479	451	481	481
Mysore State .. ..	..	..	..	6	1	..	..	..	43	11
Nizam's State .. ..	1	1	1	1	1	101	101	102	108	103
North Western .. ..	27	32	29	25	28	329	368	380	398	369
Rohilkhand and Kumaon	11	15	11	17	14	9	12	10	10	10
South Indian .. ..	349	312	326	321	327	405	326	284	332	337
<b>Total .. ..</b>	<b>1,027</b>	<b>897</b>	<b>849</b>	<b>962</b>	<b>934</b>	<b>3,251</b>	<b>3,625</b>	<b>3,585</b>	<b>3,888</b>	<b>3,586</b>

*Note.*—Actual figures of tonnage of paddy and rice originating on the different railways for four years 1935-36 to 1938-39 have since been received from the Railway Board and are reproduced below. It will be appreciated that they bear out the estimates given on pages 365 and 366 regarding the extent of rail-borne traffic in paddy and rice.

*Table showing the tonnage of paddy and rice originating on the different railways from 1935-36 to 1938-39.*

(Thousand tons).

	Paddy.	Rice.
1935-36 .. ..	829	2,364
1936-37 .. ..	714	2,564
1937-38 .. ..	670	2,496
1938-39 .. ..	760	2,752
Average 1935-36 to 1938-39 .. ..	743	2,544

APPENDIX LXXVI.

*Shipment of paddy (rice in the husk), and rice by sea from maritime provinces to coastal ports in India.*

(a) *Annual.*

	Paddy.						Rice.					
	From Bengal.	From Madras.	From Bombay.	From Sind.	From Orissa.	Total.	From Bengal.	From Madras.	From Bombay.	From Sind.	From Orissa.	Total.
	Quantity. (Tons).	Quantity. (Tons).	Quantity. (Tons).	Quantity. (Tons).	Quantity. (Tons).	Quantity. (Tons).	Quantity. (Tons).	Quantity. (Tons).	Quantity. (Tons).	Quantity. (Tons).	Quantity. (Tons).	Quantity. (Tons).
1934-35 .. ..	553	188	9,143	21	7,531	17,436	11,810	2,113	28,641	12,031	1,487	56,082
1935-36 .. ..	..	..	12,855	118	29,088	42,061	9,928	3,341	26,458	11,388	2,151	53,266
1936-37 .. ..	343	1,994	10,907	104	27,614	40,961	10,558	5,132	25,323	13,363	6,162	60,536
1937-38 .. ..	843	510	9,011	154	13,663	24,181	22,029	3,610	17,380	14,525	3,934	61,478
1938-39 .. ..	..	1,651	11,097	241	23,069	36,058	14,924	5,749	12,463	82,220	10,223	75,579

APPENDIX LXXVI—contd.

Shipment of paddy (rice in the husk), and rice by sea from maritime provinces to coastal ports in India—contd.

(b) Average monthly shipment—1934-35/1938-39.

		Paddy.											
		From Bengal.		From Madras.		From Bombay.		From Sind.		From Orissa.		Total.	
		Quantity. (Tons).	Per cent.	Quantity. (Tons).	Per cent.	Quantity. (Tons).	Per cent.	Quantity. (Tons).	Per cent.	Quantity. (Tons).	Per cent.	Quantity. (Tons).	Per cent.
April	.. ..	31	9	..	..	1,082	10	3	2	2,245	11	3,361	10
May	.. ..	2	1	..	..	377	4	..	..	2,530	13	2,909	9
June	.. ..	..	..	350	41	2	Neg.	1	1	2,089	10	2,442	8
July	.. ..	..	..	..	..	1	Neg.	..	..	1,501	7	1,502	(5)
August	.. ..	..	..	12	2	11	Neg.	..	..	1,199	6	1,222	(4)
September	.. ..	110	30	287	33	111	1	1	1	902	4	1,411	(4)
October	.. ..	119	34	46	5	731	7	9	7	1,164	6	2,069	(6)
November	.. ..	37	11	151	17	272	3	40	31	1,066	5	1,566	(5)
December	.. ..	..	..	20	2	1,199	11	39	30	993	5	2,251	(7)
January	.. ..	..	..	..	..	2,715	26	24	19	1,779	9	4,518	14
February	.. ..	1	Neg.	..	..	2,155	20	5	4	2,194	11	4,355	14
March	.. ..	48	14	2	Neg.	1,947	18	6	5	2,531	13	4,534	14
Total	.. ..	348	100	868	100	10,803	100	128	100	20,193	100	32,140	100

NOTE.—The periods of smallest shipments are bracketed.

APPENDIX LXXVI—concl'd.

Shipment of paddy (rice in the husk), and rice by sea from maritime provinces to coastal ports in India—concl'd.

(b) Average monthly shipment—1934-35/1938-39—concl'd.

	Rice.											
	From Bengal.		From Madras.		From Bombay.		From Sind.		From Orissa.		Total. ●	
	Quantity. (Tons).	Per cent.	Quantity. (Tons).	Per cent.	Quantity. (Tons).	Per cent.	Quantity. (Tons).	Per cent.	Quantity. (Tons).	Per cent.	Quantity. (Tons).	Per cent.
April .. ..	1,099	8	837	21	3,969	18	1,535	9	312	7	7,752	13
May .. ..	1,084	8	561	14	1,976	9	1,197	(7)	341	7	5,159	8
June .. ..	645	(5)	121	(3)	696	(3)	548	(3)	130	3	2,140	(3)
July .. ..	758	(6)	73	(2)	260	(1)	795	(5)	157	3	2,043	(3)
August .. ..	721	(5)	153	(4)	305	(2)	1,007	(6)	97	2	2,283	(4)
September .. ..	474	(3)	248	(6)	527	(2)	1,279	8	191	4	2,710	(5)
October .. ..	1,363	10	226	(6)	925	(4)	1,510	9	275	6	4,299	7
November .. ..	1,116	8	163	(4)	1,334	(6)	1,720	10	109	2	4,442	7
December .. ..	1,501	11	341	8	1,932	9	2,337	14	515	11	6,626	11
January .. ..	1,868	13	228	6	3,137	14	1,882	11	851	18	7,966	13
February .. ..	1,924	14	400	10	3,595	16	1,313	8	885	18	8,117	13
March .. ..	1,297	9	638	16	3,397	16	1,582	10	928	19	7,842	13
Total .. ..	13,850	100	3,989	100	22,053	100	16,705	100	4,791	100	61,388	100

NOTE.—The periods of smallest shipments are bracketed.

**APPENDIX**  
*Cost of storing paddy (rice in the husk) and rice in*  
 (Pies per maund per

	Paddy (in bulk).					
	Rent.	Handling (filling and emptying).	Interest.	Type of storage.	Average storage period (in months).	Total cost.
<i>Bengal—</i>						
1. Burdwan .. ..	0.8	0.44	4.32	Pucca go- down.	8	5.56
2. Magrahat .. ..	..	..	..	..	..	..
3. Hili .. ..	1.3	0.58	4.32	Do.*	6	6.70
<i>Madras—</i>						
1. Ellore .. ..	1	0.4	2.04	Gadit ..	6	3.44
2. Do. .. ..	1.2	0.4	2.04	Dhanyappa kottut.	6	3.64
3. Madras .. ..	..	..	..	..	..	..
<i>Bihar—</i>						
1. Dinapore .. ..	1	0.8	3.8	Pucca go- down.†	2 to 3	6.6
2. Muzaffarpur .. ..	1	2.0	3.8	Do. † ..	1 to 3	8.3
<i>Assam—</i>						
1. Silchar .. ..	2.2	0.35	3.8	Do. ..	6 to 9	6.35
2. Karimganj .. ..	2.90	0.50	3.8	Do. ..	3 to 6	7.2
<i>Central Provinces—</i>						
1. Raipur .. ..	..	..	..	..	..	..
2. Drug .. ..	..	..	..	..	..	..
<i>United Provinces—</i>						
1. Saharanpur .. ..	1	0.62	3.6	Pucca go- down.†	6	6.02
2. Nawgarh .. ..	..	..	..	..	..	..
<i>Bombay—</i>						
1. Bombay .. ..	2.3	0.3	2.88	Pucca go- down.§	10	7.06
2. Poona .. ..	2.3	0.3	2.88	Do.	12	7.5
3. Bhivandi .. ..	4	0.17	3.6	Do.	12	7.77
<i>Sind—</i>						
1. Larkana .. ..	1	0.44	1.92	Unpaved godown.	4 to 5	3.36
2. Tando Mohd. Khan	1.5¶	0.33	1.92	Plastered heap in the open air.	6	3.73
3. Karachi .. ..	..	..	..	..	..	..
<i>Punjab—</i>						
1. Amritsar .. ..	1.5	0.57	2.16	..§	6	4.66
2. Kamoke .. ..	1.3	0.57	2.16	..§	6	4.46
<i>Hyderabad—</i>						
1. Warangal .. ..	0.8	0.15	3.24	Pucca go- down.	12	4.19
2. Hyderabad .. ..	..	..	..	..	..	..

\*Insurance, 3 pies per maund.

†A kind of storage, see page 326.

‡In bags—

1. Bihar, 12½ per cent. depreciation.

2. U. P. (Saharanpur), 20 per cent. depreciation.

§In bags. Depreciation in bags 50 per cent. Insurance and watchman Rs. 5 per 100 bags per month.

## LXXVII.

some important markets.  
month).

Rice (in bags).						
Rent.	Handling (filling and emptying).	Interest.	Depreciation in bags.	Type of storage.	Average storage period (in months).	Total cost.
0.50	0.44	5.76	0.62	Pucca godown	8	7.32
0.56	0.7	5.76	1.4	Do.	5	7.65
1.3	0.58	5.76	**	Do.	6	7.64
..	..	..	..	..	..	..
..	..	..	..	..	..	..
2.1	.06	3.12	1.0	Pucca godown	6	6.29
0.8	0.4	6.24	0.85	Do.	2 to 5	8.29
0.8	0.6	6.24	0.75	Do.	2 to 6	8.39
2.9	0.8	5.76	**	Do.	2 to 4	9.4
2.9	0.8	5.76	0.8	Do.	2 to 3	10.26
0.7	.24	3.3	0.9	Do.	10	5.14
1.05	0.27	2.86	1.12	Do.	8	5.30
0.8	0.50	5.02	0.80	Do.	6	7.12
0.8	0.30	5.02	**	Do.	8 to 12	6.12
2.3	1.2	4.32	4.8	Do.	2 to 3	12.62
2.3	0.6	4.32	1.6	Do.	6	8.82
2.7	.96	5.4	4.8	Do.	2 to 3	13.86
3	4	2.88	4.8	Pucca paved godown.	1	14.68
3	2	2.88	3.0	Kachcha bldg. with paved floor.	2	10.88
3	.66	3.36	.08	Pucca paved godown	6	7.10
1.05	0.2	3.36	0.5	Pucca godown	12	5.11
.96	0.2	3.36	0.5	Do.	12	5.02
0.8	0.41	5.04	1.0	Do.	6	7.25
0.7	0.82	5.04	1.6	Do.	4	8.16

[In bags—

1. Depreciation in bags 40 per cent.

2. Re. 1 per 4,000 bags per month as watchman charges.

†Cost of covering the heap of paddy with a plaster of mud and cowdung.

\*\*In bulk.

## GLOSSARY OF VERNACULAR TERMS.

## A

<i>Aus</i>	..	..	..	Autumn (early) rice crop.
<i>Adopao</i>	..	..	..	One eighth of a seer.
<i>Adholi</i>	..	..	..	A Bombay measure for rice.
<i>Aman</i>	..	..	..	Winter (late) rice crop.
<i>Annawari</i>	..	..	..	According to annas in the rupee, i.e., in 16 ths.
<i>Appam</i>	..	..	..	A rice preparation (Madras Presidency).
<i>Arah</i>	..	..	..	A wooden receptacle used for storing paddy (Travancore).
<i>Arat (arhat)</i>	..	..	..	Commission and the business carried on by commission agents.
<i>Arhatiya or arhatdar</i>	..	..	..	Commission agent.
<i>Ata</i>	..	..	..	Flour.

## B

<i>Bania</i>	..	..	..	A class of trader and financier.
<i>Banjara</i>	..	..	..	A class of itinerant dealer who is also generally professional dehusker (U. P.).
<i>Barhaya</i>	..	..	..	A measure in Central Provinces.
<i>Barhi</i>	..	..	..	A kind of grain loan returned with 50 per cent extra.
<i>Bazar</i>	..	..	..	Market place.
<i>Beopari</i>	..	..	..	A kind of itinerant merchant.
<i>Beopar butura</i>	..	..	..	Division of business profits.
<i>Bharbhunja</i>	..	..	..	Grain parcher.
<i>Bheri</i>	..	..	..	A container made of bamboo splits (Bihar and Orissa).
<i>Ehusa</i>	..	..	..	Broken straw.
<i>Bhunja</i>	..	..	..	Parched rice (Bihar and Orissa).
<i>Boma</i>	..	..	..	A hollow spear for drawing off samples.
<i>Boro</i>	..	..	..	Summer crop (rice).
<i>Bund</i>	..	..	..	Embankment.

## C

<i>Chakki</i>	..	..	..	Hand mill (stone) for grinding wheat or other grains.
<i>Chapati</i>	..	..	..	Unleavened bread.
<i>Chhatank</i>	..	..	..	One sixteenth of a seer.
<i>Chauki</i>	..	..	..	A Central Provinces measure.
<i>Chettyar</i>	..	..	..	A class of moneylender in South India.
<i>Chhanahua</i>	..	..	..	Sifted.
<i>Chiti</i>	..	..	..	Letter.
<i>Chouthiya</i>	..	..	..	A Central Provinces measure.
<i>Chowkidar</i>	..	..	..	Watchman.
<i>Chura</i>	..	..	..	Beaten rice.

## D

<i>Dadan</i>	..	..	..	System of selling produce in advance (Bengal).
<i>Dal</i>	..	..	..	Pulses.
<i>Dahua</i>	..	..	..	Summer crop (rice).
<i>Dalal</i>	..	..	..	Broker.
<i>Dalali</i>	..	..	..	Brokerage.
<i>Dane</i>	..	..	..	Deduction in kind payable by seller on account of impurities, drriage, etc.
<i>Dara</i>	..	..	..	Fair average quality.
<i>Deorhi</i>	..	..	..	One and a half times.
<i>Desi</i>	..	..	..	Indigenous.
<i>Dharmao</i>	..	..	..	Charity.
<i>Dharmada</i>	..	..	..	Charity.
<i>Dhalta</i>	..	..	..	An allowance in weight in favour of buyer.



## D—contd.

<i>Dhangappa kottu</i> ..	..	..	A wooden receptacle used for storing paddy (Madras Presidency).
<i>Dhenki</i> ..	..	..	A manually operated device for hulling paddy.
<i>Dhobi</i> ..	..	..	Washerwoman.
<i>Dhola</i> ..	..	..	A receptacle made of bamboo splits used for storing paddy (Central Provinces).
<i>Dholi</i> ..	..	..	Diminutive of <i>dhola</i> .
<i>Dosai</i> ..	..	..	A rice preparation (Madras Presidency).
<i>Dudh</i> ..	..	..	Milk.

## F

<i>Faria</i> ..	..	..	A kind of itinerant dealer.
<i>Firni</i> ..	..	..	A rice preparation.

## G

<i>Gadi</i> ..	..	..	A receptacle made of bamboo used for storing paddy in Madras Presidency.
<i>Garee</i> ..	..	..	A measure (Madras Presidency).
<i>Ghat</i> ..	..	..	Ferry.
<i>Ghumam</i> ..	..	..	Potter (Punjab).
<i>Gola</i> ..	..	..	A store.
<i>Gorahala</i> ..	..	..	An institution providing shelter for old invalid cows.
<i>Gummi</i> ..	..	..	A receptacle made of cotton stalks used for storing paddy in Hyderabad State.
<i>Gundis</i> ..	..	..	A mud bin.
<i>Gunj</i> ..	..	..	A grain market.
<i>Gur</i> ..	..	..	A kind of raw sugar.

## H

<i>Hamal</i> ..	..	..	A porter or market labourer.
<i>Hamalage or hamali</i>	..	..	Wages charged by a <i>hamal</i> .
<i>Hat</i> ..	..	..	Periodical market.
<i>Hans</i> ..	..	..	Swan.
<i>Hira</i> ..	..	..	Diamond.
<i>Hundi</i> ..	..	..	A bill of exchange or draft.
<i>Hundekar</i> ..	..	..	A forwarding or clearing agent.
<i>Hundekari</i> ..	..	..	<i>Hundekar's</i> remuneration.

## I

<i>Iddli</i> ..	..	..	A rice preparation (Madras Presidency).
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## J

<i>Jotedars</i> ..	..	..	Tenants or lease-holders.
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## K

<i>Kachcha</i> ..	..	..	Not standard.
<i>Kacheri</i> ..	..	..	A straw container used for storing paddy (Bihar).
<i>Kalanjiam</i> ..	..	..	A receptacle made of bamboo for storing paddy (Madras Presidency).
<i>Kalam</i> ..	..	..	A measure (Madras Presidency).
<i>Kanaj</i> ..	..	..	A masonry cubicle for storing grain.
<i>Kanji</i> ..	..	..	Water decanted from boiled rice.
<i>Kankkyi</i> ..	..	..	Late or winter rice (Burma).
<i>Kankkyin</i> ..	..	..	Early or autumn rice (Burma).
<i>Kangni</i> ..	..	..	A receptacle made of cotton stalks used for storing paddy in Hyderabad State.
<i>Karda</i> ..	..	..	Deduction on account of refraction.
<i>Katha</i> ..	..	..	A Central Provinces and Bengal measure.
<i>Kathi</i> ..	..	..	An Assam measure.

## K—contd.

<i>Khandi</i> .. ..	..	A measure (Madras Presidency and Central Provinces).
<i>Khatti</i> .. ..	..	An underground pit for storing wheat (United Provinces).
<i>Kheel</i> .. ..	..	Parched paddy or puffed rice.
<i>Kheer</i> .. ..	..	A kind of rice preparation.
<i>Khichiri</i> .. ..	..	Mixture of rice and pulse cooked together.
<i>Khudi</i> .. ..	..	Mixture of broken rice (Bihar).
<i>Kochias</i> .. ..	..	Cultivators collecting the produce of other growers (Central Provinces).
<i>Kotha</i> .. ..	..	A masonry godown, also an Assam measure.
<i>Kothi</i> .. ..	..	A mud bin for storing produce.
<i>Kottai</i> .. ..	..	A measure (Madras Presidency).
<i>Kungan</i> .. ..	..	A Central Provinces measure.
<i>Kuro</i> .. ..	..	Do.
<i>Kutanharas</i> .. ..	..	Professional dehuskers.

## L

<i>Lahi</i> .. ..	..	Parched rice.
<i>Lotna</i> .. ..	..	A straw container used for storing paddy in the Central Provinces.

## M

<i>Macha Chavadi</i> .. ..	..	Business court yard (Madras Presidency).
<i>Machan</i> .. ..	..	Two parallel wooden beams fixed to the wall.
<i>Maida</i> .. ..	..	Wheat flour.
<i>Malguzar</i> .. ..	..	Landlord.
<i>Mali</i> .. ..	..	Gardener.
<i>Mamools</i> .. ..	..	Usual charges.
<i>Mandi</i> .. ..	..	A market.
<i>Mani</i> .. ..	..	A United Provinces and Central Provinces measure.
<i>Map</i> .. ..	..	A Bengal measure.
<i>Marakkal</i> .. ..	..	A measure (Madras Presidency).
<i>Mati</i> .. ..	..	Sense.
<i>Mayin</i> .. ..	..	Spring crop (rice) (Burma).
<i>Moora</i> .. ..	..	A measure (Madras Presidency).
<i>Morai</i> .. ..	..	A receptacle made of straw for storing paddy.
<i>Mota</i> .. ..	..	Thick (bold).
<i>Muddati hundi</i> .. ..	..	A bill of exchange drawn for a specified period.
<i>Mura</i> .. ..	..	A straw container.
<i>Mushk</i> .. ..	..	Musk.
<i>Murmura</i> .. ..	..	Parched rice.

## N

<i>Nag</i> .. ..	..	A jewel.
<i>Nak</i> .. ..	..	Nose.
<i>Nali</i> .. ..	..	United Provinces measure.
<i>Naq</i> .. ..	..	Pure.
<i>Nelpuras</i> .. ..	..	A wooden storage for paddy (Travancore).
<i>Nozibu</i> .. ..	..	A Burma measure.

## P

<i>Pai</i> .. ..	..	A Bengal and Central Provinces measure.
<i>Paikar</i> .. ..	..	Agent.
<i>Paili</i> .. ..	..	A Bihar measure.
<i>Paila</i> .. ..	..	A measure (United Provinces and Central Provinces).

## P—contd

<i>Palladar</i> ..	..	..	Market labourer.
<i>Palladari</i> ..	..	..	Wages of a <i>palladar</i> .
<i>Palli</i> ..	..	..	A container made of bamboo splits (Sind).
<i>Panchayat</i> ..	..	..	A committee.
<i>Panat</i> ..	..	..	A storage made of mud (Bombay Presidency)
<i>Panseri</i> ..	..	..	A five seer weight.
<i>Paoseer</i> ..	..	..	One quarter of a seer.
<i>Parkhi</i> ..	..	..	A hollow spear for drawing off samples.
<i>Patti</i> ..	..	..	A measure (Madras Presidency).
<i>Pattarai</i> ..	..	..	A straw receptacle used for storing paddy (Madras Presidency).
<i>Pathazam</i> ..	..	..	A wooden safe (Travancore).
<i>Pettai</i> ..	..	..	A parking place for carts (Madras Presidency).
<i>Pheriyala</i> ..	..	..	Itinerant vendor.
<i>Pok</i> ..	..	..	A bamboo split container used for storing paddy in Burma.
<i>Pulao</i> ..	..	..	A rice and meat/vegetable preparation.
<i>Puttu</i> ..	..	..	A rice preparation (Madras Presidency).
<i>Pura</i> ..	..	..	An Assam measure.
<i>Puresa-gyi or daing puresa</i> ..	..	..	A kind of broker (Burma).
<i>Pyi</i> ..	..	..	A Burma measure.

## R

<i>Rubi</i> ..	..	..	Crop sown at the end of the rainy season.
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## S

<i>Saba-de</i> ..	..	..	A kind of produce loan (Burma).
<i>Saba-do</i> ..	..	..	Do.
<i>Saba-pe</i> ..	..	..	Advance sale (Burma).
<i>Saba-nyun</i> ..	..	..	A kind of cash loan (Burma).
<i>Sai</i> ..	..	..	A United Provinces measure.
<i>Samundar</i> ..	..	..	Sea.
<i>Samundrasok</i> ..	..	..	Sea-foam.
<i>Sattu</i> ..	..	..	Flour of parched grain (rice).
<i>Sawai</i> ..	..	..	One and a quarter time.
<i>Shandy</i> ..	..	..	Periodical market.
<i>Sher (kathi)</i> ..	..	..	An Assam measure.
<i>Shroffs</i> ..	..	..	Indigenous bankers.
<i>Silai</i> ..	..	..	Sewing charges.
<i>Sojji</i> ..	..	..	A rice preparation in Madras Presidency.
<i>Sohi</i> ..	..	..	A Bengal measure.
<i>Sufeda</i> ..	..	..	White.
<i>Supa</i> ..	..	..	A winnowing tray.

## T

<i>Talin</i> ..	..	..	Threshing floor (Burma).
<i>Taw-puresa</i> ..	..	..	A kind of broker (Burma).
<i>Tahsil or taluk</i> ..	..	..	Subdivision of a district.
<i>Tedi</i> ..	..	..	Bent or crooked.
<i>Tehri</i> ..	..	..	Do.
<i>Tera</i> ..	..	..	Submontane region.
<i>Thanedar</i> ..	..	..	Head of village police station.
<i>Thela</i> ..	..	..	A four wheeled cart.
<i>Thuddi</i> ..	..	..	Unburst grain left in the parching of paddy.
<i>Tola</i> ..	..	..	A weighman.
<i>Tolai</i> ..	..	..	Weighing charges.
<i>Tulsi</i> ..	..	..	An aromatic plant.

## U

<i>Uppuma</i> ..	..	..	A rice preparation (Madras Presidency).
<i>Urad</i> ..	..	..	A kind of pulse.

## Z

<i>Zamindar</i> ..	..	..	Landlord.
<i>Zamindari</i> ..	..	..	A landlord's landed property, also market tax collected by landlord.
<i>Zarda</i> ..	..	..	A rice preparation (sweet and yellow).

**CHECKED**  
**2003 04**