

EAST INDIA (PROGRESS AND CONDITION).

STATEMENT

EXHIBITING THE

MORAL AND MATERIAL PROGRESS AND CONDITION

OF

INDIA,

DURING THE YEAR 1872-73.

(PRESENTED PURSUANT TO ACT OF PARLIAMENT.)

*Ordered, by The House of Commons, to be Printed,
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P R E F A C E.

THE statement exhibiting the moral and material progress and condition of India for 1871-72 was the first of a new series. It was arranged on a plan by which an inquirer might obtain, by the perusal of one section, a good general knowledge of what had taken place during the year under review in connection with any subject in which he might be interested. It was thought that a knowledge was required, not so much of the general proceedings of the different local governments, as of the progress that had been made throughout British India in improving the condition of the people and in providing for their moral and material wants. In commencing a new series it was thought necessary to give a concise account of the previous history of administrative measures connected with such subjects as land revenue, irrigation, and some others, so that, during the perusal of future statements similarly arranged, there might be ready means of reference to a fuller account of any measure or undertaking the yearly progress of which might be recorded. This plan provides a place for every subject or section of a subject, and so long as it is closely adhered to in future statements the progress under any given head may be traced throughout the different years without any trouble.

It is necessary that the first of a series designed on this plan should be complete as regards the provision of a place for every important section of the great subject of which the statement treats. This could hardly be successfully achieved at the first attempt; and there were shortcomings and omissions in parts of the statement prepared for 1871-72. It was, therefore, decided to make the statement for 1872-73 a second edition of that for 1871-72; so that the former will, in fact, be the first of the new series. The meeting of a new Parliament was another reason for this decision.

In the second edition, now presented, the events and administrative measures of 1872-73 are substituted for those of 1871-72 throughout. Nearly the whole has been re-written, and it remains only to enumerate the additions and alterations. The whole subject is arranged, as before, in 15 sections, each treating of a department of administration which is complete in itself, and under one or other of these heads every measure and every event naturally finds its place.

The first section treats of changes and reforms in the Administration, and of Legislation. The additions consist of a further account of the reforms introduced by Sir George Campbell in Bengal, and of a more complete statement of the laws respecting municipalities and of their working.

The financial section contains further information respecting the systems of local taxation, and an account of the currency, especially of the paper currency. The section on land revenue, which was very incomplete as a review of the systems throughout India, has been considerably enlarged. It now contains a much fuller account of the permanent settlement in Bengal and Bahar, and of the recent discussions respecting the settlement of the North West Provinces. An account of the Orissa settlement, and of the waste lands rules, a fuller account of the Oudh settlement, and of the Madras system, including details respecting the method of classing land, and accounts of land revenue systems in Sind, Mysore, and Curg, have also been added to this section; which contains many other additions, and has, indeed, been almost entirely re-written.

The section on agriculture in the present statement commences with information respecting the existing arrangements for the study of meteorology in India. The next subject is the crops, and especially those of the Lower Provinces. Notices are then given of existing means of collecting reliable agricultural statistics; which are followed by an abstract of the important new 'Land Improvement Act.' The paragraphs on agricultural societies, Government gardens, experimental farms, and cotton cultivation have received considerable additions. Then follow accounts of the jute, rhea, hemp, flax, silk, tobacco, Carolina rice, coffee, tea, chinchona, and other special cultivations, of the fisheries, and of horse and cattle breeding.

The sections on irrigation and communications, on forests and minerals, contain

many additions and corrections, and all information on these subjects is brought up to March 1873.

Special care has been given to the new section on trade and manufactures, which has been completely re-written. The balance of trade and the mysteries of exchanges have been explained by the light of Sir Richard Temple's minute of September 1872. Fuller particulars are given respecting the rise of native cotton manufactures and its cause, and the jute trade. Full accounts are inserted of the intercourse of British Indian merchants with Zanzibar and other ports on the east coast of Africa; of the Povindah trade; of the trade with eastern Turkistan and the Palampur Fair; of the various commercial routes from India to Tibet; and such particulars as could be collected of the internal trade of India.

The section on the condition of the people has received many additions. To the account of the census of Bengal has been added those of the census of the North West Provinces, the Central Provinces, Madras, and Bombay. Much fuller particulars are given respecting vital statistics, wages, sanitation, diseases and their alleviation and prevention, and emigration. The section on police and justice has been revised and corrected, and the statistics have been brought up to March 1873.

The section on education has been re-written and arranged on a plan more in accordance with the general system on which the statement is based. The various classes of schools throughout India, referred to in the Despatch of 1854, are now dealt with separately. Their usefulness and influence affect different classes of the community, and, although they form parts of one homogeneous scheme, and are, to some extent, linked together by scholarships, it is thought that the most lucid way of dealing with the subject will be to glance at the condition and progress of each class over all India, instead of, as in the first edition, giving a general summary of the educational work of each province. The paragraphs on missionary work in the statement for 1871-72 brought the subject down to 1873, and, as no later information has been received, they have been reprinted in the present statement.

The political section is entirely new. It is an enumeration of the native states, with a brief account of the treaty rights and obligations of each, of their rulers and history, with some general statistics. The aim is that all may have their due place in the general scheme of the Report. With the object of making this enumeration as clear and intelligible as possible, a classification of the Native States has been adopted, with reference to geographical position, ethnological affinity, and political connection.

The military section is on the same plan as in the statement for 1871-72. The concluding section, on surveys and statistics, gives a general sketch of the origin and progress of the great trigonometrical survey, of the topographical surveys,* of the publishing work done in the office of the Surveyor General at Calcutta, of the system for the supply of instruments, of the work of the Geographical Department at the India Office, and of the materials for the preparation of the statements.

The various subjects are illustrated either by tabulation or by cartographic illustration. The tables, forming an appendix, are intended to illustrate those subjects which are best shown by that method. Such are the areas and population of provinces, the financial statements, the state of trade, the progress of education, and the number and distribution of troops. The maps show the territorial divisions; the rainfall; the systems of irrigation; the railways, lines of telegraph, and light-houses; the reserved forests; trade routes across the Himalayas; the distribution of troops; and the progress of surveys.

CLEMENTS R. MARKHAM.

* Marine Surveys are treated of in the Section on Communications, Revenue Surveys in that on Land Revenue, the Geological Survey in that on Minerals, and Meteorology in that on Agriculture. See pages 88 for Marine Surveys; 23, 26, 28, 30 for the Revenue Surveys; 107 for the Geological Survey, and 34 for Meteorology.

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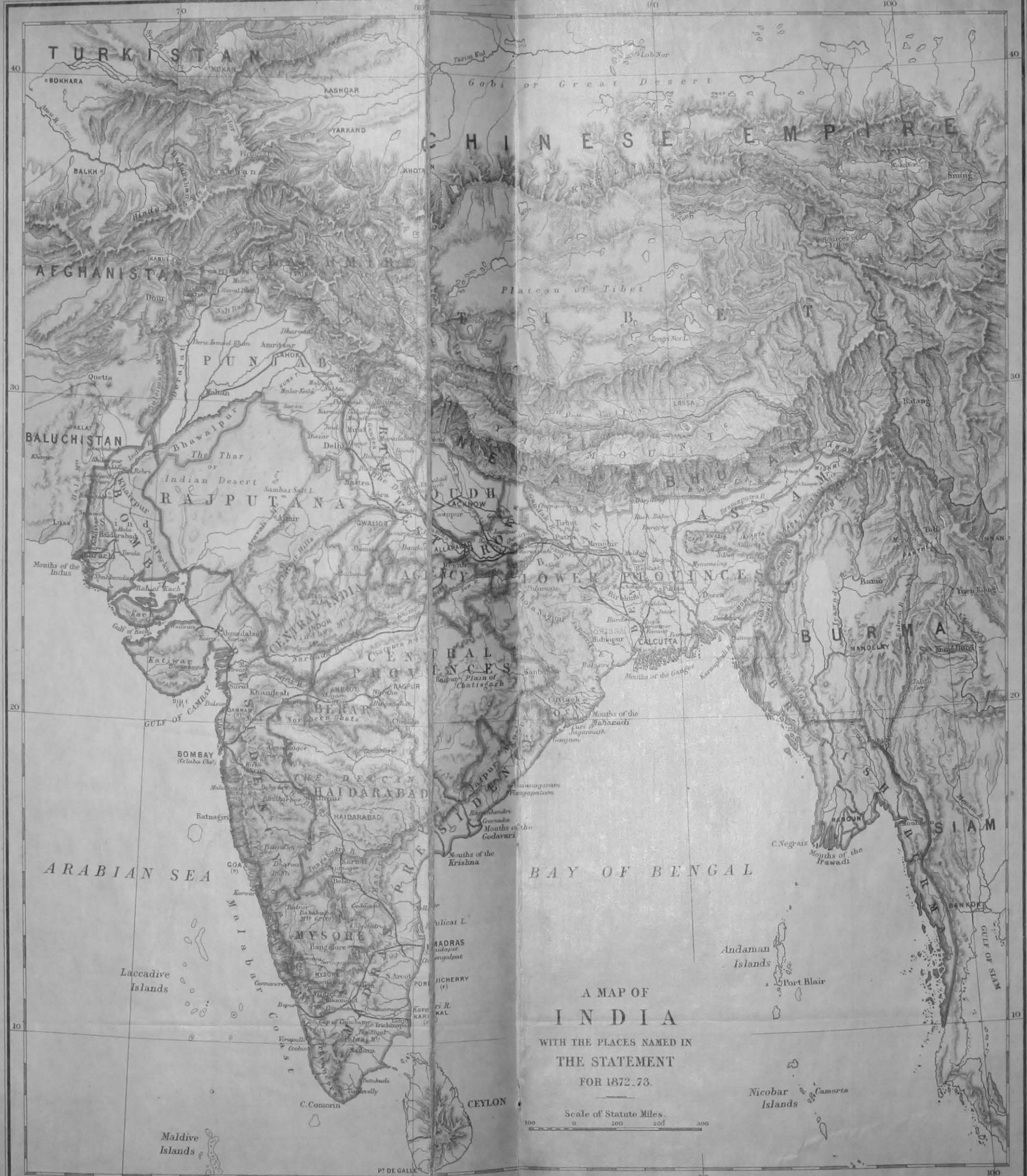
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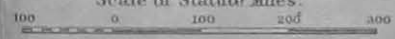
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A MAP OF
INDIA
 WITH THE PLACES NAMED IN
 THE STATEMENT
 FOR 1872-73.
 Scale of Statute Miles.



STATEMENT

EXHIBITING THE

MORAL AND MATERIAL PROGRESS AND CONDITION OF INDIA

DURING THE YEAR 1872-73.

I.

ADMINISTRATION AND LEGISLATION.

THE year 1872-73 was the first of the administration of Lord Northbrook, who arrived at Calcutta on the 3rd of May. It was also the first year of the administrations of the Governors of Madras and Bombay; Lord Hobart arrived at Madras on May 15th, and Sir Philip Wodehouse at Bombay on May 7th. During this year Sir George Campbell was Lieutenant-Governor of Bengal, Sir William Muir of the North West Provinces, and Sir Robert Davies of the Punjab. Sir George Couper was Chief Commissioner of Oudh, Mr. J. H. Morris of the Central Provinces, Sir William Merewether of Sind, and Mr. Eden of British Burma.

The Legislative Council of the Governor General passed 31 Acts, the most important of which was that to amend the rent law in the North West Provinces. It is referred to in section on land revenue. An Act was also passed with reference to the canals in Northern India.

The Legislative Council of Bengal passed bills during the Session of 1872-73 to amend the Salt Act, the excise laws, and the municipal laws, and for the registration of births and deaths within certain areas. In Madras only two Acts were passed, one to amend the Police Act, and the other to extend the purposes for which port rules may be passed. The new Bombay Municipal Act (III. of 1872) will be noticed further on, and the Bombay "Port Trust Act" places in the hands of a corporate body, the members of which are nominated by the Government, the wharves, docks, piers, warehouses, lights, moorings, and reclamations of Bombay harbour.

Lord Mayo created a new department in the Government of India to deal with all subjects connected with revenue, agriculture, and commerce, which has now been three years in working order. The want of such a department had been the direct cause of much loss and waste, and of numerous mistakes in times past, in consequence of the special subjects belonging to it being scattered in various departments, and not being considered as any one's business. Yet these very subjects are the most important with which the Government has to deal. On the wise and judicious treatment of them absolutely depends the material welfare of the people, and the fruitfulness of the various branches of the revenue. Lord Mayo and the majority of his Council felt that more systematic measures should be taken for securing the improvement and development of the agriculture, commerce, and industrial arts of India; and that closer attention should be given to the great products which constitute the staples of agricultural and manufacturing industry, and of export trade. Agriculture in India is susceptible of almost indefinite improvement; while the future development of Indian commerce depends on the quantity and quality of existing staples, and on the introduction of new products. The cultivation of the quinine-yielding chinchona plant, of cotton, coffee, tea, indigo, tobacco, rhea, and jute fibres, and other products, needs the intelligent and watchful care of a central department, as do all measures for improving the breeds of horses and cattle, for introducing new products, for

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regulating fisheries, and for promoting agricultural instruction. Lord Mayo's Government, therefore, came to the conclusion that a separate department should be formed for the care of these great interests, and to take cognizance of all matters affecting the practical improvement and development of the agricultural resources of the country, and the administration of the land revenue, the forests, commerce, mines, surveys, and industrial arts.

Lord Mayo's proposal was favourably received by the Home Government. The Secretary of State considered that the Finance Minister should be a minister of control only, separated from the actual administration of any branch of the revenue. He thought that the work of the new department would increase as the natural result of special attention being devoted to many branches of administration which had hitherto been more or less neglected. It was anticipated that the local governments would, as a rule, originate improvements and reforms, and that the new department would make the valuable experience, locally gained, subservient to the interests and welfare of the whole empire. Formerly great attention was paid to audit and to retrenchment; now the far wider and more important duty of watching the sources and development of the revenue, and of ascertaining how it may be increased, and how best the welfare of the people may be promoted, will also receive its due share of attention.

The Department of Revenue, Agriculture, and Commerce was constituted by a Resolution of the Government of India, dated 6th June 1871, and Mr. A. O. Hume, C.B., was appointed its first Secretary. It has charge of all questions relating to land revenue and settlements, to Government advances for works of agricultural improvement, to agriculture and horticulture, to studs and cattle breeding, to silks and fibres, to forests, to commerce and trade, to customs, salt, opium, excise, and stamps, and to industrial arts. The department also has under its charge the census, the gazetteers and collection of statistics, and the surveys, including geology and meteorology. Its establishment has only entailed an additional expenditure of under 2,000*l.* a year, and its usefulness has already become apparent. Subjects of vital importance to the people of India that were formerly neglected, or treated in separate departments, will now receive constant and careful attention and supervision. The department, during the year under review, published a most valuable series of papers on tea cultivation in India; and a monograph on the tobacco industry. Lord Mayo hoped and expected that in due time the local governments would form similar departments for the same purposes.

In close connection with the new department is the statistical survey of India, of which Dr. W. W. Hunter was appointed Director General in October 1871. The object of Dr. Hunter's appointment is to introduce systematic arrangements for collecting accurate statistical material, to act as a central guiding authority to the local collectors of information, to take steps to ensure uniformity in their operations, and hereafter to consolidate provincial reports in a general gazetteer of India.

Dr. Hunter's work on Orissa forms the first fruit of the statistical survey, which is the largest of the kind that any single government has ever yet attempted. It deals with a population exceeding 240,000,000, split up into 50 different races, speaking a great variety of languages, and representing very diverse stages of human society. But Dr. Hunter succeeds to a vast accumulation of materials collected during the last 100 years. The Court of Directors encouraged researches into their territories, and between 1807 and 1813 they expended 30,000*l.* on a statistical examination of part of Bengal alone. But there has hitherto been no central organization for bringing such local researches to a common focus. Materials are buried in different offices, unavailable either to the public or to the Government. The survey of Bengal, just alluded to, was stored away in the India House in 50 folio volumes of maps and manuscripts without being touched. Dr. Hunter's first duty has been to collate and utilize already existing materials, and to supplement their deficiencies. His plan is to distribute the work as much as possible, and at the same time to secure uniformity and punctuality in the results by means of a central editor. A set of leading questions has been issued by the Director General showing exactly what is required, and reducing the work of the local officers to the minimum. The returns will gather together all the essential characteristics of the empire, district by district, exhibiting them in a skeleton form.

The final operation of the statistical survey will be to work up the whole, and to compile a connected account of each district from the returns. These provincial accounts will be condensed by the Director General into an Imperial Statistical Account of India.

The Government of India, with the approval of the Secretary of State, has adopted a uniform system of orthography for the purposes of the statistical survey, and for official use generally. The system is based on that of Sir William Jones, but a certain freedom is allowed in spelling names which have become familiar to the public, and Dr. Hunter has himself prepared a guide to the orthography of Indian proper names, as an illustration of the principles sanctioned. An official list of towns, geographical divisions, and natural features, such as rivers, mountains, &c., is in course of preparation.

The Lieutenant Governor of Bengal has also been very active in re-organizing the administrative machinery of his provinces. He found no reliable, or even approximately reliable, information available regarding the area of land under cultivation, the prevailing rent rates, the area sown with different crops, which districts produce more grain than they consume, which hoard grain, which export it. He felt that, in case of famine, he could not tell whence the deficiencies of the famine tract could be best supplied.

His first changes were in the procedure of the Board of Revenue. Formerly the Board disposed of land revenue and other questions. Sir George Campbell ordered that they should all be submitted to him for final sanction. Instead of the two members sitting as a Board as heretofore, he placed one in separate charge of land revenue, and the other of salt, opium, customs, excise, income tax, and stamps; and he considers that the efficiency of the executive administration has been much improved by the arrangement. The enormous quantity of reports and returns which used to be sent in by heads of departments have been reduced. Each head is now ordered to analyze and digest the returns into one, and in that form to submit them to the Government.

Sir George Campbell has also made a change in the districts, by concentrating more power in the hands of the magistrate-collectors. He has been anxious to give them a stronger controlling power over all the departments in their districts, for he holds that departments are excellent servants but bad masters. The collector will thus be the real executive chief and administrator, over every one and every thing except the proceedings of courts of justice. Thus the police have been made more entirely subordinate to the magistrates, the gaols have been placed under their general control, as well as the public works. In most parts of India, except Bengal, there is a native executive establishment, which is extremely useful in many ways, under an officer called a tahsildar in the Upper Provinces, and a mamlutdar in Bombay. These officers see to the assessment and expenditure of local rates, look after the excise, manage sequestered estates, arrange for the passage of troops, carry out local works and repairs, and obtain statistics. Sir George Campbell is desirous of giving some such executive establishment to the district officers in Bengal. He would institute a native civil service on a wider basis, and thus supply a want which, in his opinion, impairs the efficiency of administration in the Lower Provinces. This has been effected to some extent by the formation of sub-divisional establishments for executive and judicial work, and for the collection of statistical information.

The main features of the changes thus effected in the administration of the Lower Provinces are a more active system of Government, the recall to life of the district officers, and the centralization of power and responsibility in the hands of the magistrate. He now exercises control over all departments; the nominal subordination of the police to him has become real; the executive engineer is under his orders; and he has the guidance of all education measures, with the aid of a committee.

Municipal institutions in India were, in their present form, the creation of our Government, and are quite distinct from the old village communities. Municipalities were first formed for the three presidency towns. In Calcutta the municipality consists of the justices and a chairman named by Government. Its expenditure amounts to 436,108*l.*, and the taxation is levied in the form of lighting, police, water, and general rates on all owners and occupiers, besides license fees for carriages, horses, and carts, and license tax on trades and professions. The Calcutta municipality already has a debt of 1,400,000*l.*, and a sinking fund for paying off the loans. Its income is nominally 507,298*l.*, and actually 270,000*l.* Great improvements have been effected, especially as regards drainage and water supply. In Madras the receipts of the municipality are 51,774*l.*, and there is a debt of 101,957*l.*, being money borrowed for completing the water supply project. The municipal funds are applied to education, hospitals, vaccination, and other objects of public utility, and on experiments to utilize sewage for agricultural purposes, which have been very successful. The water supply project is the chief undertaking of the Madras Muni-

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pality; for which 37 miles of piping have already been laid. In Bombay there had been agitation for self-government for some time, and the Municipal Act for the city became law in February 1873. It grants the franchise to certain classes of ratepayers, who elect half the corporation of 64 members, the other half being nominated by the Government and the justices. The functions of this corporation are to fix the rates and vote budgets. There is also a Town Council of twelve persons, eight elected and four nominated by Government. This body has full control over the finances. At the first election, out of 3,927 rate-payers entitled to votes, only 700 recorded them. Of the newly elected members of the corporation 22 are English, 19 Hindus, 17 Parsis, 5 Muhammadans, and 1 Portuguese. The municipal receipts of the city of Bombay amount to 304,833*l.*, and the expenditure to 297,772*l.*

Except in the presidency towns, municipal institutions only date from 1850. It is true that an Act was passed in 1842 empowering inhabitants of towns to form municipalities, but it proved ineffectual for the purpose, and the existing municipal institutions are based on Acts XXVI. of 1850, XX. of 1856, VI. of 1868, IV. of 1873 for the Punjab, and some provincial Acts.

If the people of a town expressed a desire to that effect, the Government was empowered to order Act XXVI. of 1850 to be put in force. A certain number of inhabitants were then appointed as commissioners for defining the taxes to be raised for the purposes of the Act, for applying them in payment of officers and servants, for the execution of works for the improvement of the town, and for other expenses. This Act is now in force in very few places, except in the Bombay Presidency. Act XX. of 1856 was passed for the maintenance of police *chaukidars*, and may have effect in every town to which the local government may extend it by notification. The magistrate is then to determine the number of police to be maintained, and the sum to be annually raised, which is to be either an assessment according to the property of the persons liable, or a rate on houses and grounds not exceeding five per cent. of their annual value. In each town brought under the provisions of the Act, the magistrate is to appoint a *punchayat* or committee, consisting of three or five inhabitants, whose duties are to apportion the rate; but the police are appointed by the magistrate. The surplus, after paying the wages of the police, may be devoted to the purposes of cleaning or lighting the town, or to other improvements. Act VI. of 1868 may be extended, by Government notification, to any town, when the provisions of Act XXVI. of 1850, and XX. of 1856 are to cease to have effect. The police rate is fixed at *Rs.* 1. 8. a year for each house; and the municipal tax is limited to *Rs.* 2. 4. for each house. The proceeds are to constitute a town fund, under the control of the magistrate. This fund is to be applied to the support of the police, construction and maintenance of roads, the general improvement of the town, vaccination, and dispensaries. A town committee is to be formed of not less than five inhabitants, and, if necessary, subordinate ward committees. These committees are to be nominated by the magistrate, unless orders are given for their appointment in some other way, and one-third are to be officials; they are empowered to elect their own chairman, and a third of the members are to retire each year. Their duties are to consult and advise with the magistrate on the assessment and expenditure of the town funds. If the Government appoints the magistrate to be the chairman of a town committee it becomes a corporation, and the committee itself receives magisterial powers. In the Punjab all municipalities are under Act IV. of 1873. By it, the towns where it is in force are administered by a committee which must consist of five members, but which is invariably much larger. These committees are divided into three classes, with graduated powers of expenditure; those of the first class expending the town funds on objects authorized by the Act, without control beyond a Government audit of accounts; those of the second class only expending sums without sanction up to 200*l.*, while all proceedings of those of the third class are subject to confirmation.

These Acts, it will be seen, render municipal institutions compulsory when the Government sees fit to introduce them into any town. The Act VI. of 1868 applies to large cities, the older Act, XXVI. of 1850, to smaller towns, and Act XX. of 1856, called the *Chaukidari Act*, to groups of villages and very small towns.

Excluding Calcutta, the municipal expenditure in Bengal amounts to 178,764*l.* The oldest municipal Act yet unrepealed is XXVI. of 1850, which is now only in force in one town in Bengal, namely, *Jamálpur* in the *Monghir* district. It is the only Bengal Act which admits of *octroi* duties. There are, however, 68 small towns and groups of villages under the *Chaukidari Act* for watch and ward (XX. of 1856). The Bengal Legislative Council have passed several important municipal Acts. The

first is III. of 1864, which introduced an elaborate system of local taxation, and vested its administration in a body of commissioners, partly *ex-officio*, and partly selected from the inhabitants. This body submits annual estimates of expenditure, and furnishes statements of receipts and outlay, and, with the sanction of Government, the commissioners may raise loans. Bengal Municipal Act, VI. of 1868, is for smaller towns, the number of the committees being only five and with less power, and the occupiers being taxed, instead of the owners. Bengal Act, VI. of 1870, is for rural villages, and to reform the police. The Lieutenant Governor considered that the existing municipal Acts differ in their scope from each other; and in the Municipal Bill which was passed by the Bengal Council in 1871-72, an attempt was made to weld these Acts together, and to regulate the whole subject of municipal administration and taxation. But the Bill failed to receive the sanction of the Viceroy. The Bengal Council, therefore, passed an Act which enables the ratepayers to elect commissioners under Act II. of 1874; and extends their powers, by allowing them to spend the funds on education, vaccination and medical relief, and registration. Serampur was the first municipality to avail itself of this franchise. Sir George Campbell considers that the best method of guarding against apathy and indifference in the town committees, is to render the position of their members more dignified and independent. In Bengal there are 25 large towns with municipal institutions under a local Act (III. of 1864), 91 smaller towns under another local Act (VI. of 1868), and 68 under the Chaukidari Act.

In the North West Provinces there are 78 municipalities under Act VI. of 1868; and, in many cases, the two-thirds of the committees which are not official are elected by popular suffrage. A few have magisterial powers under the Act. Their income, in 1872-73, was 184,920*l.*, raised by the *octroi* impost, the tax on houses, one on professions and trades, and a tax on carriages and horses. The *octroi* duty forms by far the largest item of the municipal funds in the North West Provinces, the Punjab, and Oudh. It is levied on food, fuel, building materials, piece goods, and metals entering the town (Government property, salt, opium, and articles liable to customs duty, except piece goods and metals, and exciseable liquors being exempt); and so long as it does not become a transit duty, there is no taxation less unpleasantly felt or more profitable. There are also 315 towns under the Chaukidari Act, where the assessments are made under the orders of the magistrates, but the details are worked out by a Panchayat, or committee of the inhabitants. The collections under this Act amounted to 33,261*l.*, most of which was absorbed by the pay of the police, but the surplus was applied to local improvements.

In the Punjab, the municipal committees, as has just been explained, are divided into three classes. There are eight of the first class—Delhi, Murri, Lahor, Multan, Amritsar, and the three hill sanatoria; 19 of the second, and 98 of the third class, besides 189 minor places administered by a magistrate in conjunction with a panchayat, which are practically in the third class. The municipal income was 206,366*l.*, five-sixths of which was derived from the *octroi* duty. Election is confined to two or three of the municipalities of the most important towns. In Oudh there are 19 towns under municipal control; but the committees are all nominated by Government officials, except at Lucknow and Faizabad. Here municipal government is still in its infancy; but in the Central Provinces the principal committees are gradually acquiring more independence, and the people are beginning to take more interest in their own affairs. There are now 62 municipal towns in the Central Provinces, of which 26 are in the valley of the Narbada. Since 1868, members of committees have been elected by the ratepayers, and in the larger towns the public take a decided interest in the elections, while the position of a member of a municipality is prized. The whole municipal income is 84,515*l.*, of which 56 per cent. is derived from *octroi* duties.

In the Madras Presidency there are 46 municipal towns. By the Madras Municipal Act (III. of 1871), not less than three inhabitants are appointed by the Governor in Council, as commissioners, in any town brought under its operation, to carry out its purposes, to continue in office three years; and the collector is *ex officio* commissioner in every municipal town in his district. It is provided that the Government, if thought advisable, may arrange for the election of a certain number of the commissioners by the ratepayers. The funds are to be expended on the repair and maintenance of streets and bridges, diffusion of education, and on hospitals, dispensaries, choultries, markets, tanks, and wells. The commissioners may levy a rate on the annual value of houses and lands, a tax on arts, professions,

trades, and callings, on carriages and horses, and tolls. The income of the 46 municipal towns of Madras is 111,293*l.*; and the expenditure 110,240*l.* Municipal institutions were introduced into Mysore in 1862, when municipal committees were created at Bangalore and Mysore. The experiment proved a success, and now there are 58 municipalities in Mysore. It will be a work of time to make the people value these institutions, but every effort is being made to induce the native official classes to interest themselves in the management of the local municipalities.

There are 168 municipalities in the Bombay Presidency, besides 54 in Sind. They are constituted under the provisions of the old Act, XXVI. of 1850, but it is generally admitted that the time has come for its amendment; and a Bill for that purpose is under consideration. Many towns systematically evade the burden of municipal government, while it has been introduced into others which are so small as to render its working impracticable. The most important municipalities are Súrat, with a revenue of nearly 50,000*l.*; Poona, Ahmadabad, each with an income of 10,000*l.*; Pandharpur, Sholápur, Nariád, Bulsur, Násik, Ahmadnagar, Belgaum, Hubli, and Sátára, with incomes from 9,000*l.* to 2,000*l.*; and Karáchi, with an income of 22,000*l.*; Haidarabad, Shikárpur, Sakkhar, and Lárkhána, in Sind. The members of the municipal boards in Sind, except those who have seats *ex officio*, are elective. The principal municipal revenues are from *octroi* duties, which are said to be more popular than any other form of taxation. The total municipal income, exclusive of the city of Bombay, was 198,857*l.* in 1872-73.

In Burma, municipal action is much needed; and funds are required at Rangún for conservancy, water supply, and lighting. That town has grown with extraordinary rapidity. When first occupied by the English, it was in a low swamp, under water at every rise of tide. Lands were sold, and the proceeds were directed to the purpose of raising the land and laying out streets. The Lands Sale Fund is now exhausted. Meanwhile, the town is spreading in every direction, and people are settling in swamps in the unreclaimed part. The population of Rangún is now 100,000, and 400,000 tons of shipping visit its port, yet the only water supply is from unwholesome wells. There is not a single drain, except on the surface, and there are no public lamps.

II.

FINANCE.

THE income of 1872-73 amounted to 50,219,489*l.*; of which 21,348,669*l.* was derived from land revenue; 8,684,691*l.* from the sale of Bengal opium and the duty on Malwa opium; 6,165,630*l.* from the salt tax; 8,166,329*l.* from customs, excise, assessed taxes, and stamps; and 5,854,170*l.* from smaller items. The ordinary expenditure amounted to 48,453,817*l.* leaving a surplus of 1,765,672*l.* Of the expenditure 38,205,212*l.* are spent in India; and 10,248,605*l.* in England; of which 1,146,116*l.* is for stores for India; and 9,102,489*l.* for other charges. Tables showing the revenues and charges, and receipts and disbursements, and the items of revenue and expenditure, during the year 1872-73, will be found in the Appendix.

The main source of revenue is derived from the demand on land; but this is a branch of administration of such importance as to require treatment in a separate Section. Next in importance comes the salt tax. The consumption of salt in India is greater, in proportion to other articles, than in any other part of the world. It is an absolute necessary of life, both for human beings and for cattle.

The salt tax has always been raised on various systems by the different local Governments. Until 1863 the districts on the sea board of the Bay of Bengal were divided into salt agencies. Advances were made to the agencies, and they agreed to manufacture and sell to the Government a certain quantity of salt at a certain rate. This salt was stored in Government warehouses until it was sold. The merchants paid the fixed price, including the duty, and received an order for the quantity required, upon a particular agency. The cost of each particular kind of salt was fixed each year by the Board of Revenue. The importation of foreign salt was also allowed, and it commenced in 1818, but there was no large importation until 1835. The custom dues were intended to maintain the average prices of Government sales. This Government monopoly was an artificial system of the worst kind, for the districts where the salt agencies were established were ill-adapted for the production of salt. The sea-water becomes diluted at the mouths of the Ganges and Brahmaputra; the salt cannot be evaporated by the sun's rays, and an expensive boiling process was necessary. In 1863 the Government resolved to abandon the system of manufacture altogether, and to rely upon an excise, and upon the duty on imported salt. The consequence was that the production in Bengal ceased at once, and entirely. There was no excise on salt at all in the first year after the abolition of the agencies, for there was no one who had sufficient capital to manufacture under the excise system. The price of salt fell 50 per cent. It was imported at 50 rupees per 100 maunds, having been manufactured at 100 rupees per 100 maunds. The chief importation is from England; but salt also comes from France, Madras, Bombay, Sind, and the Persian Gulf. In 1872-73 the quantity of salt imported into Bengal was 247,782 tons. The Bengal duty is *Rs.* 3. 4*a.* per maund, or about 1*d.* per pound, and the amount raised in 1872-73 was 2,660,369*l.* 7,980,000 maunds for a population of 66½ millions gives a consumption of about 9¾ lbs. per head for the year. The price of salt is 14 to 18 lbs, the rupee; and a ryot's family, of five persons, may consume 23¾ seers.* The income of a ryot is about *Rs.* 60, so that the salt tax is nearly 3 per cent. on it. There is a manufacture of salt in the Puri district of Orissa, of about 363,402 maunds, under excise rules, along the shores of the Chilka lake; and the people suffer loss and inconvenience from the difference between the Madras and Orissa rates of duty. Their equalization will be a great boon.

In the North West Provinces the salt supply is mainly derived from salt lakes in Rájputána. They overflow every rainy season, and on drying leave the salt in a thick incrustation. Formerly the duty was collected at various stations, scattered over the country. Afterwards the approach from the lakes was cut off by a long customs line which, before 1842, ran up the right bank of the Jamna until it joined the Himalayas, so as also to cut off the Lahor salt. Since that date the line has been turned from Delhi, across by Hissár to the Satlej, and, since the annexation of the Punjab, down that river to its junction with the Indus. This exterior customs line was established in 1834. It is now 2,375½ miles long. It consists of a hedge, partly green, partly dry. The revenue from the salt line is 1,414,828*l.* The duty on salt in the North West Provinces is three rupees per maund. Bengal imported salt very seldom comes up higher than Allahabad.

* 40 seers make one maund, which is equal to 82¾ lbs.

II.
FINANCE.

The Punjab salt supply is derived from the salt mines; and a customs line is also maintained down the Indus, to keep out the red salt of Peshawar, 982 miles long. The out-turn from the salt mines (*see* section on minerals) was 1,366,494 maunds, and 416,930*l.* was realised by the sale of it to traders at *Rs.* 3. 1. per maund. From the quarries in Kohat 413,984 maunds were taken, worth 8,874*l.* The income from salt in 1872-73 was 811,190*l.*, including that from the salt line. The duty is 3 rupees per maund.

In Madras the salt revenue, since 1805, has been collected through a monopoly, the sale and manufacture being in the hands of the Government. Contracts are made with manufacturers at the different salt works for the quantity required for the year, which is then brought into store on the Government platforms and sold by measure. The manufacture during the year under review was impeded by the rains, and the production was only 188,111 tons, or 32,721 below the average of the last five years. A sum of 44,600*l.* a year is paid to the French Government not to manufacture salt at Pondicherry, but to receive supplies from the British officials, and not to sell below the Government price. The price has been periodically raised, and it is now two rupees per maund. Without the duty the price would be two annas per maund, so that the duty is *Rs.* 1. 11. The net income in 1872-73 was 1,142,061*l.*; the revenue having been increased by raising the price, but the increase of profit was considerably less than the degree in which the tax was augmented, and the sales have actually diminished. It is proposed also to substitute an excise for the present monopoly, and an Act conferring powers to do so was passed in 1871. The consumption per head of the population in the Madras Presidency was calculated by Mr. Plowden at 15 lbs. a year. It has since been given at 12 lbs. a year.

In the Bombay Presidency the excise system for salt was introduced in 1837. Previously the duty had been imposed partly as transit duty, partly as a monopoly price at the salt works, and partly as excise; but in 1837 a uniform plan was adopted. The sea shore Gujrat salt works are Government property, and a fixed price is paid to the makers. But they were all closed during the year under review, except those at Cambay, Balsar, and Chaurasi. The question of permanently closing or retaining them is still under consideration. New salt works were commenced in the end of 1872, at a place called Kharaghora, which are intended to supply the whole of Gujrat. The work of sinking wells and preparing evaporating pans was commenced in November, 1872, and by March, 1873, the works were in full operation. Elsewhere there is an excise on the manufacture, the makers taking out licenses to open works. The total quantity manufactured amounted to 7,901,974 maunds; a large increase on the preceding year. Salt is exported to the Malabar coast, to the Nizam's territory, the Narbada valley, and across the Inland Customs line. The total quantity exported in 1872-73, from the Bombay Presidency, was 3,646,627 maunds. A good deal is smuggled, and large quantities are made by solar evaporation in the Runn of Kach. In 1869 the Bombay duty was raised to *Rs.* 1. 14. The superintendence of the Bombay Salt Revenue has been removed from the Commissioner of Customs to a new officer styled Collector of Salt Revenue. In 1872-73 the excise duty on salt removed from the pans amounted to 628,722*l.*, and the duty on salt imported by land and sea 40,258*l.* There were 62,713 maunds imported by sea, yielding a duty of 11,384*l.* Of this only 271 maunds came from England. The largest quantity (32,713 maunds) was imported from Goa to South Kanara. Large quantities also came from Dwarka and Daman. The other sources of salt income are proprietary right in Government salt pans, ground rent from pans, and sale of smuggled salt, giving a total of 685,013*l.* for 1872-73. The consumption of salt *per head*, in the whole Bombay Presidency, is estimated at only 9.74 lbs.; almost the same as in Bengal. The quantity annually consumed is calculated at 2,275,373 maunds.

In British Burma there is a duty on imported foreign salt, and an excise on that manufactured in the country. In 1872-73 the amount of foreign salt imported was 28,889 tons, and the revenue 13,147*l.* The salt from Liverpool finds its way up the Irawaddy to Bhamo, and is taking the place of indigenous salt.

It will be seen that the salt tax varies in amount in the different provinces; that in Bengal it is *Rs.* 3. 4., in the North West Provinces and the Punjab 3 rupees, in Madras *Rs.* 1. 11., in Bombay *Rs.* 1. 8., and in British Burmah as low as 3 as. per maund.

The possibility of equalizing the duties has long been discussed. Lord Hobart is in favour of reducing the duties in Northern India to the level of Madras. Sir G. Campbell thinks that the tax is too high in the North West Provinces and those

countries which are far from the sources of supply; he would equalize the rate all over India, except in the lower valley of the Ganges, where the land revenue is permanently settled, making it two rupees for the lower and three rupees for the higher duty. The subject, which is one of vast importance to millions of people in India, is likely to receive very careful consideration from the Government of India.

The gross Bengal opium revenue for 1872-73 amounted to 6,069,793*l.* The number of chests sold was 42,675. No one is allowed to grow the poppy except on Government account, and the manufacture is conducted at two separate agencies, Patna for Bahar, and Ghazipur for the North West Provinces and Oudh. The agents enter into annual engagements with the cultivators, under a system of pecuniary advances, to sow a certain quantity of land with the poppy, the whole produce being delivered to the Government at a fixed rate. There are 330,925 acres under poppy cultivation for the Bahar, and 229,430 for the Benares Agency, in all 560,355 acres. It is a high class cultivation, the land being specially attended to and manured; but of late years the poppy has been attacked by a blight. The opium is gathered in the early spring, manufactured and stored in the summer, and sold in the following year. In the autumn of 1872, Mr. Scott, of the Calcutta Botanical Gardens, was deputed to the localities where the opium blight had appeared, to work two seed gardens of his own, and watch the blight through all its phases, and he also has under his charge several small experimental gardens at the sub-agencies. Successful trials have been made of the effect of interchanges of seeds between the sister agencies of Bahar and Benares; but the trials of Persian and Malwa seeds have resulted in failure.

Opium is also grown in Malwa, in the region of Central India between Agra and Bombay. It can be grown more cheaply in Bahar, but the Malwa country is within the territory of native states, so that their free grown competes with our highly taxed opium. An administrative problem thus arose, which is analogous to that with reference to the unequal amount of the salt tax. It was necessary to put Malwa opium on an equality with that of the Bahar and Benares, and to deprive it of the advantage it derived from being grown free of the monopoly in native states. This has been effected by levying a heavy duty on Malwa opium at Bombay, its sole legal port of export. Up to 1842 the duty was only 125 rupees per chest, and the quantity of Malwa opium exported was equal to that from Bengal. The object has since been to equalize the duty in two ways; first, by increasing the quantity and lowering the price of Bengal opium, and secondly, by raising the duty on Malwa opium; it is now 600 rupees per chest. The amount realised on account of pass fees on opium at Bombay was 2,612,520*l.* in 1872-73, levied on 43,542 chests, of which 42,379 came from Indor and 1,163 from Ahmadabad. The quantity of Malwa opium exported was 42,401 chests.

After land revenue, salt, and opium, the next item of revenue is the custom duties, which yield 2,653,890*l.*, exclusive of refunds and drawbacks. In Bengal alone the land and sea customs receipts in 1872-73 were 1,090,544*l.*, of which one quarter was for exports and three quarters for imports. Besides Calcutta, the ports are Chittagong, and ports in the Balasor, Cuttack, and Puri districts. The largest item of import duty was on cotton manufactures, amounting to more than three-quarters of a million; next come liquors, and then metals. Of the Bengal exports, more than half consist of rice; then follow indigo, oil seeds, and lac. The exportation of jute, cotton, silk, tea, saltpetre, wheat, and sugar is free. The export duty on wheat was abolished on January 4th 1873. In Madras the customs receipts amounted to 293,742*l.* The customs receipts of Bombay reached to 667,826*l.*, being a decrease as compared with the previous year, which is accounted for by smaller imports of coffee, cotton, piece goods, metals, and railway materials, raw silk, and sugar; and by the export of spirits from bond to Damaun free of duty, for importation to Súrat, under the so-called Firmaun privilege, which was used up to September 1872. This privilege was granted to the Portuguese factory at Súrat by the Great Mogul in 1714, and has hitherto been recognised by our Government. By it goods belonging to Portuguese subjects, and carried in Portuguese vessels, were subject only to 2½ per cent. duty on importation at Súrat, while the tariff rate was three rupees per gallon. A wide margin was thus left for profitable speculation. The Firmaun privilege ceased under orders of the Government of India dated July 26th 1872.

The gross amount of land customs duty was 177,314*l.* and 2,459,830*l.* on sea customs; or 2,653,890*l.*, including miscellaneous receipts, being an increase on 1871-72 of 77,900*l.*

II.
FINANCE.

The abkâri, or excise duty on spirits, and the duty on stamps, are the items which come next to customs in importance. In Bengal the excise duties include spirits, intoxicating drugs, and the proceeds of the retail sale of opium. In 1872-73 the Bengal excise revenue amounted to 696,683*l.* It is derived from duties on spirits, and preparations of opium and hemp. The latter, called gaujá, is produced in a limited area in the districts of Rajshahi and Bogra, where it is cultivated in a skilful and scientific way. The duty on it has been so raised as that the consumption has become a third less than it was fifteen years ago, and the revenue has been doubled. There has been an increase in the revenue derived from country spirits; while the consumption has been checked by an enhancement of the distillery duty, an increase of the license fees, and restriction of the number of shops. The Punjab licenses for the sale of spirits and drugs, as well as the sale proceeds of excise opium, in 1872-73, yielded a sum of 87,633*l.*; Oudh 64,443*l.*; and in Madras, Mysor, and other provinces the abkâri is a steadily increasing item. In the North West Provinces the excise takes three forms; a duty on the manufacture of country spirits, sale of opium, and farm of the right to retail drugs. The excise revenue of the North West Provinces was 203,090*l.* In Bombay the excise revenue is derived from country-made spirits and toddy, and the retail sale of opium and drugs. Except at Ahmadabad, Broach, Surat, and near Bombay, the right of manufacture and retailing is sold by auction, and it is the interest of the contractors to prevent smuggling. Toddy is manufactured almost entirely in the Konkan, a duty of from 8 annas to 2 rupees being paid on each tree tapped. In Oudh, Mysor, and near some large towns of Bombay, the *Sadar* distillery system prevails. A large enclosure is erected, called a *Sadar* distillery, at the head quarters of each district, where all country spirits must be manufactured. Any one may erect a still within the enclosure, and distil liquor, on condition that, before removal, the excise duty is paid and the spirit reduced to the authorized strength.

The year of 1872-73 was the last in which income tax will form an item in the financial account; as from henceforth it is abolished. The receipts had fallen off, owing to the minimum taxable income having been raised to 100*l.*

A very important financial measure was adopted by Lord Mayo's Government, which came into operation in 1871-72. Formerly, expenditure was completely centralised in the Supreme Government, by whom grants were made to the local Governments, on detailed estimates showing the needs of each department. The local Governments asked as much, and the central Government gave as little, as possible. By a Resolution, dated 14th December 1870, certain heads of expenditure were transferred to the control of the local Governments, with a fixed annual grant to meet them. This grant amounts to the net assignments of the previous year for each head; a proportion of about 7 per cent. being deducted as a relief to the Imperial finances, and as representing a share of the burden to be charged upon local resources. The remainder was made over as a fixed annual income, the excess being defrayed at the cost of the province.

The heads, thus transferred, are jails, police, education, registration, medical services, printing, roads, civil buildings, and miscellaneous public improvements. This will, undoubtedly, prove to be a very beneficial measure. It will give the local governments a special interest in controlling expenditure on these heads, as well as in their efficient administration. The arrangement came into operation, for the first time, in 1871-72. The local taxation and expenditure is divided into two heads—provincial funds, including the annual Imperial assignment; and local funds, comprising all other sources of local revenue. For 1872-73 the Imperial assignment for Bengal was 1,320,383*l.* The combined provincial and local funds amounted to 1,631,799*l.*; and the disbursements were only 1,556,118*l.*; leaving an unspent balance of 462,376*l.* In the North West Provinces the combined receipts were 1,682,805*l.*, and the expenditure 1,663,567*l.* The annual Imperial assignment for the Punjab amounted to 531,800*l.*; and, adding receipts under other heads of service formerly subject to Imperial control, the receipts for provincial funds were 748,718*l.*, and the expenditure 515,153*l.* The receipts from local funds were 751,040*l.*, and disbursements 468,174*l.* The powers granted by Act XX. of 1871 have enabled the Punjab Government to raise 192,280*l.* out of these local funds, by imposing additional rates on the land, to be expended under the control of local district committees. These rates amount to 4½*d.* per head per annum of the agricultural population, or 2*d.* per cultivated acre; and they provide for the repair of 19,000 miles of road, and the maintenance of 116 public hospitals, and 1,042 village schools. Exclusive of municipal, cantonment, and police funds, there was a

balance, at the close of 1872-73, in the Punjab Local Funds, due to insufficiency of the staff of the Public Works Department to carry out the works on hand, and to the imperfect organization of the new district committees. Both defects are being remedied. The Department has been much strengthened, and rules have been issued to define the constitution, powers, and duties of the committees. It is hoped that, at the close of 1874-75, the balance will be considerably reduced. In Oudh there has also been a difficulty in spending the local funds, and out of the income of 616,252*l.*, there is a large balance of 120,794*l.*

In the Central Provinces, local demands are partly met by the *pandhri*, an old Mahratta tax on the non-agricultural classes, which was in existence when Nágpur was annexed, and though re-adjusted, it has always been continued. In 1867 it became a pure income tax on persons whose incomes were derived from any other source than agriculture, the lowest limit being 7*l.* 10*s.*; and persons assessable to income tax were exempted from the *pandhri*. In 1869-70, its proceeds were made over to the local government, and by this means an adjustment of local income and expenditure was effected. The lowest range of the *pandhri* has been raised from 7*l.* 10*s.* to 25*l.* per annum, while the maximum amount assessable has been advanced from 75*l.* to 100*l.* These changes are a great boon to the poorer classes. Out of 143,343 former payers of the *pandhri* tax, 127,000 will be exempted; while the loss of revenue is partly made up by raising the maximum, and thus including a richer class, formerly assessable to income tax. Tolls were also introduced on two important lines of road in the Central Provinces, but with an unsatisfactory result. There are also education, postal, and road cesses, besides the octroi levied by municipalities.

In Madras the Imperial allotment is 797,465*l.*; and here, again, there is a large unexpended balance, due, it is said, to the novelty of the system. In Bombay the allotment from general revenue was 1,051,442*l.*, and the receipts from local taxes 43,120*l.* The local expenditure was 1,070,594*l.*, the surplus at the close of the year being 223,566*l.* By Act III. of 1869 the Bombay Government was enabled to put a cess of 1 anna on land revenue, giving two-thirds of the receipts to the roads, and one-third to education. By Act IX. of 1863, for the suppression of frauds in the cotton trade, fees were taken, on export and on licenses for working presses, of 2 annas per bale, to maintain cotton inspectors, whose duty it is to see that cotton offered for compression is not adulterated. There is also a fund for the repair of jails, established in 1866.

There was a large balance remaining over at the end of 1872-73 in the accounts of provincial and local taxation of almost all the Governments in India. This, no doubt, is due to the novelty of the system, and, as is explained by the Punjab Government, to the inadequacy of the staff of engineers and others who would have to perform the duties connected with the expenditure of funds. If all the work that is contemplated is thoroughly done in each year, as, no doubt, will be the case when the new system is in good working order, these large balances will disappear.

The plan, inaugurated in December 1870, of assigning Imperial funds for certain heads of local expenditure has certainly not led to any serious increase of local taxation, although, in the last few years, there has been a considerable increase in the amount of such taxation. In the North West Provinces the Act XVII. of 1871 sanctioned the levy of cesses for certain purposes at the rate of 10 per cent. on the land revenue, which yields about 32,000*l.*; but simultaneously there has been a reduction of 196,000*l.* in the demand for income tax. In the Punjab Act XX. of 1871 authorizes a levy of a rate upon the land not exceeding six pies in the rupee, for roads, education, hospitals, and wells, the whole amount raised in any district being expended in that district under the superintendence of a local committee. The yield is about 137,000*l.*, but as some of these cesses already existed, the actual amount of additional taxation is 114,000*l.*, while the amount of income tax remitted is 123,000*l.* The local rates in Oudh are 5 per cent. on the land revenue, and yield 35,000*l.*; but the income tax remitted amounts to 37,000*l.* Altogether, including Madras and Bombay, every kind of local taxation in India amounted, in 1865, to 2,000,000*l.*, and now to 3,000,000*l.*

Before referring to the paper currency, it will be useful to insert here a paragraph on the metallic currency of India, using information derived from Mr. Seccombe's monograph on that subject. The silver rupee was first introduced by Shír Shah, the intruding Patan who had temporarily ejected the Emperor Hamayún, in 1542, the weight being 11½ mashas. The rupee of the Emperor Akbar—called the *jilály*—was of the same weight and value, being 179·5 troy grains of nearly pure silver. The

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later rupees of Akbar's successors weigh 175 grains. The towns of Agra, Ahmadabad, and Kabul alone had the privilege of minting gold. Allahabad, Surat, Delhi, Patna, Kashmir, Lahor, Multan, and Tandah coined silver; and 28 towns were allowed to fabricate copper coins. On the breaking up of the Mogul Empire, numerous mints were established by the Subadars and others who assumed independence; and the abuses that thus arose was very great. The East India Company therefore, in 1773, resolved that all rupees coined for the future by them, should bear the impression of the 17th year of Shah Alam, and thus this *sicca* rupee retained the full value of the original rupee of the Moguls. At about the same time the Surat rupee was adopted as the currency of the Bombay Presidency, of 178.3 grains troy. This rupee was, in 1800, ordered to be struck at Bombay, and was fixed at 179 grains weight (164.7 pure).

The Benares mint was established by Raja Bulwant Singh, under a sanad from the Emperor Muhammad Shah, in 1730. When Benares was ceded to the Company in 1775, the mint remained under native management until 1795; and it was abolished in 1829. Its rupee was of 175 grains; and it also coined a copper coin largely, called the *trisuli*, from a trident with which it was marked.

On the cession of the Doab in 1802, the rupee struck at the Fathigarh mint, of 165.2 grains, was assumed as the standard of the new territory, and was commonly called the Fathigarh rupee. In 1819 its standard was increased to 180 troy grains, with the same quantity of pure silver. This mint was abolished in 1824, after having coined 77,542,114 *Rs.* Its abolition temporarily caused a great increase in the value of silver, which gave rise to pressure in the North West Provinces, felt most severely by the agricultural classes.

The Sagar Mint had been set up by the officers of the Peishwa in 1779, at Garha Mundlah, it was continued by the British as a useful centre of issue, and a new building was erected in 1824; but this mint was abolished in 1835.

The unit of the Hindu system of currency was of gold; and, in the southern states where the Muhammadans did not gain ascendancy, this system always continued in force. The *huns* of Mysor and the South are the *pagodas* of Europeans which, in 1796, were the principal part of the remittance annually made from Madras to Bengal, caused by the balance of trade in favour of the latter province. A pagoda was worth $3\frac{1}{2}$ rupees; and when, in 1818, the silver rupee of 180 grains (165 pure) was established at Madras and declared to be the standard coin, all accounts and public engagements were ordered to be converted at an exchange of 350 rupees for 100 pagodas. The Muhammadan gold coin was the gold mohur, and by Bengal Regulation of November 21st, 1792, it was declared to be legal tender in all public and private transactions. Sir John Shore recommended silver as the only legal tender; and in 1818, the high standards of the gold mohur and *sicca* rupee having been found inconvenient, their value was ordered to be reduced to the standards of Bombay and Madras: the gold mohur 204.7 grains (187.6 true), and the rupee 191.9 (175.9 true). These were to be legal tender from January 1st, 1819. From 1801 to 1833, *Rs.* 337,131,778 were coined at the Calcutta mint; *Rs.* 105,815,663 at Benares, up to the abolition of its mint in 1829; *Rs.* 7,542,114 at Furruckabad; and *Rs.* 5,327,503 at Sagar; in all *Rs.* 525,817,058. The copper coins issued from the Calcutta and Bombay mints were quarter and half anna pieces. For very small payments, cowries (*cypræa moneta*) were in use, but by 1834 they had ceased to be imported, and had been nearly superseded by the copper pice. They are still, however, made use of for fractional payments, 400 cowries being equal to one anna.

The foundations of the Calcutta mint were laid in 1824, and it was completed in 1830. The Bombay mint was also completed in the same year; and the coinage of silver was commenced at the Madras mint in 1841. But the Madras mint was closed on August 31st, 1869. By Acts XVII. and XXI. of 1835, a new coinage was introduced. By Act XIII. of 1836 the *sicca* rupee was declared not to be legal tender after January 1st, 1838, but was to be received by weight, subject to a charge of 1 per cent. for re-coinage. For silver coinage the Company's rupee was substituted, with double, half, and quarter pieces, the rupee being of 180 grains (165 pure). For gold coinage the gold mohur or 16 rupee piece also of 180 grains (165 pure) was established, with 30, 10, and 5 rupee pieces; and the copper coinage was to be a copper pice of 100 grains, with a double pice and pie; the pice being only legal tender for fractions of a rupee. These were the only coins to be struck at the Company's mints, and the coinage of India has not since been altered. In 1843 measures were taken to displace all silver currency except the Company's rupee; for the native States continued to exercise their right to coin money, which caused some incon-

venience. Gold coins have practically ceased to be in circulation. In the year 1872-73 the quantity of bullion received for coinage at the Calcutta mint was 810 lbs. troy of gold, 112,857 lbs. of silver, and 101 tons of copper. The importation of the precious metals has decreased very sensibly, the amount of gold imported into Calcutta being less by 322,134*l.*, and of silver by 2,583,218*l.* The total import of gold in 1872-73 amounted to 844,842*l.*; and of silver to 2,583,218*l.*; exports of gold 16,368*l.* and of silver 59,612*l.* The gold imported into Bombay was 1,345,740*l.*, and of silver 1,444,780. At the Calcutta mint there were coined 23,254 gold mohurs, 7,788,695 rupees and 938,376½, 913,625½, and 808.87 rupees worth of half, quarter rupee, and two anna pieces; also 984,424 copper pie pieces, and 18,000,000 Ceylon cents. The latter item accounts for the large receipt of copper. At Bombay no gold and no copper was coined, but 28,095,600 rupees, 552,800 half-rupees, 338,500 quarter-rupees, and 362,800 two anna pieces. It is estimated that the coin in circulation, being calculated from the actual British coinage for the last 25 years for all India, is represented by 16,200,000 rupees worth of gold mohurs, 1,580,000,000 of silver, and 29,600,000 of copper. It is also believed that there are 10,000,000 sovereigns in India, as they are found in every village in the Bombay Presidency, where there is a special demand for the St. George and Dragon sovereigns of George IV. and the later Victorias, for religious purposes. Gold is mainly used for hoarding and ornament.

At about the same time as the currency was fixed, Chartered Banks were established at Calcutta, Bombay, and Madras. The Chartered Bank of Bengal was constituted by Act VI. of 1839, with a capital stock of 75 lakhs, with power for further increase, 275 shares (11 lakhs) being the property of the Government. The nine directors were to be nominated, six by subscribers and three by Government. The Chartered Bank of Bombay, by Act III. of 1840, was to have a capital stock of not less than 50 nor more than 56 lakhs, three lakhs being Government property, and two out of the nine directors being appointed by the Government. The Madras Chartered Bank was formed by Act IX. of 1843. It was to have a capital stock of 30 lakhs, three being the property of Government, and three out of the nine Directors were to be appointed by the Governor of Madras in Council. These Chartered Banks, previous to 1861, issued a limited circulation of notes, confined almost exclusively to the presidency towns; and the great financial measure, with a view to a more general paper currency throughout India, is due to Sir Charles Wood.

The introduction of a paper currency dates from 1861. India had been steadily draining Europe of silver bullion at the rate of 10,000,000*l.* a year; the circulating medium was silver, and there was an incessant transmission of large remittances to and fro over the length and breadth of the land. The great expense and inconvenience of carrying about heavy packages of silver rendered the introduction of a paper currency a measure of no small consequence to the welfare of the people of India. Mr. Wilson originally proposed the adoption of this measure in a Minute dated 25th December, 1860. But his scheme received some modification in the Act to provide for a Government Paper Currency (XIX. of 1861), which was passed when Mr. Laing was Financial Member of Council. A Department of Issue was established for the issue of promissory notes, payable on demand, for sums not less than ten rupees. Mr. Wilson intended to have issued notes as low as five rupees. The head commissioner of the Department of Issue is the master of the mint at Calcutta, and the master of the Bombay mint is also a commissioner. Circles of issue are established, each with a chief town as a centre or place of issue of notes, with subordinate agencies of issue within the circle. The head commissioner provides the promissory notes, which are issued at the different centres in exchange for silver, or for other notes; and the whole amount of the bullion or coin so received for notes must be retained as a reserve, with the exception of such an amount, not exceeding four crores of rupees, as the Government may from time to time fix, the amount so fixed being invested in Government securities. The notes are deemed to have been issued on the security of silver received for them, of the money invested, and of the general credit of the Government. The promissory notes are legal tender within their respective circles. A short Act (I. of 1866) was subsequently passed, altering the conditions on which persons tendering bullion or foreign coin were to receive promissory notes in exchange. In the first Act it was provided that such persons might be required to pay the expense of melting and assaying such bullion or foreign coin. The new Act entitled them to receive a certificate acknowledging the receipt, and the value, after deducting the expense of melting and assaying, and

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also stating the interval on the expiration of which the holder shall be entitled to receiving notes in exchange. In March 1862 an agreement was made with the chartered banks, to continue in force for five years, which provided for the issue and payment of the currency notes, through their agency, and for the establishment of branch banks with the same object. The notes are of 5, 10, 20, 50, 100, 500, and 1,000 rupees; and up to 1867 ten circles had been established at Calcutta, Allahabad, Lahor, Nágpur, Madras, Calicut, Trichinapalli, Vizagapatam, Bombay, and Karáchi. The amount of notes to be issued was not to exceed 4,000,000*l.* beyond the bullion held in deposit; but in 1870 the limit was raised to 6,000,000*l.* In 1866 the circulation of these notes had reached to over 10,000,000*l.* Since that time the demand for notes has steadily increased. In Bengal the value of notes paid into the treasuries in 1872-73 was 3,000,000*l.*, and of those paid out 2,500,000*l.*, which largely exceeds the total of the previous year. Small notes were in great demand in the interior, while large notes travel back to Calcutta. The notes are cashed as freely as possible at all the treasuries, and are really passing into circulation. In the North West Provinces there has also been a considerable increase in the circulation of the currency notes. From May 1872 there was a steady monthly increase up to the end of March 1873. 1872-73 was the first year of issue of the five-rupee notes, which met with a favourable reception, 18,590 having been issued during the year. This shows that paper currency is not only used as a medium of exchange in remittance, but that it is applied to the ordinary transactions of daily life and petty trade. The tendency to make use of Government paper is reported to be gradually gaining ground among the people of the North West Provinces; 414,633*l.* worth were in circulation in March 1872, and 1,285,215*l.* in the end of March 1873. Of this 676,026*l.* worth were in the hands of the public, against 222,302*l.* worth in 1872. In the Madras Presidency there has been a marked progress in the issuing and cashing of notes of the treasuries during 1872-73, and in the Calicut and Cocanada circles there has been a considerable and extended increase in their use, throughout the year under review. In Bombay there was an increase of 341,000 notes received and issued, over the previous year; and in Sind, the five-rupee notes are reported to be a great convenience, and to be freely used by the people. The currency notes are acquiring the ready confidence of the public; and this measure, which was first worked out by Lord Halifax, has, in a very great degree, promoted the convenience and commercial welfare of the people of India.

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The Land Revenue of India is a branch of the Administration which is so closely connected with the every-day life of the people, and so important in its political as well as in its merely fiscal bearings, that it can never be treated like salt and customs, as a mere item in a financial account. The welfare and contentment of the people depend upon the wise adjustment of the demand on the produce of the land; and the difficult questions relating to land revenue have always required the most close and careful attention from Indian statesmen.

The famous measure of Lord Cornwallis, by which the amount of the Government demand on land, in Bengal, Bahar, and Orissa, was declared to be permanent, has necessarily had an enduring influence upon the districts that were effected by it. These districts are suffering from one of those terrible visitations with which parts of India are periodically afflicted, and the working of the permanent settlement is now therefore, a matter of special importance. As it has influenced the well being of a vast population during the greater part of a century, so it must be a main feature in the consideration of measures by which future calamities, like the present famine, may be met and averted.

A decennial settlement was commenced in 1789 and completed in 1791, the assessment for land revenue in Bengal, Bahar, and Orissa being fixed at 2,858,772*l.*, and this settlement was declared to be permanent in 1793.

For the full comprehension of this measure it is, in the first place, essential to bear in mind the exact area over which its influence extended. The Bengal of those days comprised the present divisions of the Presidency, Rájsháhi, Chittagong, and Dacca, with parts of Hazaribagh and Maunbhum, now in the Chota Nágpur division, and of Julpigori and Kuch Bahar. Bahar comprised the Bhagalpur and Patna divisions; while Orissa did not include any part of the present division of that name. The term, in those days, meant only the tract of country between the Rupnarain and Subanrekha rivers, now included in the district of Midnapur.

The importance of attending carefully to geographical limits, in the consideration of questions relating to administration, is very strikingly shown with reference to the Bengal permanent settlement. It has been seen that the original assessment, which was declared to be permanent in 1793, amounted to 2,858,772*l.*, yet it is now 3,520,886*l.*, an increase of 662,114*l.* The causes for this remarkable enhancement cannot be fully explained, owing mainly to the neglect of a systematic record of changes in geographical limits. Out of the whole increase of 662,114*l.*, Bahar yields as much as 404,096*l.*, and in this province all the districts have frequently contracted and expanded, while three new ones have been formed; and the records of changes are incomplete.

The primary object of the permanent settlement of 1793 was to record all rights to the land. The Regulation (XII. of 1793) provided that there should be a general register of estates, and of intermediate mutations, and every fifth year the original register was to be re-written. All zemindars were required to maintain *patwaris* or village accountants, who were to file their accounts with *kanungos*, or officers appointed by Government, one for each estate or *parganah*, to keep the public accounts and receive returns and registers. The zemindars, or great landholders, had their rent charge permanently fixed, but there were also general provisions in favour of the tenants, and the theory was to give all under-holders the same security of tenure as against the zemindars, which the zemindars had as against the Government. The zemindars were bound to specify, in writing, the original rent payable by each ryot; the ryots were entitled to a renewal of their *pattahs* or leases, at established rates, and the zemindars had no power to cancel them.

But in the working of the permanent settlement between 1793 and the present time many of the provisions of Regulation XII. have been neglected, others have been altered, and the intentions of its framers have been departed from very materially.

The zemindars, with whom the settlement was originally made, were for the most part powerful men, whose authority extended over a wide tract, and who had police and other functions entrusted to them. But, under the influence of debt and mismanagement, these large zemindaris were speedily broken up. There was wide-spread default, and consequent sales for the recovery of arrears, and within ten years from 1793, there was a complete revolution in the ownership of estates. In order to

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ensure the payment of the Government demand, it was thought desirable to enable the zemindars to realise their rents more readily. In 1799 they were invested with greatly increased powers over the ryots, whose persons were allowed to be seized in default; and in 1812 further powers were given them to distrain the property of ryots; so that, for some fifty years of the present century, they exercised powers over the ryots, far greater than those given them by the Regulation of 1793. Those parts of that document which gave rights and privileges to the zemindars have been stretched to the utmost, while those parts which restrained and limited their rights have been utterly set at naught. Many illegal cesses have also been habitually levied by the zemindars, while the Government more and more gave up the functions of recording the rights that were created after 1793, and extensive tracts were leased out on long terms. In 1819 these permanent alienations had been so extensively effected that they were legalised by Regulation VIII. of that year, when means were afforded the zemindars of recovering arrears from their patnidars. The practice of granting these under-tenures has steadily continued, and now but a small proportion of the whole permanently settled area is in direct possession of the zemindars. The holders of *patnis* and *izars* have again created lower gradations of sub-tenures in great numbers, and there are even further subordinate tenures, besides older fixed and transferable under-tenures which existed before the settlement of 1793, when their permanent character was recognised.

The powers given to the zemindars over the ryots, in 1799 and 1812, nullified the clauses of the Regulation of 1793, which protected the inferior holders, leaving everything to the judicial tribunals. Regulation I. of 1819, indeed, established the kanungos, and defined the position and duties of patwaris; but the kanungos ceased to exist everywhere but in Orissa, and the patwaris fell into disuse, or became the mere servants of the zemindars. Hence the registers have never been kept up in such a way as to be really useful. They do not show who the zemindars are, and give no information at all respecting the under-holders or ryots.

Yet many permanent under-tenures, known as *patni* and *iza* tenures, were withdrawn in 1859, when the whole rent law was rescinded by Act X. of that year. This law reduced the powers previously exercised by the zemindars, while it increased the grounds of enhancement and afforded the remedy of a summary process before the Deputy Collectors. Rent suits are now transferred to the Civil Courts, where there is difficulty in quickly realising undisputed rents by legal process.

The result of the permanent settlement has been a great multiplication of the number of estates, with corresponding reduction in the average area. In 38 districts, out of 154,200 estates on the public books, 533 only are great properties with an area of 20,000 acres and upwards; while 137,900 contain less than 500 acres. The partition of estates has been partly voluntary, and partly to bring portions to sale for arrears or debts; and the transformation has been so complete, that it is almost impossible to establish points of identity between the lists of 1793 and those of 1872. The average annual number of sales of whole estates during the last ten years has been 686.

It has been the aim of Sir George Campbell, during the term of his Lieutenant-Governorship, to register and recognise patwaris throughout the Lower Provinces, to restore the kanungos where they had ceased to exist, and to ensure the due registration of the rights of ryots, as was contemplated by the Regulation of 1793. He has found, in the provisions of the Road Cess Act, an instrument by means of which an efficient register of tenures in Bengal may be secured. This Act provides for the valuation of properties, and thus involves a record of tenures and rents such as has never before been made in Bengal. These valuations have been most successfully conducted, and registers have been compiled of all the zemindars and sub-tenures, and of the rent paid by every ryot, in each of the nineteen districts to which the Road Cess has been extended. The returns are compiled into intelligible tables which show the facts of each district; and already the ryots, in many Road Cess districts, have come forward to take extracts from the returns relating to their holdings and rents. These returns are the first authoritative records ever framed in Bengal, of the rents payable by ryots over any large area of country.

The sales of estates, which come into the hands of the Government from default of payment of the demand, are suspended pending a full inquiry into the minor tenures, and until all rights have been recorded. Many landed estates also come under Government management from being owned by persons disqualified on account of sex, age, or mental incapacity; and these estates of wards are intended to be the

models of what well-managed estates ought to be. There are now 104 wards' estates under management, some with very large rentals. The sale of Government estates was stopped until the receipt of a report from the Board of Revenue regarding the effects of the sale system on the well-being of the people, as shown by the position of the ryots on the land after it was sold. This report had not been received, and no Government estates were sold during the years 1872-73. But, meanwhile, all collections on Government estates are made through the village headmen, and on large estates through a *tahsildar*, or officer who collects directly from the headmen. Thus the question will probably settle itself, through this new system of settling direct with the ryots or tenure holders; for when such settlements are made there can be no occasion to sell the estates.

During the year 1872-73 some agrarian disturbances broke out in the Isufshahye Pargana of the Pabna district (Serajganj Sub-Div.), at the confluence of the Ganges and Brahmaputra. The zemindars attempted irregularly to effect a large enhancement of rent, both by direct increase and by the consolidation of rent and cesses. The ryots yielded at first, but soon began to organize themselves for systematic resistance into what they called *bidrohi* (union) under a petty landholder, their demands being a very large *bigah* of measurement and very low rent. Large bands of villagers were formed. On July 4 the Lieutenant-Governor issued a proclamation requiring the ryots to disperse, and to prefer peaceably any grievances they might have. About 300 persons were arrested and tried for rioting and illegally assembling, of whom 147 were convicted. There was no more rioting, but the union movement has spread, and it appears that these local ryots' unions are quite common in Eastern Bengal.

With the exception of Midnapur, the survey of Bengal proper is now complete. It was commenced in 1835 in Chittagong, in 1836 in Monghir, in 1838 in Cuttack, Puri, Balasor, Gaya, and Bhágalpur, and in 1841 in Patna, and was completed in Hugli in 1872. Most of the districts are surveyed so as to show the boundaries of each village and each estate, on a scale of 16 inches to the mile; but, except in a few limited tracts, there are no field measurements. All disputes regarding boundaries are decided by the demarcation officers. When a whole village belongs to one estate, only the outer boundary is surveyed; but when a village contains the lands of more than one estate, each separately-owned plot is surveyed. In Hugli 4,000 village circuits are demarcated; in 1,000 the whole village forms one estate, while in the other 3,000 interior measurements were necessary, and 80,000 plots had to be surveyed, owing to the intermixture of the lands of different estates. Demarcation is followed by a professional survey, comprising a scientific survey of village boundaries, and the insertion of geographical and topographical features. The great defect in the Bengal revenue survey is the absence of permanent marks. By Act IX of 1847 the survey of alluvium and diluvium along the banks of rivers was provided for. It was commenced at Patna in 1863, and completed in Rájsháhi in 1872. Large portions of land were often washed away, sometimes suddenly and sometimes by slow degrees, from one side of a river to another. Those who suffered from diluvium were allowed an abatement of revenue, and those whose estates had gained land were assessed in proportion. This survey should, in future, be made at intervals of ten years.

The present Orissa division does not correspond with the district of the same name which came under the permanent settlement of 1793, as has already been explained. Orissa proper, conquered by the Moguls in 1580, lies between the western mountain tracts and the Bay of Bengal. It consists of sea board plains, and of encircling hills, where Orissa chiefs formerly maintained semi-independence. The hill tracts were called Rajwara. Midnapur and part of Hugli, acquired by the Company in 1760, is the Orissa of the permanent settlement. The true Orissa, including Balasor, Cuttack, and Puri, was not taken by the English from the Mahrattas until 1803.

The Mahrattas imposed on the hill Raja of Khurda, and all the subordinate feudal chiefs or khundaits, a quit rent, which was often levied by force. The English recognised the right of the Raja of Khurda and all the principal khundaits to hold their estates at permanent quit rents; while the remainder were left in the position of semi-independent tributary states. But the Khurda Raja rebelled and was dispossessed, and ever since his estate has been held under direct Government management, the Raja receiving a pension. The other large estates were permanently settled at fixed rates.

The permanent settlement was not, however, extended to the rest of the province.

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There were 10 short temporary settlements between 1803 and 1837, and a 30 years' settlement was concluded in the latter year, which expired in 1867. It was then renewed, without alteration, for another 30 years. This Orissa settlement of 1837 was based upon a careful field measurement, and upon an investigation into the individual rights of each landholder and under-tenant. This was a work of great labour, and occupied eight years. The system was to settle the revenue payable by each of the ryots, and then to give a settlement to a superior landlord, who collected the revenue from them. The revenue from the 30 years' settled tracts is 133,672*l.*

In Assam the settlement for land revenue is made annually with each cultivator, who is assessed for the land actually occupied by him. The revenue is satisfactorily and punctually collected by mouzahdars, or native village officers, who receive a commission on their collections. The revenue for 1870-71 was 209,337*l.*

The rules respecting the sale of waste lands belonging to the Government apply to tracts in the Sunderbuns, the uplands of Chittagong, the Himalayan terai, Assam, and Cachar. The old Assam Waste Land Rules, promulgated in 1854, allowed grants to be made for 99 years; a quarter of the area of each grant being rent free in perpetuity, and the rest being free for 15 years. There were certain conditions respecting clearance within a specified time, and if not complied with, the grants were to be resumed. No grant was to be of less area than 500 acres, and a sum was to be deposited to provide for proper survey. In 1856 these rules were extended to Cachar and Silhet. But after the mutinies there was an outcry for grants in fee-simple, and against the clearance conditions, which had an effect upon the Government. In his Minute, dated October 17, 1861, Lord Canning laid down three main principles on which grants of waste lands were to be made. The first was that grants should be in perpetuity as heritable and transferable property, subject to no enhancement of land revenue assessment: the second, that all prospective land revenue should be redeemable at the grantee's option by a payment in full, either when the grant was made, or gradually: and the third, that there should be no obligation to cultivate or clear any specific portion within a specified time. The minimum price for the fee-simple was to be 5*s.* per acre, and by paying 10 per cent. (6*d.* per acre) a title was to be obtained. The Secretary of State subsequently added two further requirements, that every estate should be surveyed previous to the sale, and that all sales should be by auction to the highest bidder, above a fixed upset price. Rules for the sale of waste lands in the Sunderbuns were issued in 1863, and for Darjiling in 1859.

In making grants of waste lands many abuses have been allowed to creep in. In 1864 there was agitation against the sale of lands by open auction, and the Government was induced to allow land to be taken up on leases of 30 years for tea cultivation; without any efficient provision for survey, or for the protection of native interests. Then there was a great rush of speculators in tea planting, who bought Government wastes upon credit wherever they could get them. In many cases the Government officers relaxed the rules as to surveys; and large areas were sold to jobbers, who transferred them at a profit, or threw them up altogether. Cultivated lands not regularly settled, in some instances, were sold as Government waste lands, over the heads of the native occupiers.

As a remedy for these evils Sir George Campbell has published some *ad interim* rules, by which no more lands are to be sold, free of revenue, without the previous sanction of the Government of India, except for gardens or buildings not exceeding 10 acres. But the whole question is still under consideration.

In March 1873 the Lieutenant-Governor submitted a set of rules for approval by the Supreme Government. They provide that Government may sell land outright for tea cultivation, so long as the rights and claims of cultivators and ancient inhabitants are respected, as well as rights of way and user. No single plot exceeding 1,500 acres is to be put up for sale, and a previous survey is to be obligatory. The sales are to be by public auction, the upset price in the Sunderbuns being *Rs.* 5 per acre, in Assam *Rs.* 8, in Darjiling *Rs.* 10: the unculturable part being sold at one half. The final Draft Rules were submitted to the Government of India on the 31st of October 1873, and will shortly receive sanction.

The principal settlement of the land revenue of the North West Provinces was made between 1834 and 1842, generally for 30 years, so as to terminate between 1864 and 1872. A renewed settlement has now been in progress for several years; but the revision has not yet been finally sanctioned in any district. The sanction of Government for the new settlement in the different districts will be

given during the next and following years, so that the present is a convenient time for giving a short general sketch of the principles upon which these settlements are based.

The first regular settlement of what are now called the North West Provinces was commenced by Shir Khan, and completed by the Emperor Akbar. Correct accounts of the boundaries of each village were drawn up, the cultivated and uncultivated areas were measured, the land was divided into classes with reference to the description of soils, and each field was assigned to one class or other. The average produce of each class, and the average price of grain was then ascertained for 10 years, and one-third of the average gross produce was taken as the rent. But the leading principle of Akbar's settlement was that the Government held the village community, and not each individual cultivator, responsible for the payment of the rent.

When the North West Provinces became British territory a proclamation was issued on the 14th of July 1802, afterwards incorporated into Regulation XXV. of 1803, according to which there was to be a triennial settlement from 1802 to 1805, another from 1805 to 1808, and a quartennial settlement from 1808 to 1812. At the expiration of the above ten years, it was declared that there would be a permanent settlement concluded with the same persons (if they were willing to engage, and if no others having a better claim came forward) for such lands as might be in a sufficient state of cultivation to warrant the measure, on such terms as the Government should deem fair and equitable.

By Regulation VII. of 1822 there was an attempt to ascertain the amount of the State demand, by a calculation of the gross produce, the cost of cultivation, and the net yield of every field. But it was found impracticable to carry out this system, and for ten years it remained ineffective. By Regulation IX. of 1833 Lord William Bentinck decided that the settlement should be based on the rents actually paid, and it was commenced on that principle. Mr. R. M. Bird carried it through during the next nine years, and by 1842 it had been completed in all the districts.

Mr. Bird was at first only interested in the improvement of the judicial machinery, and the various arrangements of the settlement were not originally intended as machinery for the accurate ascertainment of the resources of the land. Their first object was the framing of a record of the several interests of those who held their lands in common, and of the rights of cultivators; and Mr. Bird was induced to enter upon the investigation by the conviction that the judicial tribunals were unequal to the ascertaining of those rights, and to the protection of those who possessed them. He undertook the duties of a revenue officer only with the view of perfecting these plans for the good of the people, and because he was convinced that practical operation might be given to the rules contained in Regulation VII. of 1822. His principle was that the assessment of a fair and moderate revenue on the land might be so combined, with an ascertainment of private rights of the village communities, that such records might be framed, such principles fixed, as would correct the evils which, at that time interfered with agricultural prosperity.

The principle of the settlement was to take two-thirds of the rental as Government revenue, leaving the remaining third, and all future increase during the term of settlement, to the proprietors. It will be remembered that Akbar took the whole rental, and recognised no proprietor but the State. In this lies the main difference between his system and ours. The proprietors recognised by the settlement were not always the village communities, but in many, if not in most cases, they were intermediate persons, who succeeded in establishing claims to the rent. The tenure by village communities or brotherhoods is called *Bhyacharah*; but this tenure exists in the smaller proportion of the whole number of villages in the North West Provinces. The most common tenure is that where a village belongs to a family, the cultivators being tenants of all the family as a body. The Government settlement is made with the proprietors for each village or township.

The first operation is the demarcation of the village boundaries, and the ascertainment of its total area, and the next is the interior measurement of fields by rod and chain. Each field is registered with the name of the cultivator and proprietor, its dimensions and area, the nature of the soil, and the rent. A list of cultivators is made out, showing what each holds, and what rent each pays, and another list is made out of the proprietors. An administration paper of each village is then drawn up, showing how the revenue is to be distributed and collected, what are the relations between proprietors and tenants, and the remuneration of village officials. *Kanungos*, or district accountants, are then appointed by the Government, and *patwaris*, or village accountant, by the landholders.

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The first settlement, for 30 years, was completed in 1842. It included 80,883 townships, and an area of 71,985 miles; and the revenue demand was fixed at 4,052,992*l.* including the permanently settled province of Benares. The rate per acre on cultivation was 3*s.* 6*d.* The population affected by the settlement was 23,199,668.

Mr. Thomason, one of Mr. Bird's assistants, administered the system for 10 years (1843 to 1853) as Lieutenant-Governor of the North West Provinces. The collectors of each district have under them an efficient native executive staff, consisting of tehsildars, eight or ten to a district, who superintend subdivisions, and enable the collectors to exercise a minute control over the affairs of the district.

The 30 years of the first settlement were interrupted by the Drought and Famine of 1837-38, the Mutiny of 1857, and the Famine of 1860-61. The latter visitation gave rise to a long discussion on the advisability of introducing a permanent settlement into the North West Provinces. The Famine of 1837 was more severe than that of 1861, although there was heavier pressure from drought in the latter year, and the reason of the power of the people in the latter year to pass through the ordeal with far less suffering, was believed to be the creation of a vast mass of readily convertible and easily transferable agricultural property. This state of things was the direct result of the limitation of the Government demand on land for the long term of 30 years, and the careful record of individual rights. The settlement had introduced moderate assessment, minutely recorded and easily understood titles, long leases, and the guarantee of enjoyment of all profits during the currency of such leases. Land thus obtained an increasing marketable value, which as a security was largely made use of in mitigating the pressure of the famine. Such being the result of the fixity of the public demand for 30 years, it was argued to perpetuate these results, the public demand on land should be fixed for ever. These arguments were urged by Colonel Baird Smith in his Report on the Famine of 1860-61, and by Mr. Patterson Saunders in his account of the cotton districts of the Doab. Sir William Muir, who was then (1861) a member of the Board of Revenue, was also in favour of a permanent settlement, his advocacy being based on the assumption that, in future settlements, the revenue would not materially vary from the then amount. But he never advocated a limitation of land revenue in perpetuity, under circumstances which would gratuitously sacrifice the interests of the Government. His view of the benefits of a permanent settlement were the saving of expenditure now incurred by the periodical assessments; the deliverance of the people from the vexations prevalent at every re-settlement; the freedom from the tendency to deterioration of property towards the close of each temporary settlement; the prosperity arising from increased incentives to improvement and expenditure of capital; the increased value of landed property; and the content and satisfaction among the people. Thus a strong feeling arose in favour of a permanent settlement. In a dispatch dated July 9th 1862, the Secretary of State for India announced a deliberate intention to grant, under certain conditions, a permanent settlement of the land revenue demand in the North West Provinces. A long official discussion on the subject was carried on between 1862 and 1868. The Government never appear to have intended to introduce a permanent settlement over a wide extent of country, but to limit it to particular estates under certain conditions. The proposal was to calculate the proportion between cultivated and fallow land on an estate, and where the cultivated area exceeded a fixed ratio, to grant a permanent settlement, withholding it from estates where that test failed, until the required proportion was reached. This method was resolved upon as a precaution against "undue sacrifice" of the Government revenue; and Sir Charles Wood, in a Despatch dated 24th March 1865, ordered that no estates of which the actual cultivation amounted to less than 80 per cent. of the cultivable area was to be admissible to a settlement in perpetuity. This decision was repeated in a despatch from Sir Stafford Northcote, dated 23rd March 1868; and another provision was added, namely, that no permanent settlement should be concluded for any estate to which canal irrigation was likely to be extended within the next 20 years.

But Sir William Muir, when he became Governor of the North West Provinces in 1868, considered it necessary to re-open the question. He found a difficulty in applying the prescribed rules for a permanent settlement to the pargana of Baghpur, in the Zillah of Matra, where the standard of rent, from various causes, was greatly below that prevailing elsewhere. At the same time there was an extraordinary and sudden rise of rent in Bulandshahr. He therefore represented that the two conditions

enjoined by the Secretary of State were not sufficient, and that a third ought to be added, namely, evidence that the standard of rent prevalent is adequate, and not below the level of rent throughout the country at large.

During the year 1872 the question was again referred to the most experienced settlement officers of the North West Provinces; and most of the highest Indian authorities have now expressed their views on the subject. The general inclination of those who are in favour of permanency is in the direction of a settlement, not upon the basis of a fixed money assessment, but of the value of produce according to the average prices which prevail. This was the view of the late Sir Donald McLeod, Lieut.-Governor of the Punjab. Before he left India in 1870, he recorded his opinion against the introduction of a permanent money settlement. He considered that it would be a mistake to declare permanent the money assessment of any land whatever, because money is an unreliable standard of value. Fifty years hence, if the demand assessed upon land represents but half the real value it did when first fixed, it will be a matter of the utmost difficulty to find other sources from whence the enormous deficit can be supplied, and the effort to realise it will be attended with exceeding danger. But Sir Donald added that if, instead of using a cash standard, we were to employ some other standard supplying a correct measure of the increase of value, such as the value of labour and the price of corn, he would be entirely in favour of permanency of settlement, wherever the cultivation had attained to the required proportions. The Madras Government have been in favour of a similar system. Between 1856 and 1870 they urged the advisability of imposing a permanent grain rent, with a changing money rate; but were unable to obtain the sanction of the Secretary of State to the carrying out of their views.

Sir William Muir placed his own final views on record on March 2nd 1874. He believes that in future there will be a great rise in rent, caused by the slow but certain influence of a rise in prices, and other causes; and, with a view to a settlement of the question, he proposes a plan which was suggested by the code of procedure in the Bombay Presidency. It is there laid down (*Act I. of 1865, sec. 30*) that revised assessments of land revenue shall be fixed, not with reference to improvements made by the owners, but to general considerations of the value of the land as to soil, situation, prices of produce, and facilities of communication. This principle of respecting improvements made by owners is, as a rule, lost sight of in the North West Provinces. Sir William Muir suggests that, under favourable circumstances, the claims of Government might be met, at a future period, not by a revision of the settlement, but by the imposition of a rateable increase. The district where such a system is introduced must have been in a fair state of development at the time of the settlement, which must have been carefully and uniformly made. Under these circumstances, if the letting value of the land has advanced 12 or 15 per cent. since the last settlement, the Government claim might be met simply by a rise of 10 per cent. in the land revenue. By this plan two advantages would be secured. The exertions of landlords would be encouraged, and the demoralization from a sudden alteration of the landlord's income would be avoided. These suggestions are intended for future consideration, and meanwhile Sir William Muir would confirm the present revised settlements for thirty years.

The Famine of 1861 led to this long discussion of the permanent settlement question, which is not yet concluded. Another very important event during the currency of the first settlement of the North West Provinces was the passing of Act X. of 1859, to amend the law relating to the recovery of rent. By this Act every cultivator is entitled to a potta, or legal document, containing the amount of annual rent to be paid to the proprietor; but the proprietor is empowered to raise the rent at the expiration of the period stated on the potta, by serving a written notice. The grounds on which the different classes of cultivators are liable to enhanced rent are stated in the Act, and the proprietor is empowered to enforce his claim in a court of law. The State now takes a clear half of the landlord's rent as the Government demand. But the landlord's moiety is by no means a clear income to him. About 20 per cent. is deducted to pay the Government cess, the *patwari's* salary, *lumbardar's* fees, and on account of unrealizable balances and miscellaneous expenses.

The new settlement of the North West Provinces has necessitated a repetition of all the elaborate processes which were introduced by Mr. Bird in 1832: measurement, inspection, assessment, preparation of records, and decision of claims. Almost all the records were destroyed during the mutinies. During the 30 years of the old

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settlement, the proprietors effected considerable changes in the rent rates, while the Government demand of two-thirds of the rent remained the same. In the new settlement, the Government demand has been reduced to one-half the rent; but the settlement officer has to discover the extent to which the rent rates have been modified by competition and increased prices, and by the rent law (Act X.) of 1859.

The settlement of 10 districts was completed before the beginning of the year under review, namely, Dehra Dun, Saháranpur, Gorakhpur, Busti, Jhansi, Lalatpur, Bulandshahr, Budáon, Bareli, and Garh wal. In the case of Muzaffarnagar, a doubt was raised as to the sufficiency of the rates fixed, and a revision was ordered. This revision has effected an increase in the Government demand of 30 per cent. The measurements were completed in 13 districts, and the work of inspection was brought to a close in six. The revised assessments have resulted in a very considerable increase of land revenue, notwithstanding the Government share of rent being reduced to one-half, instead of $66\frac{2}{3}$ per cent. The increase is due to reclamations of waste land, to improved modes of cultivation, and also to rises in rent. The actual net increase of revenue up to March 1872 is 282,631*l.* or 13 per cent. on the land revenue assessed. The revision of settlement has been going on for 18 years, and there are now only four districts, Murádabad, Agra, Humirpur, and Banda, in which the former settlement had not expired on 1st April 1872. Those of Murádabad and Humirpur expired on July 1st 1872. In Etáwah and Matra it came to an end in July 1871.

An important change has been made in the manner of conducting the village surveys, which are the foundations of the settlement operations. Instead of the old method by means of measurements of fields by native *amins*, checked by an accurate survey of village boundaries, there is in future to be a cadastral survey on rigorous principles, in every detail, such as exists in Madras. The settlement maps were sufficient for the purposes for which they were primarily intended; but they could not be used in compiling a district map, nor could they pretend to the same scientific accuracy as is obtained by the adoption of correct principles of surveying. The Government of India, therefore, resolved to have the field surveys, as well as the village boundaries, executed by the Surveyor-General's Department, and thus to place the whole operation under one head, and to introduce a cadastral survey such as is executed in the countries of Europe and in Madras. In 1871-72, the cadastral survey of Mattra, Humirpur, and Murádabad was accordingly made over to parties of the regular survey, and Agra was added in 1872-73. By this measure there is a saving of labour, for work was formerly done twice over to some extent; the surveys become most useful for general purposes; and the cost is in no way out of proportion to the increased value of the work. In Murádabad the settlement officer has expressed himself well satisfied with the success of the experiment of making over the measurements to the revenue surveyors, and he considers that it will lead to the settlement work being more expeditiously done.

The Government demand is now fixed at 50 per cent. of the assumed rental, and an additional 5 per cent. is taken in the form of a cess for local purposes of education, roads, police, and other objects of general improvement. But, by a recent despatch from the Secretary of State, a change has been made with regard to the settlement of the cesses, for, while the amount of the land revenue is fixed absolutely for the period of the settlement, the amount of cesses is declared to be open to revision, from time to time, at the discretion of the local Government. Judging from the districts already settled, it is calculated that the rent rolls of the province have increased by 52 per cent. since the first settlement, by reason of extension of cultivation, enhanced prices, and competition.

A very important fact in connection with the agricultural prosperity of the provinces has been brought out by the new settlement. As much as 74 per cent. of the assessable area of the districts hitherto surveyed is actually under cultivation. Mr. Bird's opinion was that one-fifth of the cultivable land should always be left untaxed, to allow for raising artificial grasses or other fodder for cattle, and for fallows. This margin has long been encroached upon in many districts, so that very little increase of revenue can be expected to arise from further extension of cultivation. Hence, if the Government raises its demand on the land, the proprietor can only meet the enhanced demand by raising his demand for rent. Here, then, will the great difference between the system of the Emperor Akbar and that of the English, be made practically apparent. Akbar recognised no proprietors, and the rent was the Government demand. We have created a body of proprietors with powers, which none but the Government ever claimed before, over the original

occupants of the land. Thus the process of raising rents, aided by our law courts, may give rise to much strife and discontent; yet the revenue cannot be raised further than the rents have as yet risen, without the danger being faced of a general rise of rents. To remedy this evil, it is proposed to pass an Act enabling the settlement officer, when he raises the revenue, to raise the rent also. It is said that the powers given by Act X. of 1859 are not now largely used by the proprietors to raise rents, but they have the power and may, at any time, begin to use it. During the year 1870-71 there were 60,405 suits instituted under Acts X. of 1859, and XIV. of 1863; of which 34,516 were for arrears of rent, 4,812 to eject cultivators, 3,025 to recover occupancy, and 2,468 complaints of excessive demand of rent. The evil will be remedied by an Act that became law on November 24th, 1873. By this Rent Act all rent suits are to be heard in future in the Rent and Revenue Courts only, and not in the Civil Courts. Suits for the enhancement of rent are to be tried only by officers of experience specially empowered for that purpose by the Government. Decrees of enhancement are not to be given against cultivators with occupancy rights oftener than once in 10 years. The rights of a proprietor in land are distinguished from the rights he acquires as a cultivator in the fields he cultivates, and in future the sale of the former for debt will not involve the loss of the latter. The ex-proprietor, instead of becoming a homeless outcast from his ancestral village, will only sink into the position of an occupancy tenant of his hereditary fields, holding them at favourable rates. Another very important Act, which also became law in November 1873, is a codification of all the laws relating to the assessment and administration of the land revenue. A fuller exposition of the contents of these Acts will be given in the Report for 1873-74.

After the annexation of Oudh in 1856 a settlement was made village by village. The object was to deal with actual occupants of the soil, called village zemindars, or with proprietary co-partners, and not to suffer the interposition of middlemen. The claims of the talukdars, or great landed nobility, were to be considered at some other time. But it was a mistake to assume that the talukdars were only middlemen employed to collect revenue. They formed, to a great extent at least, an old landed aristocracy possessing undoubted rights of property in the soil; and two-thirds of Oudh (23,500 villages) were in their possession at the time of the annexation. Yet the assumption that they were interlopers, with no rights of property, was acted upon in the extremest manner. The Maharaja Man Sing, one of the most powerful talukdars, possessed 577 villages, paying 20,000*l.* to Government as land revenue. The settlement of 1857 dispossessed him of all but six villages paying 290*l.* It is doubtful what his private income may have been, but it was probably 20,000*l.* a year, which was suddenly reduced to 300*l.* This is one instance out of many. In another ancient estate out of 378 villages, 266 were taken away; in another 155 villages were confiscated out of 204. The consequence was, that in Oudh alone, the mutiny of the army led to a general rebellion of the more influential classes of the people. Lucknow was recaptured in March 1858, and Lord Canning issued a proclamation confiscating the proprietary right in the whole soil of Oudh, with the object of making all titles depend upon grants from the British Government.

Sir Robert Montgomery, the First Commissioner of Oudh after the Mutiny, resolved to abandon the policy of 1856-57, and to restore the talukdars to all they had formerly possessed. They were invited to come to Lucknow with safe conducts; two-thirds of them did so, and political engagements were entered into with them, for the settlement of the land revenue of Oudh. It was, as General Barrow, one of the divisional Commissioners, expressed it, "A revenue settlement made upon the battle-field," and as such possesses the character of a political treaty.

The present settlement of Oudh is, therefore, a talukdari settlement, so framed as to secure village occupants from extortion, and exacting certain duties and responsibilities from the talukdars. The talukdars were confirmed in possession of everything they held at the time of the annexation, in February 1856, and the rights of subordinate proprietors were confirmed as regards all they had held at the same period. The Government demand was fixed at half the gross rental, the under-proprietors only retaining that share of profits which they formerly enjoyed. In 1856 sanads or titles were issued to the talukdars, giving them permanent hereditary and transferable rights, including the perpetual privilege of engaging with the Government for the revenue of their talukdaris; these rights, however, being subject to any measure the Government might take to protect the village zemindars and other occupants from extortion, and to uphold their rights in the soil, in subordination to the talukdars. These sanads were granted and issued by Sir Charles Wingfield on the 19th of October 1859. The talukdars hold their property

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by virtue of these sanads, on conditions unknown to Hindu or Muhammadan law. They have full powers of alienation by will, and in case of intestacy their estates descend to the nearest male heir, according to the law of primogeniture. But subsequent legislation has introduced some modifications. Every talukdár now has power to revert to Hindu or Muhammadan law, or to the ancient customs of the family as regards the rule of succession to estates; and by the "Oudh Estates Act" (I. of 1869) a list of Oudh talukdárs is to be placed on record with the law of succession applicable to each estate, but the right to transfer or bequeath is still retained.

The talukdárs, as a rule, have shown themselves willing to make concessions with regard to the smaller proprietors who hold land under them, and whose rights have now been well secured. The great landowners have agreed that a class, including one-fifth of the whole number of cultivators, shall receive rights of occupancy, and important protection has been extended to other classes of tenants. By Act XXVI. of 1866, called the "Oudh Sub-Settlement Act," the rules were declared to have the force of law, which the Chief Commissioner had previously made, for determining the conditions under which those who possessed subordinate rights under the talukdárs should obtain the sub-settlement of lands or villages, which they held before the annexation in February 1856. The payments made by the under-proprietors to the talukdárs, before the annexation, form the standard by which the present payments are regulated; but they are never to exceed the gross rental of the village, less 10 per cent., in what are called *scír* or *nuukár* lands, that is, lands set apart for the subsistence of the tenant or home farms.

Thus there are two classes of tenures in Oudh, those which are held direct from the State, and those which are held indirectly. The former are divided into talukdári estates, the nature of which has been described, zemindari or *mufriid* estates, and estates held in fee simple. The *mufriid* estates may be the property of one man, or, as is far more common, of a whole community, who are generally the descendants of a common ancestor. Sometimes such an estate is held in common, sometimes each member of the brotherhood is accountable for the management of his own share. In the latter case *lambaráhrs* or headmen are appointed, who are responsible to the Government for the land revenue. The fee-simple estates are very few in number, and consist of the properties sold under the waste land rules.

The tenures held indirectly are of four kinds: first, the sub-settled villages included in talukdári estates, the rights of which are defined by Act XXVI. of 1866; second, the lands held by former proprietors who have been unable to prove their right to a sub-settlement of a whole village, called *sir*, *daswant*, *núukán*, and *dihdári*; third, certain groves held either by ex-zemindars or simple cultivators, who give the landlord a share of produce; fourth, lands granted, either by sale or as gifts for religious purposes, with full under-proprietary rights. Village servants also have a certain number of bigahs free of rent.

The revenue and field survey of Oudh was completed in 1871; 1419 square miles, assessed at 56,381*l.* a year, were settled in perpetuity; 21,071 for 30 years and upwards; 71 for terms under 30 years; and 441 were in progress of assessment. The number of acres held under the law of primogeniture is 2,499,465. There are 410 talukdárs, of whom two-thirds hold their estates under that law. The number of under proprietary holdings in the province is 31,280, and the average rent paid on them about 1*s.* 6*d.* per acre. The land revenue of Oudh in 1872-73 amounted to 1,421,974*l.*, the largest that has been collected in the province since the commencement of British rule. No estate was sold for arrears.

There was a specially organised department for demarcating village boundaries. The limits were marked out by demarcation officers, and earth pillars were erected at intervals; a masonry platform, 4 feet square by 2 feet high, being set up where three boundaries met. The demarcation officers handed over a list of villages in each tahsil, with a record of the boundary pillars, and a rough map of each village, on a scale of 16 inches to the mile. The survey was conducted by the revenue surveyor and the settlement officer. The former measured the area of every village, and prepared two sets of maps, one on a scale of one inch to a mile, including 300 to 400 villages, and another on a four inch to a mile scale, containing eight or ten villages. These elaborate maps show, for every village, the boundaries, cultivated lands, groves, roads, houses, tanks, and waste land. The settlement officer superintends the *khasráh* or field survey, the measurements for which are made by *amíns*. The unit of measurement is the Sháh-Jhaní bigah of 3,025 square yards. There

is also a map showing all houses and enclosures, and a register of occupants and their castes, distinguishing males, females, adults, and children. As soon as all the villages of a parganah are measured and mapped, the settlement officer enters upon the work of assessment. The present, the first regular settlement of the province, commenced in 1860. Its principles are to assess by villages and not by estates, the Government demand being half the average gross rental of each village. The descriptions of soils, rents, character and caste of the people, style of cultivation, capability of improvement, comparative certainly or precariousness of crops, vicissitudes of seasons, and liability to floods, are the chief elements that are taken into consideration. The registers for each village comprise a map and field register, a house map and register, a list of wells and tanks, a register of the land of each co-sharer, a census paper, and a record of customs respecting inheritance, irrigation, fisheries, groves, and the appointment of village officers and servants.

The system of the North West Provinces was introduced into the Punjab on its annexation, but there is one great difference between the two provinces. In the North West Provinces the village communities have only been partially preserved, but in the Punjab, including the Delhi district, all the old village communities are very often perfect, each with a cultivating body and a complete internal system of management. Each man has land to correspond to his share in his own separate management, and the grazing ground is common to the cattle of all. Certain sums were always set apart from the revenue, for the remuneration of village officials. The Punjab settlement is based on the same system as that of the North West Provinces, with the essential difference that in the Punjab the bulk of the proprietors are actual cultivators, and that there are much fewer non-cultivating proprietors. The whole area of the Punjab covers 105,005 square miles. Out of 32 districts there are returns of the land tenures in 29, which have an area of 90,462 square miles. In these there are 29,558 villages held by 1,955,928 cultivating proprietors, and only 1,301 held by 3,579 proprietors of the landlord class. Thus the great mass is held by small proprietors who cultivate their own land, and are associated together in village communities with joint interests and responsibilities. The organization of the proprietors of land into village communities has existed from time immemorial, and is the work of the people themselves. Each Punjab village undertakes the payment, through its representative council of elders, of the revenue assessed upon it; and the payment is distributed among individual members of the community in proportion to the land held by them. The revenue is very punctually paid, and sales of land are unknown. Another great blessing enjoyed by the proprietors of land in the Punjab has been that, up to this time, they have been exempted from the interference of the civil law courts administering technical law. The settlement officers are invested with judicial powers, and landed property is not liable to summary sale in satisfaction of simple debt, without the special sanction of higher authorities.

As in the North West Provinces, the village boundaries are surveyed scientifically, and the fields are measured by means of native agency, the village field map and index being annually revised by the village accountant or pátwari. Every acre belongs to some one, and can change hands by sale, mortgage, will, or legal transfer, but the settlement is made with the proprietors as a whole. The assessment is fixed on each village for a term of years, and is calculated to leave an ample surplus profit. This demand does not exceed one-half of the net rent to the proprietor, after deducting all expenses of cultivation. In addition, one per cent. of the net assets is deducted for a road fund, one per cent. for an education fund for village schools, and there is a charge for a district post, besides a cess for police and conservancy. There has been a very great increase of cultivation during the last 15 years, under the settlements made for limited periods.

During 1872-73 revenue settlements were at work in eleven districts. As many as 11,069 suits for rights in land and rent suits were disposed of, in the settlement courts, during the year 1872-73, besides a large number of miscellaneous revenue cases. Four revenue survey parties were at work in Delhi, the Derajat, and Bbáwalpur, an independent State, under the Punjab Government.

The land revenue of the Punjab, for 1872-73, was 2,005,666*l.*, being an increase over the preceding year of 37,959*l.*, which is chiefly due to large lapses of revenue free grants, and to considerable excess of alluvium over diluvium.

In the Central Provinces the settlements throughout the greater part of the districts have been sanctioned, and have been working for several years. Within the limits of the Central Provinces is to be found almost every form of land tenure

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that exists in India. There are estates of feudatory chiefs, held on conditions requiring only loyalty and good government; zamindari tenures, held by hereditary landlords, with no subordinate tenants having fixed rights; talukdari tenures, where the subordinate holders usually have permanent holdings, and village communities. The prevailing tenure in the Central Provinces is the *malguzari*, by which the estate is managed by a single proprietor, and the land is held by cultivators, whose rents are thrown into a common stock. Profits are divided, or losses shared, with reference to the respective shares of the different proprietors. When disputes occur there is a regular division of the whole lands of a village, which are then separately held according to shares. The tenure then becomes *patidari*.

The revenue survey of the Central Provinces has been conducted very much on the principle of that in the Punjab. The amins and patwaris are trained to the use of plane table, compass, and chain; and they demarcate the village boundaries and measure the fields, preparing a map (*shajrah*), a field-book (*khasrah*), and other documents. These *khasrah* measurements are followed and checked by the professional survey, and its work, in the majority of the districts, has already been completed.

The land revenue of the Central Provinces amounted to 596,386*l*. Out of an area of 36,046,250 acres, a little less than a third is cultivated, and about another third is cultivable. The rate of assessment on cultivation is about 1*s*. an acre.

The prevailing system of land revenue in the Madras Presidency is entirely different from that which prevails in the north of India, the settlement being made with each ryot or cultivator, instead of with the proprietor or village community. The revenue unit is the actual field, and not the township or estate. Every ryot is secured in possession so long as he pays the revenue; and waste lands are available for the first comer who chooses to take them on the prescribed terms. Sir Thomas Munro, who was Governor of Madras from 1818 to 1827, was chiefly instrumental in introducing this ryotwar system, and he considered its great advantage to be the strength and security it gives to the Government, by bringing it into direct communication with the great body of the cultivators. In the ryotwar system a maximum rent is fixed on each field, to be paid for good crops. If the crops fail, the rent is reduced; and there is an annual settlement on cultivated land, according as it is irrigated or not irrigated. In 1837 it was ordered that there should be no increase of demand on account of the growth of more valuable produce; and, in 1852, another order was promulgated, to the effect that no ryot was to pay an additional tax on account of improvements, causing an increase of value, which were made by himself. During the government of Lord Harris, in 1854, very considerable reductions were made in the demand on land in most of the Madras districts, amounting to a total sacrifice of revenue to the amount of 259,000*l*. This led to a very considerable increase in the area of cultivation, a proof that the people were previously too heavily assessed.

The original Madras surveys were exceedingly incorrect, and in many districts the land revenue demand was based merely on the unchecked statements of the village accountants. But, in 1858, a new revenue survey was commenced in Madras, under the able management of Colonel Priestly, with the object of correcting the measurements of superficial areas, and of ensuring a fair and just assessment on each description of land, by a classification of the different fields in each village. The Survey Department was brought up to its present strength in 1865. The survey is conducted on the accurate English method, and is the only Indian revenue survey, except those now in progress in three districts of the North West Provinces, which is based on rigorous principles in every detail. It combines the operations of a cadastral survey with those of a topographical survey on a trigonometrical basis. The fields are measured in triangles, and plotted in village maps on a scale of 5 chains to an inch, as regards all ryotwar lands. These village maps show all topographical details, and the limits and area of every field, with a record of the nature of tenure, cultivation, present assessment, name of ryot, and source of water supply, if irrigated. Estates not held on ryotwar tenure, hill ranges, and wastes, are drawn on a scale of 4 inches to the mile. The village maps are compiled into *taluk* maps, on a scale of one inch to a mile, and these form the materials for district maps. The area to be surveyed was assumed at 60,000 square miles, or 38,000,000 of acres. Up to 1873 the survey of eight districts was completed, and eight were in progress. The completed area surveyed and plotted in fields was 40,848 square miles; the area mapped and topographically surveyed was 48,872 square miles. The excess of assessable area brought to light by the surveys ranges

from 2 to 23 per cent.; and in the completed districts the survey gives 24,000 square miles, which have hitherto only been counted as 21,500 for assessment purposes. The average assessment is 3s. 9d. per acre, and the addition of these 2,500 square miles to the taxable area represents an annual gain to the State of 300,000l. The average size of fields is about two acres, and the approximate number measured and plotted in the eight completed districts is 7,000,000. The number of village maps that has been drawn is 15,546, and the average error per mile, shown by the test of comparing the work with that of the Great Trigonometrical Survey, is 7.61 feet. Sixty-seven *taluq* maps have been completed, 34 of which have been lithographed. It is most desirable that these *taluq* maps should be worked up into district maps, with the necessary numerical data, so as to be reduced and incorporated in the sheets of the Atlas of India.

The measuring work of the survey is followed by the equally important operation of classing the fields, with reference to the productiveness of their soils. The soils are first divided into five series with reference to origin and general characteristics; and then sub-divided according to component parts of clay, sand, lime, and organic matter. The first is the alluvial and exceptional series, sub-divided into two sorts of *lanika* or island soil, and two sorts of permanently improved garden land. The second is the *regur* series, sub-divided into three sorts of clay *regur*, three of mixed or loamy, and three of sandy *regur*. The third is the red ferruginous series, also divided into three sorts of clay, three of mixed or loamy, and three of sandy or gravelly. The fourth is the calcareous series divided into two sorts of clay, two of mixed or loamy, and two of sandy or gravelly. The fifth is the arenaceous series, divided into two sorts of loamy, two sandy, and two sand. Thus there are altogether 34 sorts of soils; which are determined chiefly by the quantity of organic matter, or the presence of other valuable or deleterious ingredients. The next operation, after the fields have been classed with reference to soils, is the assignment of grain values to the several classes and sorts of soils. Much care is taken to ascertain the actual yield of land sown with staple products; and an average per acre is eventually fixed. From this from a fourth to a sixth is deducted for vicissitudes of season. The commutation prices are then determined according to the average market price prevailing during 20 years, from 1845 to 1865, deducting from 8 to 20 per cent from the market prices, to obtain the wholesale or cultivator's prices. The cultivation expenses are then estimated and deducted, the result being the net profit on the land. Half of this is taken as the Government demand, and becomes what is called the "money rate" or future assessment for wet and dry land respectively. Then modifications are allowed on account of distance from markets, conveniences with respect to roads and canals, and the efficacy of irrigation, and villages are grouped with reference to these considerations.

In the Northern Circars, including Ganjám, Vizagapatam, and Rájmahendri, the perpetual settlement was introduced; and there are a great number of inams or rent-free estates throughout the Presidency of Madras, some of them held for upwards of 700 years. The perpetual settlement in the Northern Circars is made on *zemindari* and *mutadari* tenures, which are also found, to a small extent, in Madura, Nelor, and North Arcot. In the ancient *zemindaris* the eldest son succeeds, the other members of the family being entitled to maintenance from the estate. But in the newer estates of this kind, called *mutadari*, formed under the operation of Regulation XXV. of 1802, the ordinary Hindu rule of inheritance prevails. The *zemindars* are subject to an annual payment of a fixed amount. But the rights of the actual cultivators are carefully guarded by the Madras Act VIII. of 1865 (*Secs. 11 and 12*). With regard to rent all special contracts are to be enforced, but when there is no contract the rent is to be fixed with reference to the assessment on the fields at the time of the survey, or to local usage; and is subject to enhancement with the sanction of the collector. But occupants can only be ejected on failure of payment.

The peculiar *Oulungu* renting system formerly prevailed in Tanjor and Tinneveli; but it now only exists to a very small extent. When the assessment in kind was converted into a money assessment, it was agreed that it should vary with the current price of grain, whenever the market price rose more than 10 per cent. above the commutation rate, or fell more than 5 per cent. below it.

In Malabar and Canara the tenures are peculiar, and no Government has hitherto interfered with them. The proprietors have held their estates from time immemorial; and the rent is fixed, not on each field, but as a lump sum payable on the whole holding. The landlords receive from 20 to 40 per cent. of the rent, and pay the rest

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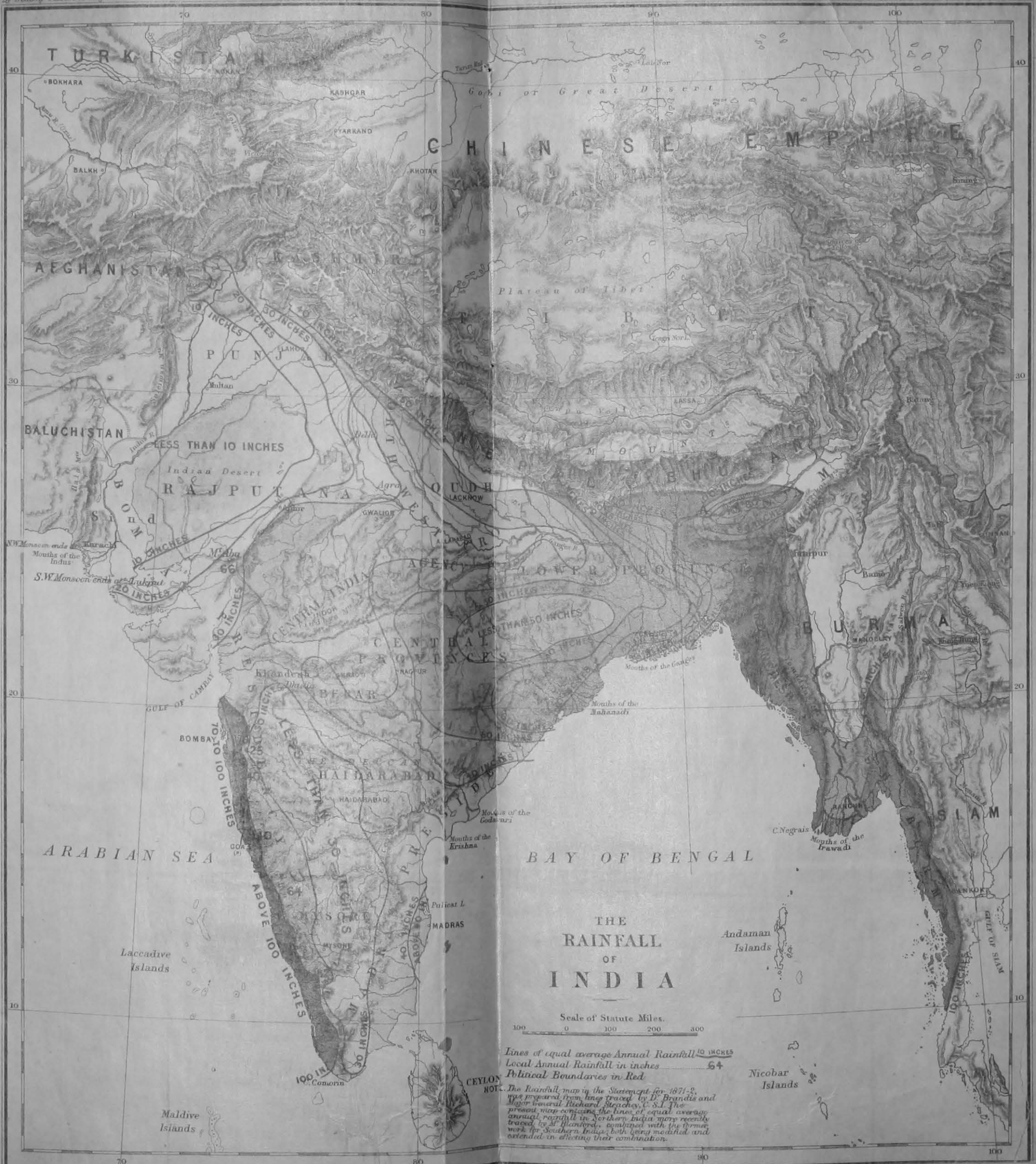
to Government. The Malabar rule is to deduct 20 per cent. of the gross produce of the rice fields for reaping, the remainder being the available gross rent. From this one-third is taken as the expense of cultivation, and one-third as the cultivator's share. The remaining third is rent to be divided between the landlord and the Government. The assessment on the rice lands, essentially the same as that fixed by Tippoo in 1784, though unequal and in some places heavy, is on the whole light. The assessment is not calculated on the extent of land, but on the amount of seed required to sow a given extent, varying according to the quality of the soil, which is divided into three sorts, clay, sand and clay and sand. The garden assessment of Malabar was fixed, in 1820, on cocoa-nut trees—the chief wealth of Malabar—betel, and jack trees. The cocoa-nut trees are classed according to their situation and soil. The upland cultivation of rice and oil-seed is taxed on an annual inspection, 40 per cent. of the gross produce of the former being deducted on account of the peculiar labour, and 20 per cent. of the remainder being the Government share. Other dry grains, pepper, ginger, and coffee, are free of land-tax.

The land revenue of the Madras Presidency for 1872-73 was 4,693,469*l*. The area of cultivated ryotwari land was 17,253,604 acres; of which 3,124,480 were irrigated, and 14,129,124 unirrigated. The assessment was 3,195,033; and the assessment for Malabar and Canara was 305,701*l*.

The Bombay Presidency did not comprise extensive territory subject to a demand on the land until a comparatively recent period. As Akbar made the first regular settlement in the north of India, so Malik Ambar, the Abyssinian, was the great native administrator for the western side of the peninsula. He revived and confirmed the tenures of village communities (mirasi tenures) and made village settlements for money payment. But this system was not adopted by the English; and in 1847 the present ryotwar system was introduced under the superintendence of Sir George Wingate. It is a field settlement, but it differs from the Madras system, from the circumstance that in Bombay, instead of an annual settlement, the rent is fixed for each field for a period of 30 years. Each ryot may each year cultivate what field he pleases, and give up what he pleases; the fields which are not taken up for cultivation being let annually by auction as grazing grounds. All joint tenures and common responsibilities are entirely abolished.

The unit or basis of the Bombay Survey is an artificial field, or area, called a "number," the size of which is fixed at what one pair of bullocks could plough up to double that size. This varies from four to eight acres for rice cultivation, and from 20 to 40 acres for dry crops. The village boundaries are marked by stone pillars, and a series of detached earthen mounds are raised to demarcate the limits of fields or "numbers." The survey is a very rough measurement, and is useless for general purposes, or for the construction of correct maps; but the classing is a complicated and elaborate system, by which the value of each "number" is carefully ascertained. Numerous considerations are brought into account, which are classed under three heads, namely, distance from the village site, natural productive capability, and the nature of the water supply. When the classing is completed the amount of the assessment is fixed, which is calculated with a view to leaving such a surplus to the cultivator as will render him capable of improving his circumstances, and extending his cultivation. The settlement was generally for 30 years.

As the Bombay 30 years' settlement was commenced more than 30 years ago, the revision of several districts has been completed, and several reports on the re-settlement of various talukás have been received. These reports enable an opinion to be formed on the results of the settlement; and on the effect it has had on the prosperity of the people. As examples, the three talukás of Bhímturi Chándúr, and Indapur, may be taken, the one in the Poona, the second in the Nasik Collectorate. The two first were settled in 1841, and re-settled in 1871. Bhímturi is a long narrow belt of country lying along the banks of the Bhíma, to the south of Poona, and almost destitute of trees, except where thickets of babúls grow near the river banks. In 1841 the people were in an abject state of poverty and wretchedness. In 1871 the population had increased 39½ per cent.; the number of carts from 273 to 1,011, owing to the opening of new roads; the number of ploughs, 22½ per cent., and of bullocks, 19 per cent. In 1840 there were 527 wells in working order, now there are 727. The whole cultivable area is now taken up. The Chándúr taluká is situated between the Chándúr hills and the river Godávári. Since 1840 the population has increased 100 per cent.; the number of carts from 903 to 2,747; of bullocks, from 8,602 to 13,998; of wells, from 712 to 1,076. In 1840 the number of acres under cultivation was 95,867; it is now 110,223; and the new settlement



THE
RAINFALL
OF
INDIA

Scale of Statute Miles.
0 100 200 300

Lines of equal average Annual Rainfall ^{10 INCHES}
Local Annual Rainfall in inches 64
Political Boundaries in Red

NOT. The Rainfall map in the Statement for 1871-2, was prepared from lines traced by D. Brandis and Major General Richard Stracey, C.S.I. The present map contains the lines of equal average annual rainfall in Northern India more recently traced by Mr. H. H. Wood, combined with the former work for Southern India, both being modified and extended in effecting their combination.

increases the land revenue by 52 per cent. Both *tálukás*, which may be taken as samples of many others, have now got all the cultivable land under cultivation. Indapur is notoriously one of the most unfavourable districts in the Deccan, owing to the poorness of the soil, and the small and uncertain rainfall. Yet, during the 30 years of the settlement, the population has increased 31 per cent., bullocks and farming stock, 20 per cent., plough, 28 per cent., and carts, 300 per cent. Fiscally, the most important settlement of 1872-73 is that of the Anklesar Taluka in the Broach Collectorate, where the increase in revenue amounts to $22\frac{1}{2}$ per cent. of the entire sum levied; though the new rates do not average more than Rs. 4. 3. 4. an acre. These instances may be taken as good evidence of the increasing prosperity of the people.

During the year 1872-73 the number of acres measured was 2,533,962, and the classification of 2,049,195, was completed. In the Poona, Nasik, and Sholápúr Collectorates, the results of revision give an increased revenue of 17,078*l.* or 61 per cent. in excess of the former demand; due, to a considerable extent, to the detection and measurement of land formerly unassessed.

In Ratnágiri there is a tenure, the *Khoti* tenure, the peculiarity of which is that a class of landholders invested with large and influential proprietary rights, called *Khots*, exists between the Government and the actual cultivators. The attempts to adopt the Survey arrangements to this special case have not been accepted by the *Khots* as a class; and the Bombay Government is engaged in devising a system which may place the Survey operations in Ratnágiri on a satisfactory footing, by a more specified legal recognition of the rights of the landlord class.

The land revenue of Bombay, including Sind, amounted, in 1871-72, to 3,402,789*l.*, and in 1872-73, to 3,751,050*l.*

North Canara is a district which was transferred in 1858 from Madras to Bombay, owing to the convenience offered by the port of Canara for the shipment of the cotton grown in the Bombay province of Dharwar. The tenures resemble those of Malabar and South Canara in the Madras Presidency; and the people hold that they have special tenures, and that the Government has no right to raise the demand on their land, and that it cannot be sold for arrears. Accordingly the introduction of revised rates of assessment in the Karwar Talúk was the occasion of a general combination to resist payment, and to test the validity of the Government claim by an appeal to the High Court. The Bombay revenue survey and assessment was introduced about 10 years ago, its progress has been very slow, and the result has been the filing of 600 suits against the Government. The question has not yet been decided.

Sind, the region watered by the Indus in its lower course for a length of 360 miles, is under a system of revenue assessment somewhat different from that of the rest of the Bombay Presidency. The province only became a portion of British India in 1843, and has since been administered by special Commissioners. Previously, for upwards of a century, there had been a military despotism on feudal principles under two Muhammadan dynasties, the Kalhoras and Talpurs, and many of their grants of land have been recognised, while most ancient rights and customs were continued. Thus the Sind revenue system is distinct in several respects. The prevailing tenure is *zemindari*, by which the proprietor or *zemindar* does not cultivate the land himself, but through the occupiers who pay him shares of the crops according to the immemorial customs prevailing in the different districts. In the times of native rule the revenue was paid in kind, not in money, and generally according to a system called *batai*, or division of the crops into shares, of which one-third of the gross produce belonged to the Government. As soon as the grain was threshed, the *bataidars*, and other officials, proceeded to the threshing floors, and the cultivators made the grain up into three heaps, and a fourth detached heap called *tor*. One heap was taken for the Government, two for the cultivator, and out of the *tor* heap was taken the dues of the *zemindar*, one-twentieth for reaping expenses, and the shares for the carpenter who made the water-wheel for irrigation, and for the potter who supplied the *charkh*, or pots which lift the water. What remained from the *tor* was divided into three heaps, two of which were taken by the cultivator, and one by the Government, out of which officials were paid. Another system was the *khasgi*, by which the assessment was fixed, and did not vary with the crop. There were also the *mohsuli* or fixed cash assessment for certain descriptions of crops such as tobacco, sugar cane, and cotton; the *danbandi*, which was roughly determined according to the state of crops in distant or detached fields; and the *nuta* or contract system.

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The occupiers who hold under zemindars in Sind are of two classes. The *hari*, literally ploughman, is a mere tenant at will, while the *marosi hari* has hereditary tenant right, pays the assessment to Government, and is in reality, owner, subject to a small rent to the zemindar, but with power to mortgage, sell, or bequeath his holding. In some cases the zemindar supplies the seed, and even the bullocks to the *hari*, and takes from him the amount of the Government assessment, and of the value advanced, and one-fifth as his due (called *lapo*), leaving the rest to the cultivator. In others the zemindari lands are cultivated by tenants who find their irrigating wheels and live stock, and make over one-half to the zemindar, who pays the Government demand.

The topographical survey of Sind, which to a great extent was also a revenue survey, fixing village boundaries and recording the details of cultivation, was commenced in 1856 and completed in 1870. But no regular settlement operations were commenced until 1855, and none were actually introduced on the right bank of the Indus until 1862, and on the left until 1863. Previously there were settlements for short periods, without regular measuring and classing. In 1865 the Sind Settlement Department was re-organized, and the operations were placed under two officers with suitable staffs, the Settlement Officers of the left and right banks of the Indus. The province includes three Collectorates: Shikárpur divided into the Deputy Collectorates of Shikárpur, Rohri, Lárkhána, and Mehar; Karáchi divided into Sihwán, Kohistan, Karáchi, Jhirk, and Shahbandar; and Haidarabad into Naushahra, Hála, Haidarabad, and Tanda; besides the native state of Khairpur, the political superintendency of Thar and Parkur, and the frontier district of Upper Sind. In Rohri the settlement was completed in 1871-72, the average rate per acre being 1r. 4a. to 2r. 10a. In Lárkhána the first temporary settlement was very heavy, but the second, made by Captain Ford in 1855, was much reduced, with reference to facilities of irrigation. In Mehar the settlement was introduced in 1867-71, and also in Sihwán, for 10 years. In Tanda, Haidarabad, Hála, and Naushahra, the settlement is also completed. In the hill district of Kohistan, on the western frontier, which is chiefly inhabited by Bilochis, the revenue demand has been altogether remitted for 20 years from 1865, to induce the tribes to cultivate more land on their barren hills. In the state of Khairpur, where Mír 'Aly Murad Khan Talpur still rules, the revenue is collected in kind, according to the old *batai* system. The new settlements have substituted money payments for payments in kind. The rates are fixed according as the land is watered by the *mok* or inundation wheel, the *sailab* or perennial wheel, or is *barani* or land watered by the rains. In every division there are a great number of rent-free lands. Many of them are *jágirs* granted by the princes of the old Kalhora, or Talpur dynasties. Others are either *seris* granted to officials for services, *pattas* given to persons who have dug wells or planted trees at their own expense, *puris* or tree plantations and gardens.

As the agriculture of Sind depends on the irrigation derived from the Indus, the classing of the land has reference mainly to the facilities for obtaining water, which will be found further described in the section on irrigation. Where the land is perennially overflowed the facilities are greatest. Next comes the land which receives periodical inundation, and lastly that where it is always necessary to raise the water by means of wheels, at considerable expense. The *barani* lands, dependent on rains, are of course the least valuable.

In Mysore the Revenue survey was commenced, in 1863-64, on the model of the Bombay survey; the first step being the division of land into fields not larger than can be cultivated by ryots of limited means. The measuring and classing of fields is on the Bombay system; the three main divisions being into lands dependent on rainfall on which dry grains are raised (*kushki*), irrigated lands for rice and sugar cane (*tori*), and *bagayat* or garden lands for areca and cocoa-nut trees. The Circar or Government lands are held under ryotwari tenure, either on *kandayam* or fixed money assessment, or on the principle of sharing produce, called *batayi*. Most of the *kandayam* lands are held by annual leases, the assessment, however, being seldom altered; but in the surveyed *tálukas* the term is for 30 years. There is absolute hereditary tenant right in all *kandayam* lands. The *batayi* tenure still prevails in the district of Nandidrug; but it will disappear on the completion of the survey. Besides these lands held direct from Government, there are private Inam estates, where the villagers or under-tenants hold on four kinds of tenures: the *warum* where there is an equal division between the landlord and tenant, the former paying the assessment; the *mukkuppe*, where the cultivator receives two thirds, and the landlord one third;

the *arakandaya* where the landlord receives a fourth, and the assessment is received half by the landlord and half by the cultivator; and the *volakandaya*, where there is a fixed money rate paid to the landlord. In the Nagar hills the holdings of the ryots are called *wargs*; each *warg* comprising all the fields held by one *wargdar* or farmer, which are generally scattered in different villages.

In the little mountainous province of Curg there are, besides the inam or rent free holdings for the maintenance of temples, four kinds of land tenure peculiar to the country, called *jamma*, *sagu*, *umbli*, and *jodi*. The *jamma* is the feudal tenure of the Curgs and other privileged classes. The holders only pay half assessment, but are bound to furnish police and treasure guards, and are allowed to carry arms. When the *jamma* grant is signed by the Chief Commissioner a formula is spoken intimating that the holder has secured the hereditary right to the land on the feudal conditions laid down, and a handful of the soil is given to him. The *sagu* is an ordinary ryotwari tenure. *Umbli* lands are lightly assessed, owing to the grants being made for special services. *Jodi* lands are taxed at *jamma* rates, but they have been granted for special services, instead of being held on condition of performing duties of a general nature. Lands for coffee cultivation are held free of tax for the first four years, one rupee per acre is required from the fifth to the twelfth year, and two rupees per acre afterwards. The whole land of the province was permanently settled by the Raja in 1806, and this settlement has not been interfered with by the British Government. But owing to the introduction of a land tax in the coffee plantations in lieu of the *halat* or tax on the coffee, a party was detached from the Madras Revenue Survey in 1862, and all the coffee estates have now been surveyed, though the computation and mapping is not yet complete. It is not intended to make a field survey and settlement in Curg, but merely a topographical survey, which is now in process of execution: 42 villages, 158 square miles in area, have been demarcated; and a map of the town of Mercara, the capital of Curg, on a scale of 16 inches to the mile, has been finished.

In British Burma there is a vast excess of cultivable but uncultivated land, and the rates of assessment, though varying with reference to quality of soil and means of transport, generally range low. The light land tax is, however, supplemented by the capitation tax peculiar to this province, while the rice duty is reported at present to fall wholly upon the producer, and thus to be equivalent to a further enhancement of the land tax. The holders of the land in Burma are the actual cultivators, the extent of whose holdings averages about five acres.

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THE season of 1871-72 was one of abundance and general prosperity in Bengal, and the results of the husbandry of 1872-73 were on the whole fair, and in some places excellent. The summer of 1872 began with an unusual drought, which continued into June and July; but the rains, though scanty, were well distributed, and gave an excellent early crop in the higher lands. The long delayed rain in October saved the rice crops, which yielded a good return, and in Midnapur the harvest was excellent. Nothing, to the unscientific eye, seemed to presage the terrible calamity that was looming over the land, yet, if meteorology had received more timely attention, had sooner been treated as a physical science instead of a mere register of weather, there might have been a much earlier warning. The highest known annual rainfall at Calcutta for 36 years was in 1871 (93 inches), the lowest but one (44 inches) was in 1873.

In the North-West Provinces the weather of 1872-73 was one of agricultural adversity. The rains were heavier than the average, and ended earlier than usual, and the autumn crop was a poor one, especially in the eastern districts. The Christmas rains were almost entirely wanting, and the spring crop suffered much from drought. In the Central Provinces, however, the year under review was agriculturally a prosperous one, and there were excellent harvests. In the Madras Presidency, also, though the harvests suffered in most places from unseasonable or too abundant rain, the season was on the whole good. In Bombay the rainfall was abundant and opportune, and the season much above the average. In Mysore the season was also good, and especially favourable for the coffee crops.

The close connection of meteorology with agriculture is now beginning to be felt by administrators, and the calamity of 1873-74 must ensure more attention being given to this connection, and to the most efficient means of bringing it to bear on economic questions, than it has hitherto received. Ten years ago the only meteorological observatories in India were the Surveyor-General's at Calcutta, those at Madras and Bombay, with four others in the Bombay Presidency; the two superintended by Mr. Allan Broun in Travancor, and there had been an admirable series of observations taken by General Boileau at Simla. There were also a number of registers of rainfall and temperature kept by the medical officers of stations, but these were of little value. In 1865 the first steps were taken by the Governments of Bengal and the North West Provinces to obtain regular meteorological registers from a number of selected stations, under the charge of a special officer for each Government. The system has now been in continuous operation in Bengal, under Mr. H. F. Blanford, for more than seven years. At six first-class stations the Electric Telegraph Station Masters were provided with instruments and instructions, and directed to observe at 4 and 10 a.m. and p.m. At ten second-class stations a similar series is taken by native observers under the direction of the civil surgeons, and there are 139 third-class stations where the rainfall only is observed. The meteorology of the North West Provinces, under Dr. Murray Thomson, is observed at 14 stations, ranging from 255 to 7,056 feet above the sea. The observations in Oudh are superintended by Dr. Bonavia, and in the Punjab there are 12 observing stations under the general superintendence of Dr. Neil. In the Central Provinces very good work has been done under Dr. Townsend's auspices, and 14 meteorological stations were equipped in the Madras Presidency in 1867, under Mr. Pogson, the astronomer, besides 216 rainfall registers. At the Colaba Observatory, near Bombay, observations are taken hourly, with great care and detail, under the supervision of Mr. Chambers.

But the great want still is central control, and a single publication containing observations recorded throughout India. An independent system of registration in every province, without central control, is baneful, for the comprehensive discussion of the meteorology of India is not practicable without more concerted and uniform action than now exists. When this is secured, the most important and valuable results will follow. For, as Mr. Blanford has observed, India offers peculiar advantages for the study of meteorology. At opposite seasons of the year it exhibits an almost complete reversal of the wind system, and of the meteorological conditions depending on it. Its almost complete isolation, in a meteorological point of view, from the rest of the Asiatic continent, by the great mountain chain along its northern border, simplifies, to a degree almost unexampled elsewhere, the conditions to be

contrasted, by limiting them to those of the region itself, and the seas around. India also presents, in its different parts, extreme modifications of climate and geographical feature. In its hill stations it affords the means of gauging the condition of the atmosphere at permanent observatories, up to a height of 8,000 feet. The periodical variations of temperature, vapour, tension, and pressure, both annual and diurnal, are strongly marked and regular, and their changes proceed so gradually that the concurrence and interdependence of their several phases can be traced out with precision.

At present the meteorological officer of each province issues an annual report. In 1873 Mr. Blanford, the Meteorological Reporter to the Government of Bengal, also published a valuable paper on the Winds of Northern India, in relation to the temperature and vapour constituents of the atmosphere; his object being to describe the normal wind currents of Northern India and their annual variation, and to trace out their origin and causes. This essay only professes to be a first rough sketch, requiring detailed verification. The causes of the irregularities that characterize the monsoons of different years demand special enquiry, on account of their economic importance, but the data from other parts of India have yet to be brought together and collated. The most necessary preliminary measures are now to secure a uniform system of registration, and to collect all the observations throughout India in a central office, the whole being under the control of one man.

Meteorological observations are of special importance with reference to agriculture. Before 1837, in the North West Provinces, there were four years of which the first and third were of excessive humidity, the second and fourth of like dryness, while in 1837 the climax came. Similarly, in 1858, 1859, and 1860, the climate was of an abnormal character, and a like climax came in 1861. Can anything be more vital than a scientific investigation into the laws which regulate these phenomena? Yet, until within the last few years, as has been seen, little more was done than the taking of careless rainfall observations at various stations, a great mass of which were actually given away! A writer in the *Calcutta Review*, for April 1871, pronounced our knowledge of meteorology in India to be actually but little in advance of its condition twenty years ago. Since then, great improvements have been introduced by Mr. Blanford, Mr. Chambers, and other able meteorologists; but a uniform and centrally administered system of meteorological observations for the whole of India is still needed. Mr. Blanford has pointed out that systematic observations should be directed to the special study of the normal law of the monsoons and of their anomalies, with reference to the distribution of rainfall and its variation in different years. The rains are dependent on the prevalence of certain winds, the general direction of which is known. It is also known that they are caused, and their direction determined, by differences in barometric pressure. But very little is known of the actual distribution of that pressure in India. It depends primarily on temperature, but the effects are complicated by variations in the humidity of the air, and by peculiarities of physical geography. When these elements have been collected, and true results derived from them, a great step will have been taken towards the comprehension of climatic laws, and of the apparent anomalies which cause scarcity and famine. The efficiency of the departments, the purposes of which are to collect and classify statistical and scientific information, is therefore a measure of great importance with reference to provision against the recurrence of famines.

The harvests of India, even in the years when they fail over certain areas, are abundantly sufficient to feed the people. The prevention of famine years will eventually be achieved through the increased well-being of the cultivators, improved agriculture, a more perfect system of communication, and an efficiently organized meteorological department. Famines are most frequent in regions where the climatic conditions are most irregular; but they will cease to be periodical visitations so soon as administrative measures leading to the above results are more efficient; and meanwhile they are less frequent everywhere, and have already ceased in certain favoured parts of the country, where the rains are regular, and the system of revenue settlement is best adapted to secure the well-being of the people. The terrible calamity which has fallen upon Bengal will form the subject of the main portion of this section in the report for 1875; but meanwhile it will be useful to give here a brief notice of the nature of the food crops in the afflicted region.

Rice, the varieties of which are infinite, forms the principal food grain of Bengal. The paddy (*dhan*), or rice in the husk, is divided into two main crops. The early

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or *aus** crop is mostly raised upon high level lands, and gathered in July and September. The plants are not transplanted, but reaped where they are sown. The *aman*† sown in April, transplanted in August, and reaped in November and December, is the great crop of the year. One kind is sown broadcast; but it is usually transplanted, when about a foot high, to land on which there is about ten inches of water. When sown broadcast it is called *boron* or *boorya*, and it is sown in beds of pools and rivers. As the water rises the rice grows with it, the stems reaching a length of twelve or even twenty feet. It is extraordinarily rapid in growth, and is sown and reaped at the same time as the transplanted kind. Besides these there is another principal kind of rice called *boro*, which is raised in low lands and on the edges of swamps and jheels where the water is intercepted. The plant is uprooted from the nurseries, and stuck deep into the mud during the cold weather. The crop is reaped in April and May, and its success depends on irrigation. There are innumerable minor varieties of rice. The *aus* crop produces a coarse rice, which is usually consumed by the people, while much of the *aman* crop is exported, especially from Dacca and Chittagong. The annual export of rice from Calcutta averages more than a million maunds.

In Bahar rice is also the main staple of food, though, where the fields are high and dry, one of the two daily meals of the cultivators is usually of wheat, maize, or peas. Rice is, however, the favourite food; and the food of the ordinary cultivators is half of rice and half of other cereals, millets, and pulses. Millets (*kodo* and *murwa*) are the food staples of Gaya and Chota Nágpur; and barley, either eaten with salt and chillies, or ground with dal (pulse) and baked into chupatties, is the cheapest of all the food crops in Tirhut. In Patna and Sháhabad maize is largely used. Nor is rice the sole food of the ryots of Bengal. Millets are raised after the rains and reaped in March, and many varieties of dal (pulses) are reaped in the cold weather. Among the *turkari* or vegetables of Bengal, brinjals are the most common, yielding two crops a year in almost every garden; while a gourd called *koomra* may have been seen trailing on bamboo stages, round almost every ryot's hut. The fisheaters use *huldi* (turmeric); and other ingredients of curries, such as ginger, coriander, cummin, aniseed, chillies, are commonly grown. Potatoes are chiefly found in Assam and the hill districts: the crops on the Khasi hills yielding about 185,000 maunds.

In the Upper Provinces the people are less dependent on rice, and other cereals take its place; and in the Madras and Bombay Presidencies the dry grain crops form the staple food. In Mysore the *ragi* (*Eleusine corocana*), a dark and very small grained millet, forms 66 per cent., and rice only 24 per cent. of the whole cultivation of the country. Throughout the Bombay Presidency *jowari*, or great millet, is the staple most cultivated, *bajri*, a smaller millet, comes next, and rice only takes the third place. Bajri and jowari are also the two principal grains grown in Sind.

Accurate and reliable statistics would be a great aid in the organization of efforts to improve the agriculture of India. By an efficiently tested registration of agricultural facts on the spot, a vast amount of information would be made available for the use of the Government, which, if properly handled, might become of great value. It is, therefore, important that Government should be kept continually supplied with the agricultural statistics of each successive year. Much care and attention have been bestowed upon the form in which such statistics should be compiled in the Bombay Presidency. Commencing with the village accounts, and proceeding through the district accounts, the minutest particulars affecting the administration of the land revenue are carefully and systematically recorded and compiled, until the total results of a whole collectorate are finally shown in what are known as *huzur* or collector's accounts. The Bombay agricultural statistics, thus accurately recorded, consist of details of the extent of each class of culturable land, the extent to which each product is cultivated, and the agricultural stock. The system of classing and measuring each field, which prevails in Madras, Bombay, and Mysore, offers by far the best machinery for obtaining accurate statistics. In Bengal, on the other hand, where there is nothing of the kind, it is very difficult to obtain information that is at all accurate. Sir George Campbell, during the year under review, made an attempt with this object in view. He organized establishments for obtaining agricultural statistics in four districts, Birbhúm, Shahabad, Jessor, and Rangpur. A deputy collector, with the necessary staff, was deputed to each in 1872-73, with instructions to ascertain the area occupied by the different crops, the grazing capacity of the district, the average

* The *aus* of Bengal is called *beali* in Orissa, *ahu* in Assam, and *bhadoi* in Barar.

† The *aman* of Bengal is called *saorud* in Orissa, *sali* in Assam, and *aghani* in Barar.

produce, rents, modes and results of agricultural processes, and of stock-keeping, size and tenure of farms, condition and habits of the people, rates of wages, and prices. The reports on the Jessor and Birbhum districts have been received, and the former is said to be most creditable to its compiler.

In the North West Provinces there is a complete absence of available agricultural statistics. It is true that, under special pressure, some facts have been collected about cotton, but statistics could not be furnished regarding other agricultural produce. There is, however, an excellent proposal before the Government for ensuring the maintenance of correct agricultural records in the North West Provinces. By this plan there would be a special officer, under the Board of Revenue, to supervise the maintenance of the village records, to provide an annual series of agricultural statistics, and to see that the *patwaris* or village accountants, who form the working machinery by which the above information must be obtained, are properly instructed. As regards the revenue assessment no evidence is so good as the history of the crops and irrigation of each field for a succession of years, and a trustworthy statement of the average area under cultivation from year to year. If the settlement officer knows that a field has grown sugar-cane every third or fourth year, and has been irrigated every other year for the last thirty years, he forms a better idea of its value than if he finds it growing a crop of barley bitten by an exceptional frost in the year of inspection, and paying about a sixth of its proper rental. It is also a matter of great moment that the Government should be aware of the effect of the introduction of a canal upon the agriculture of a district. At present the ideas on the results of canal irrigation are founded on mere conjecture, which a series of reliable statistics would be the means of replacing by knowledge based on certain and accurate facts. Very little is now known about the produce per acre of land in general in the North West Provinces. The most important step towards securing information is the education of the *patwaris* or village accountants; but agricultural statistics will be useless unless they are properly arranged; and hence the necessity for appointing a supervising officer, not only to secure accurate records of occupancy, and of agricultural facts, and an annually corrected rent roll, but to classify and arrange these materials, and to present them in a clear and intelligible form.

Almost from the commencement of British Rule in India, the Government has recognized the duty of making advances (called *takávi*) to owners and occupiers of land for the purpose of promoting the construction of minor works of agricultural improvement of such a description as could be designed and carried out by the people themselves. In the Madras Presidency these advances were made in bad seasons, to be repaid when the crops were gathered, or sometimes to enable ryots to extend their cultivation. The interest on *takávi* advances was 5 per cent., and they were recoverable by the same processes as are applicable to the recovery of arrears of land revenue. It was found that a consolidation of the laws on the subject of *takávi* was necessary; and in the end of September 1871 the "Land Improvement Act" became law; which is an Act to consolidate and amend the law relating to advances by the Government for agricultural improvements. It has been in operation during 1872-73. The Act authorizes local Governments to make rules prescribing the manner in which applications for advances may be made, the conditions under which they may be granted, the arrangements for securing the due expenditure of advances, and for the proper inspection and maintenance of works constructed by their means. Any landlord or tenant desiring to make improvements on land of which he is in possession or occupation may make an application to the collector for an advance, stating the nature and amount of security for re-payment, which is recoverable by the same means as arrears of revenue. But an advance to a tenant is not to be made if the landlord dissents.

Efforts have been made, during many years, both by the various local governments and by individuals, to introduce improved methods of agriculture. The agricultural societies have effected much substantial good by conducting experiments, introducing new plants, and recording information on agricultural subjects; but they have never had sufficient funds to introduce practical operations on a large scale. They have, however, had the merit of acting as pioneers, and their labours have been fairly useful. As regards horticulture they have done much. Among other things, their introduction of potatoes, cauliflowers, and peas, has led to those vegetables being largely cultivated by the natives.

The Agricultural and Horticultural Society of India was established by Dr. Carey in 1820. It imported fruit trees, offered prizes for essays on the cultivation of indigo and sugar, and on the acclimatization of foreign plants. At

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one time it had a farm of 160 acres near Calcutta, which was, however, given up. It now has an income of 3,000*l.* a year, including a Government donation of 500*l.*

The Agri-Horticultural Society of Madras was founded in 1835. It has devoted itself to the encouragement of the cultivation of European vegetables, to the improvement of the cultivation of indigenous fruit trees, and to the introduction of new species. It largely imports and distributes vegetable and flower seeds and trees from other parts of India, superintends cotton experiments, and gives prizes for sheep and poultry.

The Agri-Horticultural Society of Bombay was founded in 1830, and in the following year an annual grant of 300*l.* a year was given by the Government. In 1835 the society bought a piece of land at Suri, and laid it out as a garden, and in 1853 they established an experimental garden at Kirki, where, down to 1861, experiments were carried on at a loss of expenditure over receipts of 1,126*l.* But the only experiments of which a record exists are those conducted by Dr. Birdwood with cotton, and the sorghum or great millet (*imphee*). In his Report, dated May 1861, Dr. Birdwood makes the following remarks with reference to the *imphee* experiments:—

“ I deeply regret the poor results of these experiments with *imphee* at Kirki, for I anticipated their success with pleasure. The rapid decay of the manufactures of India invests with the highest importance every attempt to increase the number of its exchangeable raw products. The most trifling articles of native workmanship are being replaced in the bazaars by similar wares from Europe; are being driven from the home markets by the sheer force of Saxon productiveness. Our best efforts, therefore, must be directed to counterbalance the decline in manufactures by a proportionate development of the agricultural wealth of the country; new raw exchangeable products must supply the place of each manufacture as it in succession fails, if the prosperity of India is to be sustained under the circumstances of her dependent and intimate intercourse with western civilization.”

As regards the Society's experiments in cotton, Dr. Birdwood recorded the following very important remarks:—

“ Had twice as much been expended in India in cotton experiments as has actually been I would still persevere with them. Such experiments are made out of a nation's superfluities, and should be undertaken under the sense that the most of them may fail, certain as it must be that at least one will succeed, or some collateral advantage be gained that shall a thousandfold repay all the accumulated outlay. It is on this ground that agricultural and horticultural societies have been, and economic museums are being, established over the world. It is anticipated that these institutions may for years carry on their operations in vain, but they are, nevertheless, supported (quite independently of their educational service) under the unflinching conviction that, in the end, some economic plant will be naturalized, and some staple brought to the manufacturer's notice through their agency, which shall so add to the wealth of the nation that all previous expenditure will be but as dust in the balance. We must regulate such expenditure, then, not so much by its immediate results as by our means. Attention should be turned to hybridization, as the most likely mode of establishing a larger staple of cotton in the parts of India beyond the influence of the sea and the two monsoons.”

The Bombay Society was resuscitated, through the exertions of Dr. Birdwood, in 1859. When he became its honorary secretary it had only 29 members, and an income from all sources of 500*l.* a year. When he left, in 1868, the members numbered 153, with a fixed income of 1,235*l.*, besides special subscriptions. Dr. Birdwood's great work was the establishment of the Victoria Gardens and Museum at Bombay, including a complete botanical garden. The botanical garden was composed of exotic plants first introduced by Dr. Birdwood; of naturalized exotics, such as the cocoa-nut, jowari, tobacco, and many other plants, and of indigenous plants. A sum amounting to 36,000*l.* was raised by public subscription, entirely through Dr. Birdwood's exertions, for the laying out and decoration of the Victoria Gardens. It is much to be regretted that, after Dr. Birdwood left India, the botanical garden should have been destroyed, and that the Society should not have published a single report.

The Agri-Horticultural Society of Lahor was founded, in 1851, for the collection of information respecting agricultural operations, to institute experiments, and to supply members with seed and plants. It has initiated experimental cultivation of the better kinds of flax and of silk; has introduced the olive, the Chinese tallow tree, and the Australian gum tree; has established a school of gardeners; and has distributed seeds and plants.

The Government gardens at Calcutta, Saharanpúr, Madras, Bangalore (*Lal Bagh*), Lucknow, and Utakamand, have also done most valuable service in the introduction

and distribution of new plants and seeds. During 1872-73 the Calcutta garden sent out 8,620 packets of seeds, 2,302 plants in cases, and 2,891 in pots. In the same year there were 3,706 packets of seeds, 4,088 fruit and other trees, and 6,142 flowering plants distributed from the Utakamaud garden, in the Madras Presidency. At the Saharanpúr gardens, in the North West Provinces, 37,393 fruit, 156,766 timber trees and flowering shrubs, and 5,530 parcels of seeds were distributed during 1872-73, showing a considerable increase over the previous year. As many as 4 $\frac{3}{4}$ tons of seeds were supplied to the Canal Department.

Potatoes have become one of the great food staples of the country. They are extensively grown in Kamaun, Garhwal, Kangra, Dehra, as well as on the plains in Saharanpúr, Mirat, Cawnpur, Bulandshahr, and Fathigarh. A small quantity of fresh seeds should be annually imported from Europe to prevent degeneration by frequent renewal.

Owing to ignorance of the country and its agricultural customs, the farms established by Government have not made an average out-turn equal to that obtained by the native cultivators. These farms have been started with the intention of teaching agriculture to the natives of India. The real lesson has been that, given their means, and soil, and climate, it is absolutely necessary first to master their system. In fact, the native cultivators know a great deal more than they were given credit for. They know the value of certain manures. For instance, the shepherds of the North West Provinces raise a regular income by grazing their sheep on the cultivator's land. Their method of deep ploughing is to go frequently over the ground; and they understand the advantage of ploughing in the weeds during the rainy season. Their processes are the results of most careful empirical experiments carried on for several thousand years.

Experimental farming has chiefly been undertaken with a view to improving cotton cultivation and introducing new species; and these experiments of late years have been carried on upon the largest scale in the Bombay Presidency and in the Central Provinces.

In the Bombay Presidency—at least, in the Dharwar district—the introduction of American cotton has been a complete success. The number of acres under cotton cultivation in the whole presidency in 1872-73 was 3,715,945, being an increase of 336,007 since 1871-72. Superintendents of cotton experiments are employed in Dharwar, Gujrát, Khandesh, and Sind. Selection of seeds has been carefully attended to, and a considerable quantity of first-class seed has been distributed. Hybridization has also been persevered with, and in Sind there is every prospect of a valuable crop between the American and Dharwar native. The yield per acre varies very much in the different collectorates. The largest, in Poona, is given at 302 lbs. In Dharwar it is 54 lbs.; in Khandesh, 23 lbs. During 1872-73 there were 2,281 steam engines at work, and 160 steam presses.

Khandesh, Sind and Dharwar are at present the only provinces where there are model farms. The Khandesh farm is not a financial success; but the Cotton Commissioner has urged the advantages which would result from the establishment of permanent Government farms, by affording reliable information regarding the out-turn and money value of the various crops. The Sind farm is at Salaro, in the district of Hála, near Haidarabad; and much useful work is anticipated from it, both as regards cotton experiments, and the introduction of better seed and improved methods. Two other farms are at Dharwar, and near Súrat. Immense sums, in former years, were spent on cotton experiments, especially in the introduction of exotic seeds. But in order to increase the yield per acre, and to improve the quality of Indian cotton, it is necessary to continue such experiments patiently for long periods, and to convince the growers of their value. They must be fully impressed, by continual experience, that a good market is ensured to them, on condition that clean and carefully picked cotton is produced; they must be induced to seek for and use good seeds, so that the staple may be improved, and so strive to produce a larger quantity per acre, through more careful and scientific cultivation.

In 1866 the Government made provision for the performance of some of these duties in the Central Provinces and the Berárs, by appointing Mr. H. Rivett Carnac as Cotton Commissioner. In the following year (1867), 552,520 acres were under cotton cultivation in the Central Provinces, and 1,254,552 in the Berárs, out of 8,500,000 throughout British India. The exports from all India amounted to 1,500,000 bales, out of which 250,000 bales were from the Central Provinces and the Berárs. The great sheet of trap-rock of the Deccan provides the black soil which is so favourable to cotton cultivation, while the railways which traverse the Berárs to

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Nagpur offer facilities for export. Thus, in the valley of the Purna forming North Berár, 32 per cent. of the cultivated area is under cotton. But the exportation is checked to some extent, because there is a large and steady demand for home consumption. The native manufacturers of finer fabrics have been little affected by the introduction of piece goods from England, and the annual consumption in the provinces is not less than 60,000 out of 120,000 bales. In the Berárs, in 1867, the out-turn was 250,000 bales of 400 lbs. each, of which 207,000 were sent to Bombay for export.

Mr. Rivett Carnac's duties were to promote the introduction of foreign staples, and the improvement of the indigenous plant. Some of the landholders in Wardha were induced to raise cotton for seed on carefully selected garden lands. Fine "bolls" of cotton were then selected and supplied to seed gardens, and cultivators were impressed with the importance of selecting their seeds. By careful selection and careful cultivation of selected seeds, much can no doubt be done to improve the character of indigenous seed. The seed of the Hinganghát district, in the Central Provinces, is considered to be the best. Mr. Ashburner successfully improved the inferior cotton of Khandesh by introducing Hinganghát seed, and the cultivators of Nimar and Berár have also obtained supplies of it. Experiments for introducing exotic cotton have not been attended with any great success. In 1868 three cotton seed farms were established—one of 52 acres in the Wardha Valley, near Hinganghát; a second of 98 acres near Amraoti, in East Berár; and a third of 113 acres near the railway station of Shengáon, in West Berár. The object of these farms was to test the effect on indigenous cotton of deep ploughing, of manure and irrigation, to watch the effect of hybridizing various species on the plan of Major Trevor Clarke, and to instruct the natives. But it seems to be necessary first to convince them that they require instruction. When the Commissioner visited one of the model farms, he got the old head of a village on one side and said, "Now, Patelljee, tell me really what you think of all this." The Patell replied that the English gardener was an intelligent young man; that he worked hard, and was not quarrelsome, and that considering that he knew nothing about it when he came, his cotton was not much worse than theirs. The sons of several respectable landholders were, however, being trained at the experimental farms, and it was hoped that they might hereafter disseminate the knowledge they acquired.

Mr. Rivett Carnac also took great pains to improve the system of getting the cotton down to the coast. Daily supplies arrived at the railway stations much in excess of the quantity that it was possible to send off by train each day. The yards became full to overflowing. The Cotton Commissioner established cotton yards at 12 railway stations, acres upon acres were covered with cotton bales, divided into squares and streets, every compartment with its watchman and fire-engine, every bale entered in a register, and waiting its turn for loading. Order was thus established where there had been chaos. At Khámgaon, in Berár, there are two large factories for cleaning cotton, and three for full pressing bales with steam power. Throughout the Central Provinces and Berár, there are 21 full and 98 half presses. The half pressing system is chiefly in use, which takes up less space than the dokra or old native bale, but requires repacking for export.

In 1872-73, the area under cultivation in the British portion of Central Provinces was 13,608,016 acres, of which 719,767 acres was under cotton. The number of bales exported was 43,297, of which 24,432 were full pressed, and 39,754 half pressed and dokras. In Berár, 1,666,014 acres were under cotton, and in one part of Akola the natives had taken to the cultivation of New Orleans. The two experimental farms continued to be worked, but with little success. One of them has been converted into a model farm for the cultivation of all kinds of produce likely to do well in Berár.

In the Punjab there are two experimental farms, and in the North West Provinces farms have been established at Cawnpur, Allahabad, and Bulandshahr, under European supervision. The Cawnpur farm was established in 1866, and has achieved much useful work under the superintendence of Mr. Halsey, formerly Collector. The cotton experiments failed to show any improvement over native cultivators, and the farm has not succeeded in establishing any new facts in agriculture. But it has grown, and sent out free of charge, many thousands of young trees for villages and for road making; has distributed many fruit-bearing trees; has made a steady commencement towards improving the seeds of the staples of the country by selection and cultivation; and has proved beyond a doubt that no exotic cotton has a chance in that climate. The Allahabad farm of 259 acres, 159 cultivated by the Government and 93 rented to cultivators, was established in 1871.

It is badly situated, lying low between the Junna and the Ganges, and is protected by embankments from inundation during the rainy season. Its object is stated to be to graft the English on to the native method, and, by the introduction and selection of better seed, gradually to improve the agriculture of the country. Two methods are, therefore, worked side by side for comparison. The ground is twice ploughed by the English plough with two pairs of bullocks, at the rate of one *bigah* a day, and twice by a native plough, instead of a harrow, at the same rate. It is said that the ground was left in a much better condition than another piece of ground ploughed 18 times by a native plough alone. But frequent ploughing is the efficient native substitute for deep ploughing; and an English plough must be lighter, as well as much cheaper, before it can be adopted in India. The cotton farm at Bulandshahr, consisting of 182 acres, was taken up in 1870; but the dryness of the atmosphere and the cold of November will always prevent exotic cotton from being a paying crop. Nor has the cultivation of native cotton been a much greater success.

The view of Mr. Halsey, who was the acting Commissioner of cotton and commerce during the year under review, is that by careful selection and cultivation, the Indian cotton may be immensely improved. The farms might also be made very useful in trying the adaptability of cheap and light ploughs, such as those used in the United States and in Italy, and in experiments in sub-soil drainage, the absence of which converts culturable fields into a *reh*-covered plain. Mr. Halsey is of opinion that, as the superintendent of one of these experimental farms becomes master of the native system of cultivation, he will see in what way he can systematize their present rotation of crops; what grain crops he can cultivate to advantage in lieu of fallow; and how far he can benefit crops that are now grown without water, by the use of it. He might carry on experiments as to the minimum amount of water required for irrigated crops in their different varieties; on the use of manures; on the introduction of new crops; and on the selection of seed on the pedigree system.

The views of Sir George Campbell, as regards agricultural Government farms in Bengal, coincide with those of Mr. Halsey. He holds that the native agriculturist will beat us until we have as exact a knowledge as themselves of the soil, climate, and plants of the country; which can only be acquired by careful and protracted observation of their modes of farming, by educated English farmers. His plan is not to farm directly ourselves, but to select intelligent ryots to farm after their own fashion, on our land, under the supervision of our agents; giving slight assistance with the object of drawing out the full extent of their knowledge and aptitude as cultivators. In the course of three or four seasons a good European cultivator would then have mastered the whole extent of their knowledge, and would probably be prepared with well considered plans for supplementing the defective resources of the ryots, improving their processes, and introducing new ones. The small model farms of 8 or 10 acres on the irrigation canals, are in course of organization, and there is a garden farm of 100 acres on the canal in Midnapur. There are also to be a home farm of 600 *bigahs* near Calcutta, a farm of 150 *bigahs* at Barasat in the 24 Parganas, one of 50 acres under a practical gardener in Orissa, and a tree nursery and orchard of 1,500 acres at Shillong.

In the Madras Presidency, Sir William Denison started a model farm at Saidápet, near the presidency town, which has been very successful and useful, under the management of Mr. Robertson. The farm now consists of 250 acres in a ring fence. One great point established by Mr. Robertson is that green crops can be raised at all seasons of the year. Lucerne, under irrigation, produces a large quantity of valuable fodder; horse gram can be raised under dry cultivation as a green fodder plant, and it improves rather than impoverishes the soil. Yellow cholam (*Sorghum vulgare*) has also been found to be an excellent fodder, more nutritious than turnips, and pays well for high cultivation. Mr. Robertson has also shown that it is only necessary to steep the gram for horses, which has hitherto been boiled, a most important discovery. It is difficult to overrate the value of these experiments, which seem likely to make the green crops under dry cultivation in Madras what root crops are in England, and thus to be the means of furnishing the Madras ryot with far better means of maintaining his cattle than he now possesses. During 1872-73 attention, at the Saidápet farm, was chiefly directed to experiments relating to machines and implements. One great object of the Madras Government is that there should be a system of instruction and of diffusing a knowledge of agriculture. It is intended that sound knowledge should radiate from several agricultural centres of

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which Saidápet is one, and farms to be established in Bellari and Coimbatore will be the others. The sites for these farms have been selected; and in order that Mr. Robertson may have more time to devote to this branch of his work, a young graduate of the Cirencester Agricultural College has been appointed as his assistant, and proceeded to Madras in 1873. It is hoped that the instruction thus given to future native superintendents of farms will slowly leaven the agriculture of the whole country. There are native apprentices at Saidápet, and the Maharaja of Vizianagram has sent a nominee to be educated with them. Inquirers visit the farm in increasing numbers, and many private students are expected to resort to the classes as soon as they are established.

In the Madras Presidency there are now 1,678,300 acres under cotton; a considerable increase, particularly in Tinnevely, Canara, Coimbatore, and Cuddapah.

Among the crops raised for sale and export, the most important commercial staple, as regards Bengal, is the jute, which yields a soft fibre 12 feet long. Twenty years ago the ryot who happened to have a spare bit of land, would grow it for his own use. Now, next to paddy, it is the principal product of Bengal.

The fibre was sent home, under the name of *pat*, from 1793 to 1801; and it appears that the word *jute* was first applied to it by Dr. Roxburgh. He got it from the Ooriya *mallis* or gardeners; for in Orissa the name is *jhot*, from the Sanscrit *jhat*, to be entangled. The fibre is obtained from two species of tiliaceous plants, namely *Corchorus olitorius* and *capsularis*, annuals from five to ten feet high, with stalks as thick as a man's finger. The jute is grown chiefly in the districts of Pabna, Dinájpur, Rangpur, Maimansing, Purniah, Julpigori, Bogra, Dacca, Hugli, and the 24 Parganas. The balance of evidence is in favour of *sunu* or high lands as best for jute, low lands as not so good, and laterite or gravelly soils as bad. But there has been no analysis of soils, and the demand has caused all kinds of lands to be used. Jute requires a hot, damp climate, with alternate rain and sunshine, and the land should be well ploughed. Little attention has hitherto been paid to the selection of seeds, and even the bad plants are chosen for seed, as not so good for fibre. The quantity of seed used for a bigah varies from 1 to 6½ seers, and it is sown broadcast and covered with a thin crust of earth by a harrow. The harvest is in July and August, the stalk being cut near the root with a bill-hook. The stalks are then made up into bundles, each of a weight sufficient for one man to carry, and thrown into water for *retting*, where they remain for several days. They are then beaten until the glutinous substance in the bark is washed away, the fibres detach partially, and are then stripped off from end to end. The fibres are then hung up to dry in the sun for a few days, and finally made up into hanks, and are ready for market.

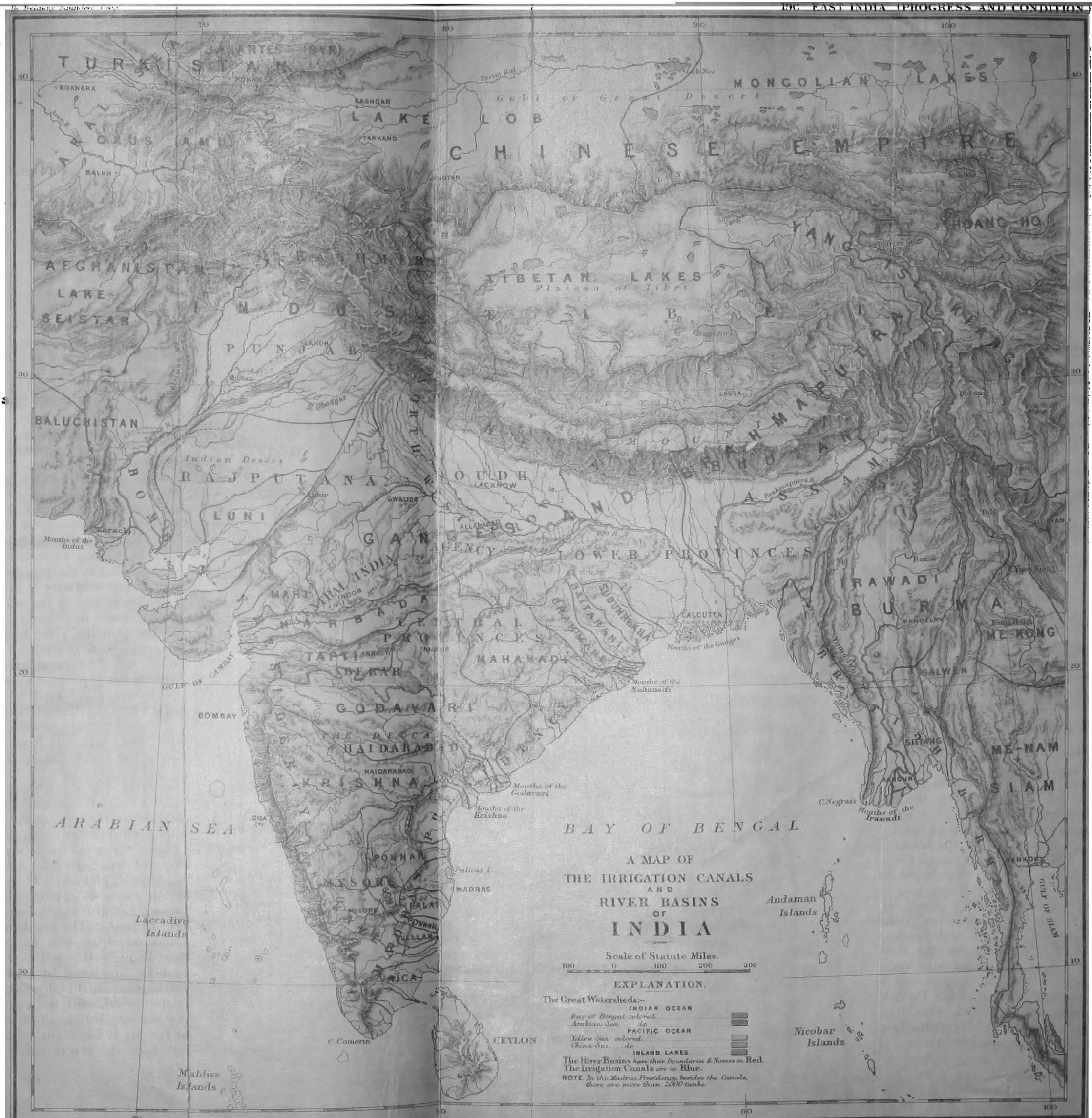
The average yield per bigah is 5 maunds 4 seers, but in the large jute-producing districts it is as much as 6 maunds. The cultivation is carried on by the ryots themselves, who often form themselves into guilds of mutual co-operation, to cultivate the fields and prepare the fibre of each member of the guild in turn. Jute is, however, utilized in many other ways besides the sale of the fibre. The leaves and tops are used as a pot herb; the leaves as manure, the reed as fencing and for fuel, the seed for oilcake, and the root for paper. It seems clear that the jute crops exhaust the soil very much; and that such remedies as manure, rotation of crops, and the observance of fallows are advisable. Some care ought also to be taken in the selection of seeds, in the drying process, and in the time of steeping; for when the manipulation is neglected the fibre loses strength and colour. In 1872 there were 2,549,824 bigahs under jute grown for export, a quarter of this area being reclaimed land, a tenth taken for indigo, and two-thirds alienated from grain crops. The cultivation has improved the condition of the ryots, and has not so reduced the supply of food as to make the reduction injuriously felt. The bulk of the jute tracts are in sixteen districts, where there are 22,498,477 acres of arable land and 876,324 under jute. Details of the jute trade will be found in the Section on Trade and Manufactures.*

The rhea fibre is known to be vastly superior to jute, yet it has failed to become a profitable object of cultivation. The reason of this is well known, and an effort is being made by Government to overcome the obstacle. The rhea fibre of India is the same as China grass (*Boehmeria nivea*), a stingless nettle with a perennial root, whence rise 9 or 10 straight slender stems to about six feet, from the exterior of which the fibre is extracted. It is a native of Assam, and of Rangpúr in Bengal, where it is cultivated by the fishermen near their huts, for making nets. Fresh sets of stems will yield them four or five harvests a year, but the manual extraction of

* See page 112.

THE
RIVERS OF INDIA
THE
AREAS OF THEIR BASINS
AND
THE LENGTHS OF
THEIR
MAIN STREAMS

	Area in English Square Miles.	Length in English Statute Miles.
Ganges	391,100	1514
*Indus	372,700	1800
Brahmaputra ..	361,200	1800
Irawadi	150,800	1060
Godavari	112,200	898
Krishna	94,500	800
*Thar Desert ..	68,700	—
Salwen	62,700	750
Mahanadi	43,800	520
*Western Ghats, West Coast Basins	41,700	—
*Narbada	36,400	801
Arakan Basins ..	29,700	—
Kaveri	27,700	472
*Katiwar & Kach Peninsulas ..	27,600	—
*Tapti	27,000	441
*Luni	22,400	320
Orissa Coast Basins	22,200	—
Ponnar	20,500	355
Sitang	18,300	230
*Mahi	15,500	350
Brahmani	15,400	410
Tenasserim Coast Basins	14,200	—
Baitarani	11,900	345
Subanrekha ..	11,300	317
Gandlaganga, &c., Coromandel Coast	10,300	—
Vaiga	9,800	130
*Sabarmati ..	9,500	200
Palikat, L., &c.	6,700	—
Palar	6,300	220
*Western Banas	6,300	180
South Ponnar ..	6,200	245
Vellar	4,500	—
Vaipar	3,900	—
Tambaravari ..	3,600	80
L. Kolair, &c. ..	3,100	—
*Dhardur	1,800	—
Total Area of the Indian Basins	<u>2,071,500</u>	
Basins of the Bay of Ben- gal	1,441,900	
*Indian Basins of the Ara- bian Sea	629,600	



the fibre is too laborious to make the cultivation on a large scale remunerative. For this object machinery is essential. When properly manipulated the rhea produces one of the strongest known vegetable fibres, three times as strong as the best Russian hemp. There is practically an unlimited demand for it in English and American markets at prices from 30*l.* to 50*l.* per ton. It is a plant which requires much moisture and a rich soil; but it will grow in many parts of India, and is susceptible of rapid propagation from cuttings. Yet, and although the merits of the plant have been known for the last 60 years, it is not successfully cultivated. Volumes have been written upon it, the Government and the Agri-Horticultural Societies have striven to encourage its growth and to develop a trade in its fibre, but all attempts have hitherto failed. The failure is entirely owing to the absence of suitable mechanical appliances for the separation of the fibre and bark from the stem, and of the fibre from the bark, and to the heavy cost of effecting such separation by manual labour. Thus the only real obstacle to the development of an extensive trade in this article is the want of suitable separating machinery. Existing flax and hemp-preparing machinery has failed where the rhea fibre is concerned. On the one hand there is an unlimited supply, on the other an unlimited demand, with only a single link wanting to connect one with the other. At last, in 1869, the Government of India resolved to offer prizes, sufficiently large to attract the attention of the first European machinists, for the best inventions for securing the manufacture of such rhea fibre, at 15*l.* a ton, as would fetch a price averaging 50*l.* a ton in the English market. The prizes offered were 5,000*l.* and 2,000*l.* for the best and the second best inventions. The trials were to have taken place at Saháranpur in 1872, but, owing to the cost and risk of sending expensive machinery to India, only one mechanist, Mr. Greig, appeared in the field. His machine did not altogether fulfil the conditions, but he was given a *douceur* of 1,500*l.* It is now proposed to have the trials in England. There was some difficulty in taking this course, owing to the necessity for using the stems in a green state, such as they would be in on a plantation. It has been found, however, that China grass is grown on an estate near Marseilles, and the proprietor will undertake to supply a sufficient quantity for the trials, in a green state. This obstacle has thus been overcome, and there is every reason to hope that the ablest mechanists will take the matter up, and that the great object will at last be gained.

The *Crotalaria juncea* is cultivated for a fibre called *sunm*, which is used for hemp and twine in Bengal; but there are no data with reference to the extent of the cultivation. In the Punjab there were, in 1872-73, as many as 47,781 acres under *sunm* cultivation, yielding 391,752 maunds of fibre. The word *sunm* is also applied to the hemp taken from *Cannabis sativa*, which is only cultivated for its fibre in Kamaun and Garhwal. In Bengal it is carefully cultivated for the leaves yielding *bháng*, and the seeds, which are smoked as *gúnjá*. The Belfast Flax Company, some years ago, tried a series of experiments to improve the cultivation of flax at Siálkot, in the Punjab, with foreign seeds sown in ridges. The result was very satisfactory; but a sufficient quantity was not grown by the cultivators, and consequently the experiment was eventually given up.

Sericulture has recently received some attention; and a most interesting account of silk in India has been written by Mr. Geoghegan, in consequence of representations made by the Silk Supply Association. The advantage of a further development of silk industry in provinces in India where it already exists, and of its extension to other provinces, was obvious; and the first thing needful was to collect information on the subject, so as to make a general review of all industries connected with silk in India. The East India Company took great pains to foster the production of silk. The planting of mulberries was urged on the zemindars in Bengal, and in 1769 a staff of reelers was sent out from Italy to set on foot, in the Bengal filatures, the system pursued at Novi. The first silk prepared in the Italian method reached England in 1772, and Bengal silk soon became an important article of export to England. When the trading operations of the East India Company came to an end in 1833, its connection with silk culture ceased. At that time 956,453 lbs. were exported. There were then 11 head factories in Bengal, each with a commercial resident, with filatures throughout the district, to which the cocoons were brought. An attempt was also made to foster the production of silk in Madras by Government aid, in 1793, but it was abandoned in 1798. The Company effected great improvements in the reeling and drying, but none in the culture of the mulberry, or in breeding and rearing the worms; and since the trade has passed into private hands no active measures have been taken for the promotion of this industry. The quantity

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exported from Bengal has not varied in the last 30 years, being about 1,500,000 lbs.; but the price has nearly doubled. The cultivation in Bengal is mainly carried on in the districts of Rájsháhi, Birbhúm, Maldah, Murshidabad, and in Assam. In Rájsháhi there are 34 filatures owned by Europeans, and 63 by Natives, having 5,760 basins, and employing 10,000 hands. The yield of raw silk is 5,000 maunds, and 150 square miles are under mulberry cultivation. In Birbhúia the silk industry, of an annual value of 160,000*l.*, supports 15,000 persons. In Assam the mulberry is grown in small patches; two kinds of worms are reared, and a fine white silk is produced. A very considerable quantity of tasar silk is raised in the Chhattisgarh country, in the Central Provinces, the worms being fed on the sál tree. The only other province where sericulture is practised to any extent is Mysore, where the mulberry gardens occupy 18,443 acres, or 31 per cent. of the cultivated area. Here it is a profitable culture, the value of the silk annually produced being 55,000*l.*; the cultivation is said to have been introduced by Tippoo.

In other parts of India sericulture may be said to have been confined to experiments which have hitherto been more or less abortive. In 1854-56, Mr. Bashford, the superintendent of the Sarda filature in Bengal, made some experiments in crossing; and Mr. Fox, in 1867, began an experiment in Sháhabad, but the trial came to an end after three years. Signor Lottei, in 1859, drew attention to the munga worm of Assam, as being capable of yielding silk, with care and better reeling, to compete with that of China; but his application for a grant of rent-free land to improve the munga worm was refused. In Bombay, Mr. Baker introduced worms from Mysore into Dharwar, 50 years ago, and the cultivation took root for a time, but cotton has since driven silk out of the field. The exertions of Signor Mutti at Poona, between 1838 to 1846, though under Government auspices, ended in failure, and there was a similar result in Khandesh. More recently a small experimental farm was established by Messrs. Dymes at Ussur, in Madras, in 1868; and Signor de Vecchi erected a filature near Bangalore, purchased cocoons largely, took much trouble to improve the native worm, and endeavoured to acclimatise the Japanese species; but he has since left the country, discouraged at the results of his efforts. In the Punjab, several experiments have been tried by Mr. Cope and others, and the late Sir Donald McLeod took a deep interest in them. The Maharajah of Kashmir has also taken steps to encourage sericulture in his dominions. But it is only in Assam, Bengal, and Mysore that silk is produced to any extent.

There is, however, another branch of the industry connected with the wild spinning insects of the jungle, called tasar and eria. In 1858, Dr. Birdwood proposed the utilization of the wild worms found in the Bombay Presidency; and, in 1856, Captain Hutton, of Masúri, represented the existence of certain wild silk worms in the Dehra Dun; but no useful result attended his experiments. He, however, maintains that Masúri is a capital place for rearing the ordinary silk-producing moths; and in 1871 he prepared a most valuable monograph for the Government, on the known Bombycidæ of India. The Tasar insect is found all along the Sub-Himalayan range, and in forest-covered hills to the south of the Ganges, and it has, for centuries, been an article of trade. It feeds on the sál, the jujub, a *Terminalia*, and other forest trees; and the seed is purchased from the jungle people by the rearers, who raise the worms on trees, and keep guard on them with pellet bows. The tasar silk is much used in native fabrics, but the yield is diminishing as cultivation extends.

The numerous unsuccessful experiments are certainly discouraging to some extent; but it is certain that several parts of India are well adapted for sericulture; and judicious steps should be taken to promote it. With this object the Madras Board of Revenue (February 1872) would limit cultivation to localities where it is still carried on with some success, and would distribute mulberry seed to the best growers gratis. They would go so far as to establish nurseries in carefully selected centres, to hatch and improve the breed by selection and distribution gratis, but would not extend Government operations to reeling silk. In Bengal it is a staple industry of the Rájsháhi and Burdwan districts; and about 9,000 bales are exported from Calcutta.

Attention has been given by Dr. Bonavia, the Superintendent of Science in Oudh, to the cultivation of the date palm in that province, where it has been found to grow well. The paper by Mr. Edwards, on the cultivation and preparation of the date has been translated into Urdu, for distribution among the natives to whom seeds are given; and an arrangement has been made with the Political Resident in the Persian Gulf for a yearly supply of seeds and cuttings of the date palm for planting

in Oudh. In October 1872, a favourable report was made on the progress of this cultivation. Jessor and Naddea are the great date-growing districts of Bengal, where there is an enormous local consumption of date sugar. The trees are grown in clusters round the houses of the ryots, a hundred trees often being planted on a *bigah* of land.

The cultivation of tobacco was introduced into India in the year 1605, during the reign of the Emperor Akbar. The Emperor himself never took to smoking, but he said, "Truly, we must not reject a thing which has been adopted by the wise men of other nations, or how shall we progress?" Then merchants began to sell tobacco, and so the custom of smoking spread rapidly in India.* The cultivation of the plant followed, and now almost every district grows more or less tobacco, each village having its patches, as garden crops. Numerous efforts have been made to improve the Indian tobacco, commencing with the action taken by the East Indian Company in 1829, when some Maryland and Virginia seed was sent out, with a paper by Captain Basil Hall, describing the Virginian mode of culture. The produce from this seed was pronounced to be very good. Madras, where the climate is admirably suited for the growth of tobacco, stands first with regard to the development of this industry. The value of tobacco exported from Madras in 1871-72 was 5½ lakhs of rupees, of which less than a fifth went to other than Indian ports. Dindigul is the great tobacco district, and cheroots are manufactured at Trichinapali. The islands in the delta of the Godavari also yield what is called *Lunka* tobacco, the climate being suitable, and the plants being raised on rather poor light soil, highly manured, and well watered. In 1866 both West India and Shiraz seeds were tried in the Godavari *Lunkas* and in Madura and Coimbatore, and Mr. Broughton, the Government quinologist, has made some valuable analyses. Manilla seeds have also been successfully tried on the Lower Palnai hills, but Wynaad is the best locality for a tobacco experiment, where it has not yet been tried. Almost every kind of seed has, however, been tried by Agri-Horticultural Society of Madras, and has thriven to perfection. The failure has been entirely due to carelessness and want of skill in the preparation.

In the Bombay Presidency the Kaira and Khandesh tobacco is of superior quality. Altogether over 40,000 acres are under tobacco in this Presidency, and both the exports and imports show an increasing trade. The former amounts to 3,000,000 lbs. Numerous experiments have been tried with Shiraz and Manilla seeds, which yield good plants in Gujrát and Kandesh.

In the Punjab over 90,000 acres are under tobacco; in Oudh, 69,574; in the Central Provinces, 55,000; in Behar, 18,500; in Mysore, 20,000; in Burma, 13,000; and in Bengal, owing to the absence of statistical information, the area under tobacco is unknown, but it is believed to be over 500,000 acres. Most of the tobacco grown in India is for consumption in the districts where it is raised. Indian tobacco is not esteemed in the English market because it is so badly prepared. It is a crop requiring high cultivation, and experienced curers from Manilla must be engaged to instruct the cultivators. Such measures for the improvement of this industry will benefit Indian agriculture generally.

The introduction of the cultivation of Carolina rice into India will probably add another high-priced crop to the number of its products. The experiments were commenced in 1868, when 15 barrels, containing 1,725 lbs. of seed, were sent to Bombay. A second supply of 19 barrels went out in 1870, and a third in 1871. The Government of India received 200 barrels of seed early in 1872, which was widely distributed. From Bombay it is reported that although the results have not been successful, several Collectors desire to continue the experiment. In Madras it is also considered expedient to persevere with the trials. The Carolina paddy is said to be in every way superior to the native paddy, but to require a higher system of cultivation. The Carolina kind must have a healthy soil, resting on a moderately porous sub-soil, through which the irrigation water must pass. The Carolina kind feeds deep down in the soil, while the country paddy is a surface feeder. Hence land with a healthy surface only three feet deep, can never produce a good crop of Carolina rice, though it may yield a fair crop of the country variety. In Mysore the experiment has been carried out to a small extent with encouraging results; the requirements for success being said to be deep ploughing, plenty of manure, and good drainage. In Bengal, out of 107 cases reported, 32 are stated to have been successful and 62 doubtful. The Carolina rice is much more highly priced than

* See an interesting account of the introduction of tobacco into India, in the forthcoming volume of Elliot's *Muhammadian Historians* (Vol. vi).

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ordinary rice. On the other hand it requires special conditions, and the cultivation is more costly. The question is whether the extra expense of cultivation can be covered by the increased value of the crop.

Indigo cultivation has increased in Bahar, while its area has diminished in Bengal. In Maldah, Murshidabad, and Rájsháhi the constant changes in the River Ganges supply ample alluvial soil, well adapted for indigo crops. In Maldah alone there are 20 working factories, turning out 2,000 maunds. But over half the exported produce is from Bahar, and almost entirely from the districts on the north side of the Ganges, Tirhut, Champarum, and Sáran. In 1872-73 the export of indigo from Calcutta amounted to 162,860 maunds, worth 2,704,408*l.*

The mountainous districts of India yield valuable crops of coffee, tea, and chin-chona, while ipecacuanha is about to be added to the list of hill products. Many hundreds of acres have already been cleared in the hill districts, where rows of coffee and tea plants have taken the place of tall forest trees and tangled underwood.

The extension of coffee cultivation in the hill districts of Southern India has been very remarkable. It was commenced experimentally in the Wynaad in 1840, and in 1862 there were 9,932 acres under cultivation in that district alone. In 1865 Wynaad coffee cultivation had increased to 200 estates, covering 14,613 acres. The exports in 1860-61 amounted to 19,119,209 lbs., and coffee cultivation has thus become a very important and increasing source of wealth. In 1873 the total number of acres under coffee was 29,595, in 6,913 holdings, of which 195 belong to Europeans and 6,718 to natives. The recent high prices obtained for coffee have given a great impetus to cultivation both by Europeans and natives; and the latter are opening large estates which are now well-planted and cultivated. In south Wynaad especially, every available piece of forest land is being opened, and land is sold at *Rs.*40 to 60 per acre. The danger is that when prices fall, a large area of fine land will be allowed to go to waste, as has already been the case with thousands of acres of the best land all over the district. The estimated produce of the Wynaad coffee crop for 1872-73 is 83,500 cwt*s.* In the mountainous province of Curg the cultivation of coffee by European enterprise was commenced in 1854, and there are now 73,306 acres under cultivation, a slight decrease since last year.

Tea cultivation is now carried on in Assam, Cachar, Silhet, Chittagong, Darjiling, and Kangra: the industry having sprung up within living memory. Before the annexation of Assam, two brothers, named Bruce, penetrated into the country, and one of them brought down the first tea plants in 1826. A Tea Committee, consisting of Dr. Wallich, Dr. Griffith, Dr. McClelland, and others, was appointed by the Government in 1834, and, proceeding to Upper Assam, established Mr. C. A. Bruce as overseer of a Government tea estate. A supply of China tea seeds and plants was then procured, and some tea makers and artizans were introduced in 1837. The Assam Tea Company was then formed, and the Government made over two-thirds of its gardens and nurseries to it. But for years the Company made no profits, and in 1846 its 20*l.* shares sold at 2*s.* 6*d.* In April 1849 the Government, having successfully created a new industry, withdrew altogether from active participation, and handed over the rest of its estate to a Chinaman who was employed on the gardens. The affairs of the Company began to improve in 1852; and Colonel Hannay then commenced the first private garden of any importance in the Debraoghur district, in Lakhimpur. In 1853 there were six tea estates near Debraoghur, and three in Sibsagar. From that time the tea planting continued to make steady progress; by 1858 there were 50 private tea gardens, and the Assam Company's shares were at a premium. From 1859 to 1863 the tea industry advanced with rapid strides, and several companies were formed. But a dangerous spirit of speculation was induced by this prosperity. In 1863-65 there was a rush to secure waste lands, and to bring portions under nominal cultivation, with the intention of disposing of them at enormous profits to newly-formed companies. Then, from 1866 to 1868, there was as rapid a deterioration in the value of tea property. In 1868 a Government Commission was appointed to enquire into the causes of the disaster, and a mass of evidence was recorded, resulting in a valuable report. At last, in 1869, there was a favourable turn of affairs; and at present the prospects of the tea industry, in India, are far better and brighter than they have ever been before. In 1850 there was one tea estate, that of the Assam Company, with 1,876 acres under cultivation, yielding 216,000 lbs. In 1870 there were 295 proprietors of tea estates with 31,303 acres under cultivation, yielding 6,251,143 lbs. of tea. In 1872-73 the area of land held by tea planters covered 804,582 acres; of which about 75 000 were under cultivation, yielding 14,670,171 lbs. of tea, the average yield per

acre being 208 lbs., which is amply remunerative. In Kangra, the Punjab tea district, there are 28 plantations including 7,732 acres, of which 3,292 are planted. The average yield per acre is 130 lbs., and the crop of 1872 gave 428,655 lbs. of tea. In the Dehra Dun there are 7,801 acres under tea cultivation, yielding 411,548 lbs., and in Kamaun 1,395, yielding 285,700 lbs. In Dehra green tea is almost exclusively manufactured for the Kabuli merchants who supply Central Asia, where only the green leaf is in demand. The trade is increasing, and the Central Asian demand has been a great advantage, as the planters now get at their very doors the same average price as they before obtained in Calcutta, after incurring the risk and cost of the journey.

Chinchona cultivation, which was introduced into the hill districts of India from South America in 1860, has now passed through all the great perils and difficulties of its experimental stage, and has assumed its place among the important permanent measures of the Government. Unlike tea and coffee, the chinchona plant had never before been cultivated. It was brought direct from the wild forests, where, in an incessant struggle for existence with other trees, it grew under many disadvantages. Everything with regard to its cultivation had to be discovered by actual experiment. The total expenditure has been under 70,000*l.* The return represents a value which is simply incalculable and without price. But the mere interest on the outlay will soon be highly remunerative: There are now 2,645,373 plants on the Government plantations on the Nilgiri hills alone; and the area covered amounts to 950 acres. Among the private plantations that at Balmadies, belonging to Mr. Rohde, has an excellent aspect, and consists of splendid trees. This estate was commenced in 1866, when 31 acres were planted, which in May 1868 was extended to 60 acres. Last year a considerable quantity of bark from Balmadies was sold in the London market, fetching good prices. The Devi Sholah plantation covers 600 acres, of which 450 are planted; Ossington consists of 400 acres; and there are many other plantations, among which may be mentioned those of Dr. Colvin Smith, Mr. Phillips, and Mrs. Morgan. The beautiful trees, with their glossy rich green leaves and fragrant racemi of flowers, cover the slopes of the mountains which overhang Wynaad, and line the hill sides almost to the peak of Dodabetta. The tallest tree is now 36 feet high, and 28 inches round the stem. The amount of green bark supplied to the quinine manufactory on the plantations during 1873 was 91,773 lbs., from which Mr. Broughton, the quinologist, manufactures a febrifuge alkaloid, at *Rs.* 1½ per oz., which is supplied to the medical stores. Thousands of fever patients are thus annually cured. In November 1873 the sale of 25,000 lbs. of Nilgiri chinchona bark, belonging to Government, took place in the London market, and realised 3,490*l.*, the average price secured being 2*s.* 10*d.* per lb.; while one parcel was sold at the very unusual price of 5*s.* 9*d.* per lb. If this average is applied to the 91,773 lbs. used in the manufactory in India, it will place its value at 13,000*l.* This makes the annual income of the plantation about 16,500*l.*, which will increase in future years. Chinchona cultivation is now entirely out of the category of experiments; and soon the grand object of this beneficent measure will be secured, by the provision of an abundant supply of the febrifuge, at so cheap a rate as to be within the means of the population at large.

Besides the great chinchona plantations on the Nilgiris, the fever healing trees are flourishing on the Palnai hills, in Travancore, and in Wynaad. There is a small plantation at Mercara, in Curg, which is about to be extended; and 24,000 trees on the Bababudin hills in Mysore. At Lingmulla, on the Mahábaleswar hills, in the Bombay Presidency, a chinchona plantation was formed in February 1864. The climate, however, was not suitable. In 1873 there were 10,203 trees; but they have been injured by want of sufficient water and heavy gales of wind. There are also 20,000 plants in the nursery ready for planting out. The results of analysis of the bark by Mr. Broughton are on the whole encouraging.

At Rungbi, near Darjiling, 2,000 acres are under Chinchona cultivation; the bark has been sold in the London market at prices ranging to 1*s.* 3*d.* per lb.; and enormous quantities of bark have been stored for local manufacture. A quinologist has been appointed to reside at the plantations, with a view to an efficient febrifuge being manufactured at so cheap a rate as to be within the means of the natives of Bengal, who will thus participate in the benefits which their brethren in Madras are already enjoying. Mr. Wood, the quinologist, arrived at his post in the autumn of 1873, and has been furnished with a laboratory. The great problem is to discover the cheapest form in which an efficient febrifuge can be manufactured from the bark; and in the Report for 1873 there is every reason to expect that valuable results may be announced from Mr. Wood's labours. He has already manufactured

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a form of the alkaloid, taking his supply of alkali from the ashes of the *Artemisia* plant, which grows in abundance on the Sikkim mountains, and is very rich in potash. In the Sittang division of British Burma Chinchona plantations have been formed by Captain Seaton, the conservator of forests, at two places, about 3,700 feet above the sea, one to the north and the other to the south of the Thoukyeghat river, east of Tounghu. The main plantation now contains 354 plants fairly established.

Cardamoms form another important product of the hill districts, chiefly on the western slopes of the mountains of Curg and Mysore, at an elevation of from 2,500 to 5,000 feet above the sea. In February the cardamom growers proceed to the forests, and mark one of the largest trees, on the steepest declivity. The ground at the foot of the tree is cleared of brushwood, and the tree is felled at about 12 feet from the ground. It falls down the side of the mountain head foremost, carrying a number of smaller trees with it in a great crash. Within three months the cardamom plants begin to show their heads all over the cleared ground. During the rains they grow two or three feet, and 20 months after the felling of the tree, when the cardamom plants are the height of a man, the ground is thoroughly cleared of weeds. In the following April the fruit-bearing branches shoot forth, and become covered first with clusters of beautiful flowers and then with capsules. In the following October the first crop is gathered, and the harvests continue good for seven years, when they fall off. Then another giant of the forest is felled, and the process is renewed. The gathering in, entailing a walk of several miles through wet underwood covered with leeches, is very hard work. In Curg the cardamom forests are rented out for Rs. 30,000 a year. In Mysore the yield is valued at 17,000*l*. Instructions were given in 1871-72 for the demarcation of such tracts of jungle as were favourable for the growth of this spice, and coffee planters are beginning to turn their attention to its cultivation.

In 1870 it was resolved to undertake the cultivation of the ipecacuanha plant in India, the medicine from which is so useful in cases of dysentery. Professor Balfour, of Edinburgh, undertook the propagation of the plant in the gardens there, by dividing the peculiar annulated root, cuttings of which give off young shoots. By this means numerous plants were produced very rapidly. In May 1871 a case of 12 plants, and in October another containing 74 plants, were despatched to Calcutta, and the majority reached their destination in a healthy state. In July 1872 a further supply of 112 plants, and in November 1872 another of 68, were sent out. It is believed that the ipecacuanha plant will thrive best in the valleys on the outer slopes of the Sikkim Himalayas, which open towards the Terai. A fine small valley near Sukna, at the point of entrance into the hills of the cart-road to Dárjiling, has accordingly been taken up as an ipecacuanha reserve. There are now 23,000 cuttings, and a permanent plantation was to be commenced in 1874.

The Cochineal insects have been imported into Mysore from Teneriffe. They have taken kindly to the acclimatised cactus; the climate is suitable, and the experiment promises well.

In 1869, Lord Mayo's Government came to the conclusion that the time having come when the great importance of obtaining exact information as to the natural capabilities of the land and water of the vast empire of India is beginning to be fully and clearly appreciated, an effort should be made to utilise to the utmost the fishes of the rivers and coasts as sources of food to the population. Dr. Day, who was already well known as the author of an important work on the fishes of Malabar, was therefore appointed to make inquiries respecting the fisheries throughout India on a comprehensive system, and to submit reports on any matters relating to the utilisation of the natural resources of the rivers and seas, which seemed to him to deserve the attention of the Government. Dr. Day commenced his investigations in Orissa, and went thence to Burma. He has also reported upon the Punjab, North West Provinces, Assam, Sind, and Madras. He treats of the fresh water fisheries of India under five heads: namely, wasteful destruction, the fishermen, the fisheries, the fish, fish in an economic point of view, and the effects of a fish diet. There seems to be a concurrence of opinion from all parts of India that there is, at present, a wasteful destruction of fresh water fish, either by poisoning, or by the use of meshes so small as to catch all the small fry. The invariable rule, among fishermen of every cast and creed, is to get everything they can, irrespective of the season, entirely oblivious of next year's supply. The consequence is that the waters are insufficiently stocked. Dr. Day has no doubt that, if the fishes were allowed fair play, an increased supply would be the result. He recommends the prohibition of trapping and snaring the breeding-fish during the monsoon months, by regulating

the sizes of the meshes of nets, or the interspace between pieces of rattan or reed. This would permit the breeding fish to deposit their ova, and return to the rivers from which they ascended for that purpose. He would also forbid poisoning and other wholesale methods of destruction; and would provide fish ladders at the weirs or anicuts.

The large fish-eating population gives great importance to these questions. The whole of the indigenous population of Burma eat fish. In Canara, Mr. Thomas, in his interesting and exhaustive report, mentions that 760,160 out of a population of 839,688 are fish eaters. In Orissa fish is almost universally eaten, and very largely in Bengal, the North West Provinces, and the Punjab. A series of questions, drawn up by Dr. Day, has been circulated, in order to elicit opinions and to obtain materials for a more comprehensive report. Meanwhile, the Secretary of State has drawn attention to the conclusions of the Sea Fisheries Commissioners in England, who recommended unrestricted freedom of sea fishing, while, even in estuaries, they reported that the natural increase of fish is so rapid and great as to be little affected by man's destructiveness. It has also been enjoined that, in framing regulations for the fisheries, care must be taken that they are of such a nature as to interfere as little as possible with the habits and welfare of the very poor class of people engaged in earning a livelihood from fishing.

A general review of the whole of the results of Dr. Day's inquiries will hereafter be made by the Government of India, and a decision will then be formed on his recommendations, and on the most advisable measures for the maintenance of supplies of fish.

The breeding of stock has received much attention in all parts of India. Great pains have been taken, especially in Madras, to improve the native sheep, and sheep have been introduced into the Punjab and the North West Provinces, from England, while shows and prizes have stimulated the breeding of cattle. As regards horses, the Madras and Bombay armies depend on the open market for their supply, but in Bengal Government studs have long been established to supply the army in that Presidency with horses. In 1794 a very unsuitable locality was selected in Tirhut for the purpose of breeding stock, and in 1808 Mr. Moorcroft, an experienced veterinary surgeon, was sent out as Superintendent of Studs. He organized the department, sent officers to Persia and Arabia to buy stallions and mares, and in 1819 he himself penetrated across the Hindu Kush to purchase Turcoman horses, and, as is well known, this intrepid explorer died of fever near Balkh. From time to time commanding officers expressed general dissatisfaction at the remounts supplied by the stud, and a Committee, appointed in 1851, exhibited very unfavourable results; but in 1860 Lord Canning recommended the continuance of the system, to which Sir Charles Wood agreed, but at the same time adduced arguments in favour of making India self-reliant in respect of the supply of horses.

The studs are in two divisions, the central at Poona, Baxar, Ghazipur, and Karunthedi; and the North Western at Hapur, Saharanpur, and Karnal. In the Central Division the mares purchased or bred by the Stud Department are lent to farmers, and covered by Government stallions; and the farmers are bound to sell the foals to the Department at eight months old. The foals so purchased are sent into various depôts, until they are old enough to be presented as remounts. In the North West Provinces the mares belong to the farmers themselves, are registered by Government and are served by Government stallions. There are about 18,000 mares on the register, and 328 stallions belonging to the stud. There is also a home system under which both stallions and mares belong to Government. There was a home stud at Hissar which was discontinued in 1842, and in 1865 it was re-established at Karnal, where there are English mares sent out in 1866 and 1867, some of the stallions sent out by the Secretary of State, and several mares from New South Wales. Twenty stallions were sent out to India by the Secretary of State, every year from 1861 to 1865, 13 in 1866, 19 in 1867, 10 in 1868, 2 in 1870, and 6 in 1872. The Government of the Punjab also gives much encouragement to the breeding of horses, providing stallions in the best breeding districts, and offering prizes for the best animals exhibited at the different agricultural meetings.

An annual supply of 750 to 800 horses is required for the Bengal army, but the Stud Department is not able to supply more than 500. In 1868 there were almost unanimous reports as to the badness of the remounts, and Lord Mayo appointed a second Committee to inquire into the general management of the

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Government studs. It was found that the Department cannot supply the number of horses required, that the prices of its horses are exorbitant, that it has extinguished private enterprise, and has failed to improve the indigenous breed of horses. In consequence of the report of the Committee, the Government of India resolved to abolish the asami system and to establish a new breeding stud in the Punjab on the home system.

The Home Government, however, have come to the conclusion that the proper direction in which the efforts of Government should tend is towards the encouragement of private enterprise. Various excellent breeds of horses have existed in India, in Katiwár, in the Bhima Valley, and in the Punjab; and with proper assistance and encouragement, the breeding of horses for the market would probably again revive as a profitable enterprise. India also receives foreign supplies from the Persian Gulf, Central Asia by Kabul, Australia, the Cape, and England. Instead of Government studs, it is proposed that stallions be furnished in the best breeding districts, that prizes be offered for promising brood mares and young stock, and that liberal prices be given for suitable three or four year old colts. With such judicious encouragement it is anticipated that the ancient and successful practice of private horse breeding in India will revive.

In the Bombay Presidency a good deal is already being done in this direction. The Government have 59 stallions distributed over the country, 7 English, 49 Arab, 1 Australian, 1 country-bred, and 1 Gulf Arab. In Ahmadabad there are also three Government bulls, the services of which are much appreciated by the breeders; and Mr. Borradaile, the Collector, zealously promotes horse and cattle breeding in his district. In all the districts the Government stallions are much sought after, and their services are fully appreciated by stock breeders. Annual horse shows have been held at Ahmadabad since 1869 with great and increasing success. At Sirúr, also, near Poona, there is an annual horse show in January, when prizes are awarded for the best young stock, the produce of Government stallions, and for mares in foal. Country breeders readily attend the show, and it promises to become, year by year, more attractive. Another annual horse show takes place at Dehwari, in Sátára, at which prizes are awarded. In the Punjab, where there are 37 Government stallions, the Lieutenant Governor has determined to make Ráwalpindi a centre of operations connected with horse breeding; and another will be formed on the Derájat frontier, where there are many first-class mares of the Biloch and Sagar breeds. A horse fair is held at Rawalpindi, where every inducement is offered, by means of prizes, to breeders of the best animals, and at the last fair in March 1873, 847 horses were exhibited against 596 in 1872. The fair is increasing in popularity as a market for the sale of stock, independent of the prizes given by the Government to encourage a better breed. The show of mules was also good. It is expected that, in a few years, the Rawalpindi horse fair will produce a good supply of artillery horses. There are cattle fairs at Hissár and Sarsa, the centres of the grazing districts in the Delhi region, at which upwards of 25,000 people assemble, some of them coming from distances of 200 miles. The most successful cattle show in South India is that which was periodically held, for a succession of years, at Nellore, through the influence of which the breed of cattle was certainly improved. It was begun by Mr. Dykes, the Collector, who took a deep interest in it.

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IRRIGATION is a necessity for a large section of British India, is of incalculable importance to the cultivators over a still larger area, and is unnecessary only in two limited bands of territory, where the rainfall is excessive. The map, showing the amounts of rainfall by tints of colour, exhibits this very clearly. In the north-west corner of India there is an arid region, including all Sind and half the Punjab, where the normal annual rainfall is less than 15 inches. Here irrigation is essential to the existence of the people. Next, there are two zones of dry country, with an annual rainfall between 15 and 30 inches. One surrounds the arid region on the north and east, in a belt from 100 to 200 miles wide, and has been named by Dr. Brandis the Northern Dry Zone; it includes Delhi and Agra. The Southern Dry Zone is in the peninsula, extending from Nasik to Cape Comorin, at a distance from the two seas. These dry zones also stand in absolute need of irrigation. The next region has a rainfall between 30 and 60 inches, and includes the upper part of the valley of the Ganges, Central India, and the Eastern Coast of the Madras Presidency. Here irrigation is also much needed, and great distress has been caused by the want of it. The fifth region has a rainfall between 60 and 75 inches, and comprises the deltas of the Mahánadi and Ganges, and the lower part of the Ganges valley. In this more favoured belt, irrigation may be looked upon as a luxury, often useful, but not absolutely necessary, except in extraordinary years. Finally, there are two belts of excessive rainfall, where irrigation is unnecessary, the one extending from the mouth of the Irawadi, along the east coast of the Bay of Bengal, up the valley of the Brahmaputra, and along the skirts of the Himalaya; the other along the west coast of the peninsula, from the sea-shore to the summits of the ghauts.

The Governments of India have always, and especially of late years, given much attention to the supply of water for the irrigation of those parts of the country which most need it. Gigantic works have been undertaken, and many have been completed in the arid region, in the dry belts, in the less dry tracts, and even in the belt where artificial supplies are more or less a luxury. Still very much remains to be done, and the progress of our efforts to supply the various regions with water for irrigation, and so to secure the inhabitants from famine, will be best considered by dividing the subject according to the principal river basins. First in order will come the basin of the Indus, the abode of the first civilized race in India, and consequently the region where irrigation was first practised: it includes an area of 372,700 square miles. Then the Ganges River basin, covering 391,100 square miles, and that of the Mahánadi. Next the basins of the Tapti and Nerbada; and, finally, those of the rivers emptying themselves into the Bay of Bengal, on the eastern coast of the peninsula.

The Indus basin divides itself into two parts, the first comprising the Punjab, where the six rivers spread out like a fan; and the second and lower being the valley of Sind.

The relative requirements and needs of the Punjab, as regards irrigation, are very clearly exhibited by the rainfall map. When the six rivers issue from the Himalaya, they come upon a narrow belt at their feet, where the supply of rain is plentiful. The rivers then enter the northern dry zone, where they spread wealth and fruitfulness along the banks; but at the same time, in the course of ages, they have cut deep down through the soil, and left high land on either side, the valley being from 10 to 50 feet below the central plateau. The fertility is consequently confined to the low valleys, four to ten miles wide, over which the rivers meander from side to side in the course of ages, and are only checked by the steep scarps which they have themselves gradually formed. The low land by the rivers is called *khádar*, and the high and sterile tracts on either side *bángar*. The *bángar* lands form the doabs between the rivers. Though the soil is fertile, cultivation must depend upon the scanty rain, unless it be supported by artificial irrigation. Large portions of the *bángar* are covered with grass or brushwood, or are entirely waste. The general surface of the Punjab slopes southward from the Himalayas at a considerable gradient, and as the rivers converge, the depth of the river beds below the plain is reduced and eventually the *bángar* is lost sight of, and low *khádar* extends right across between the rivers. But here the rivers enter the arid region, where

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there is scarcely any rain, and which would be a scorched and uninhabitable waste if the water from the Himalayas was not led over it to convert it into a garden.

The different kinds of irrigation required by such a country suggest themselves. Near the foot of the Himalayas, and in the upper valleys and *khádar* land, where water is under 25 feet from the surface, irrigation is supplied from wells. In the low tracts, where the rainfall is less than 15 inches, water must be led from the rivers during the season of inundations. The perennial canals, which can only be constructed at vast expense, and when great engineering skill can be obtained, are necessary for the high and rainless tracts of the four doabs, where wells are too costly, and to which the inundation waters could not be brought. These doabs have excellent soil, and only require water to become fertile.

During the period of native rule, well irrigation and that from inundation canals were alone available. By these canals the district of Multan, between the Satlej and the Chenab, where rain hardly ever falls, is converted into a succession of beautiful gardens shaded by date palms. There is a burning sun above and canals flowing below. During the winter the water of the rivers is not sufficiently high to enter the canals, some of which are artificially excavated, while others are merely channels abandoned by the rivers; but as the rivers rise in the spring, from the melting of Himalayan snows, the water gradually enters the channels, which obtain their maximum volume in summer; so that, when water is most needed, when the sky is brass and the earth iron, the inundation canals from April to October produce luxuriant crops. The corn, before yielding its grain is twice mown down as fodder for cattle, and then ears, and produces abundant harvests. The mangolds are only second to those of Mazagon, and oranges and pomegranates grow in profusion.

In Multan the main canals were considered the property of the Government, but the annual repairs and clearances were and are done by the people. The *kardar* of the district demands as many labourers as he considers necessary, according to the extent of the clearance required. The landholders then form *punchayats* or committees, and fix the portion of the general burden to be borne by each village, with a scale of fines for defaulters. The system is worked by *cher* or statute labour. In 1872-73 the number of statute labourers who came to work at the clearances was 512,358; and their work materially reduces the cost of maintenance. The plan of distributing the water varied. On some canals the number of hours *per diem* was fixed, during which Persian wheels were to be worked, or the side channels to remain open. On others, bunds were allowed to be thrown across for a certain time, at fixed points. One great trouble was that the waters of the rivers were apt to recede, leaving large sand banks at the canal mouths, which had to be cut through, or a new head made; then the channels were irregular, without any provision for the escape of surplus water, and the excavated earth was generally heaped up irregularly on the banks, which were never made with any slope, yet on them the safety of the country from inundation often depended. The Afghan rulers, left by Aurungzib, did much to establish this system of irrigation, and Sawin Mull, who was governor from 1821 to 1844, so enriched himself from the plenteous harvests of Multan that he left a private fortune of 900,000*l*.

But the inundation canals were not confined to one district. Taking advantage of natural ravines, some rude canals existed in Gugaira, and other districts of the Bari Doab, above Multan. There was a more complete system in the rich country of Muzaffargarh, between the Chenab and the Indus, the land under the influence of which was one sheet of cultivation. There the proprietary right was vested in zemindars, who were hereditary landowners, while under them were the owners of wells and Persian wheels, called *chukdars** and *sillundars*† who brought the land under cultivation. These paid a portion of the produce, called *lichh*, to the zemindars, and also a settled rate to the Government. A man was said so own, not so much land, but so many watercourses or Persian wheels. The actual cultivators rent from the owners of wheels or wells, and the canals were kept clear of silt by statute labour.

In the Shahpur district there are two inundation canals, drawing their supply from the Jhilar, which, in 1872-73, watered 4445 acres.

In the Derájat, on the right bank of the Indus, the canals run parallel with the river, and fill during the periods of inundation. There were 12 of these canals, with an aggregate length of 291 miles. The landowners arranged the distribution of water among themselves for the khurreef crops, which are all grown on canal lands.

* From *chuk*, a wooden frame sunk as the foundation of a well.

† From *sillum*, bricks.

The native State of Bháwalpur, on the south side of the Satlej, is also dependent on inundation canals, its *khádar* land, bordering the river, being 10 to 12 miles wide. In a former age such inundation canals were conducted from all the five rivers of the Punjab, and traces of them are perceptible, with ruins of cities and villages on their banks.

Our duty has been to maintain and improve these native works, and Lieutenant (afterwards Colonel) Anderson was appointed to superintend them in 1850. For purposes of administration they are divided into the Upper Satlej, the Lower Satlej and Chenab, and the Indus canals.

The Upper Satlej canals are in the central part of the Bari Doab, above the Multan district. Here the face of the country is covered with traces of former life and prosperity; the cause of decay being due to the loss of water supply, for the River Bias once had an independent course to the Chenab, fertilizing the land on either bank; but in 1790 it was diverted into the Satlej, and its old bed became a dry ravine, with a complicated network of deserted watercourses. Colonel Anderson's attention was early given to this waste. Inundation canals have been brought into it from the Satlej. The Khanwah canal leaves that river at a point 20 miles below Ferozpur, by a mouth 90 feet wide, narrowing to 20 feet at the end of its length of 55 miles. A great deal of water used to force its way out of the canal at weak points, and flowed back to the Satlej, inundating the country. The head of the canal also gave much trouble. It was thoroughly cleared out in 1850, and a jetty was built to turn in the water, but in 1852 a waste of sand, a mile wide, intervened between it and the Satlej. A new channel had to be opened, and it has since been much improved. The Khanwah is of the utmost value to the agriculture of the Gugaira district, irrigating 157 villages, and much labour and money have been devoted to its improvement. By 1858 these improvements had been completed, and during the following years several *rájbuhas*, or supply channels, were constructed in connection with it, with masonry outlets, which were paid for by the cultivators.

The Sohag Canal leaves the Satlej a little below the mouth of the Kanwah, to irrigate the country between that canal and the river. It is $73\frac{1}{2}$ miles long, and has been very much improved of late years; the channel straightened and masonry outlets constructed. The Kutora is a nulla to the north of the Kanwah Canal, and Colonel Anderson proposed that the Satlej water should be conveyed to it from opposite Ferozpur, and so into the old bed of the Bias. Another natural ravine, or watercourse, is the Para, which is a continuation of the Sohag. It is connected with the old Bias by a channel called Nawabbin, a name derived from Nawab of Multan, in the last century, who carried the supply of the Para into the Bias, and thence into the Multan district, for the purpose of providing a navigable passage for his wife, who was travelling down country in a boat. The aggregate length of the Upper Satlej Canals is 213 miles. In 1872-73 they irrigated 135,349 acres.

Colonel Anderson's scheme, with reference to the Upper Satlej system of canals, was to establish a control over the river by the construction of a masonry dam at Ferozpur, so as to prevent silting up at the canal heads, and he would have provided one main head for the old Bias, the Khanwah, Sohag, and Para. A great scheme, based on that of Colonel Anderson, for the complete irrigation of the central part of the Bari Doab, by inundation canals, was submitted to the Government of India in January 1872. The area of the country affected by this project is 11,000 square miles, of which 3,230 are on the left bank of the Satlej, and partly in the Bháwalpur, State. The aggregate length of the channels is 1,143 miles on the Bari Doab side, and 80 on the left bank. The estimated outlay is 3,560,786*l.* of which 633,056*l.* is the cost of a dam across the Satlej at Ferozpur, with headworks, such as was originally proposed by Colonel Anderson.

The Lower Satlej and Chenab Division comprises the canals which fertilise the Multan district. Since the annexation they have been cleared by statute labour every year, the slopes and headworks have been improved, and the distribution carefully supervised. There are now 39 canals, with an aggregate length of 632 miles, of which only 11 miles have been added since the commencement of our rule. They irrigate 242,504 acres, belonging to 410 villages.

The Indus canals include those of Muzaffargarh and the Derájat. There are 66 in the former district, drawing their supplies from the Indus and Chenab, which in 1872-73, irrigated 180,137 acres. The canals have hitherto been kept in repair and cleared by statute labour. The canals of the Derájat aggregate a length of 600 miles, 108 of which have been constructed since the commencement of our rule. The annual clearances are almost entirely effected by free labour. During 1871-72 much

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trouble was given by the high flood of the Indus, and some of the embankments were breached, causing extensive inundation and damage to crops. A scheme is now under consideration for the improvement and extension of the irrigation in the Dera Ghazi Khan district, and another for the irrigation of part of the Sind Sagar Doab, by taking of a supply of water from the Indus where it runs through a rocky channel near Kalábágh. The irrigation from inundation canals, in 1872-73, was larger by 42,582 acres than the highest aggregate yet recorded. The area thus irrigated was 573,522 acres.

Yet another project for the irrigation of the Yusafsai part of the Pesháwar valley received the sanction of Lord Mayo's Government at the instance of Sir Richard Pollock, the Division Commissioner. The Pesháwar valley is encircled by mountains with the exception of a small opening towards the Indus, and comprises 2,400 square miles, divided in two by the River Kabul, which enters the plain at Michni. It is joined midway by the Swat river, flowing from the north-west, and entering the plain at Abazai, and the Bara from the south-west, entering the plain at Shaikhan. The distribution of water from these three rivers is a constant source of feud among the villagers. Four or five villages have a joint right in one irrigation cut, and are together responsible for its maintenance, the cut being supplied by feeders from the rivers. Yusafsai is the portion watered by the Swat river to the north-west. The Swat on entering the plain divides into many channels, winding through rich meadows, fringed with willows and poplars, which all unite again before joining the Kabul. But the supply is often insufficient and irregular, and the remedial scheme is to throw a bund across the Swat at Abazai, in the gorge. A main channel will be led from above the bund, 18 miles long, with 121 miles of distributing channel. The cost of this 'Swat River Scheme' is estimated at 52,700*l.*

But the most instructive system of inundation canals is that within the native State of Bháwalpur, which has been created by the Political Agents, Major Minchin and Captain Grey, and their able engineer, Mr. Barns, during their administration of the country for the young Nawab, who is a minor.

Bháwalpur extends for 300 miles along the left banks of the Satlej, Chenab and Indus. It consists of the *khadar* land along the river banks, averaging a width of 10 miles; the *bangar*, a strip of land running along the whole length of the State, parallel to the *khadar*; and the desert to the south. A large part of the *bangar* is now covered with sand drift from the desert. The desert tract dates its origin from the drying up of the Ghaggar, the ancient Saraswati, which once flowed through the heart of the country from the Sawalikh mountains to the Indus, between Rori and Uch, parallel with the Satlej.

The waste dry channel, traversing the Bháwalpur *bangar*, has ruins of old towns dotted along its banks. It is the old bed of the Ghaggar, (the waters of which now hardly ever reach beyond Bhutner after the heaviest rainfall), and is locally called the *Hakra* and *Sankra*. For the first 80 miles of the Bhawalpur State there is a vast branch of the Hakra, parallel with the River Satlej, called the *Trewanna*, pursuing a tortuous course between the Hakra bed and the Satlej. Once it fertilised a vast tract, but for centuries it has received no water from its parent stream. It had, however, been supplied with water at the rise of the Satlej by numerous excavated channels from the river to elbows of the *Trewanna*, where, in its windings, it approached nearest. By these means lengths of the *Trewanna* were just able to keep alive some of the land it once fed plentifully. But, owing to long neglect, the feeding channels and the *Trewanna* itself silted year by year, and more and more land fell out of cultivation. The people took to rapine for a living, and at last the whole north-east district of Bháwalpur became a mere population of cattle lifters.

This was the state of affairs when Major Minchin, the Political Agent, assumed charge of Bháwalpur in 1867, during the minority of the Nawab. He borrowed 15,000*l.* at 12 per cent. interest for 10 years, and dug a canal called the *Ford-wah*, which issues from the Satlej, and extends parallel to it, and about 20 miles from it, for 105 miles. Irrigation channels are led from the canal, and it does good work, though of course it is unable to replace the vast irrigation of the *Trewanna*. It was then resolved to restore the *Trewanna*, as far as possible, by clearance and by leading feeders into it from the Satlej. These works are now in course of construction with the best results. Below the tails of the *Trewanna* and *Ford-wah*, in the Khairpur district commence six small canals, which extend to the district of Bháwalpur. Their complete remodelling is a projected work for next winter.

Below Khairpur, which is one of the districts of the Bháwalpur State, and 20 miles north-east of the city of Bháwalpur, there was a large natural dry channel, called the *Vahind*, a feeder of the Sankra. It was proposed to restore water to this channel by feeding it from the Satlej when in flood, and this was partially done in 1871-72 with great success. A new canal, 20 miles long, has also been cut to feed a ruined channel called the *Khanwah*, and the old portion of which has been re-modelled and extended. From the city of Bháwalpur to the junction of the Satlej and Chenab, a distance of 30 miles, there are numerous small native inundation canals, and one large channel, the *Nourunga*, which has been completely re-modelled, and fed at a high level by a head 20 miles long. The *Kutubwah*, *Sultanwah*, and *Mobarikwah* are perennial canals with their heads below the winter zero of the river, leading to Ahmadpur, the former capital of the State.

The principal canals from the Chenab are the *Minchin-wah*, *Barnswah*, and *Sadikwah*, large channels 100 feet to 200 feet wide, irrigating a vast area by an endless network of branches. Below the junction of the Satlej and Chenab, and parallel to the latter river, there is a great dry channel winding down the remaining length of the Bháwalpur State, called *Hurriari* or "the fertilizer." All the branches from the Chenab system of canals are tailed into the Hurriari, but their volume is inadequate to afford a useful supply to that great channel. In 1871, however, a spill from the Chenab into the Hurriari, at high flood, was carefully utilised, and it is now proposed to make a permanent cut along the line which the spill took, and so give water to the Hurriari. From the Indus there are nine canals, seven of them old native works, and two constructed by the English. The Indus alone, of these rivers, pours its flood over the face of the country in July and August, the waters uniting to run into the eastern Narra, a great channel belonging to the Sind system.

The system of yearly clearances has been placed on a thoroughly sound basis in Bháwalpur. The exact quantity due from each farmer is accurately calculated on correct principles, and he is then made responsible for the clearance along the extent of the canal which rightfully falls to his share. All this useful work has been done within the last four years; and the English Political Agency has thus raised a revenue which they found at 12 lakhs paid in grain, to 19 lakhs (or 190,000*l.*) paid in cash. This is a measure of the blessings conferred upon the country by Major Minchin and his coadjutors.

The important system of inundation canals from the Punjab rivers, upon which the very existence of the inhabitants of a vast area in the rainless region depends, was administered by the people themselves, under Government supervision. The whole of this class of canals within British territory, has now been placed under the regular management of the Irrigation Department. Until recently there was no direct canal income, the returns appearing in land revenue.

The region for state canals presented far greater difficulties. This region, in the Punjab, comprises the Bári Doab between the Bias and Rávi rivers, the Rechna Doab between the Rávi and Chenab, the Chuch Doab between the Chenab and Jhilam and the Sind Sagor Doab between the Jhilam and the Indus.

The Bári Doab was considered the most important, as containing Amritsar, and being the cradle of the Sikh nation; and a great canal was projected for its irrigation immediately after the annexation of the Punjab. One small permanent canal already existed in the Bári Doab. It was called the Husli Canal, and was constructed in about 1633, by order of Shah Jehan, not for irrigation, but to supply fountains at the royal gardens of Lahor. When the Sikhs acquired the sovereignty, they led a branch to Amritsar, to supply the sacred tank. The canal followed the natural line of drainage by a tortuous course of 110 miles, and passed through low land which least required irrigation.

The great English project was to bring a central canal down the high land of the Bári Doab for 247 miles, receiving its water from the Rávi, where that river debouches from the lowest of the Himalayan ranges, at Madhopur. Here there is a deep cutting through the high bank of the Rávi. The canal then crosses two mountain torrents, and gains the table land, striking into its wild wastes, to vivify and regenerate the ruined cities and villages, and rejoin the Rávi, 56 miles above Multan. At the thirtieth mile a branch diverges, to fertilise the most arid part of the Doab, and reaches the ancient city of Kassur (84 miles), and from this branch a smaller channel is diverted eastward to near the Satlej, opposite Sobráon (61 miles). At the fifty-fifth mile another branch is taken off, to spread fertility down to Lahor (74 miles),

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The original plan was that the canal should be navigable throughout, the slope being counteracted near the head by boulder rapids, and afterwards by masonry falls. The total length, including branches, was to have been 466 miles. The main channel, at its head, was to be 120 feet broad, and 5½ feet deep. The total cost was originally estimated at 530,000*l.*, and the work was entrusted to the late Colonel Dyas, with Lieutenant Crofton as his assistant. They commenced work on the first 30 miles in 1850.

In 1856, it was found that the cost of the canal would not be under 1,350,000*l.*; and efforts were concentrated on the completion of the main line, down to where the Lahor branch breaks off. Water was first admitted into the Bári Doab Canal on the 11th of April 1859, and it soon became evident that the declivity of the bed, in the upper parts, was too great, the consequence being extensive channelings out in the sandy tracts, and deep holes below the falls. It was also found that the discharge from the Rávi had been overrated, and that the permanent supply was less than the works were designed to carry. It became evident that to utilise the channels a supply must be drawn from other sources. The minimum supply of water from the Rávi had, in 1848, been calculated by Sir Robert Napier at 2,753 cubic feet per second. It turned out to be only 1,414, and the maximum 2,529. The sources from which the full quantity can be obtained are the River Bias, or the Rávi further down. Estimates for remodelling the canal were ordered to be framed in 1868.

The re-modelling was commenced, and in 1870 it was resolved to complete the Kassur and Sobráon branches, but without navigation. The total cost of the project has risen to 1,344,956*l.*, and when completed with the branches, will be 2,000,000*l.* Important mechanical workshops were established at the head works at Madhopur, and in 1867 the formation of a watercourse was sanctioned, to supply motive power for the machinery. The weir and new masonry headworks at Madhopur were almost completed in 1872-73; and about half the work of the new workshops was finished. The quantity of iron work turned out of these shops was 618 maunds of castings, and 618 of wrought iron.

During 1872-73, the re-modelling of the central line, and the excavation of the branches, made good progress. The aggregate length of the main canal is now 212 miles, with 692 miles of *rajhulas*, or distributing channels. The gross income for 1872-73 was 81,786*l.*, direct and indirect; and the working expenses 31,570*l.*, the combined direct and indirect profit being 50,216*l.* or 3. 8. per cent. on capital. An important question arose with regard to the rates to be charged for water. Originally these rates were uniform for all crops, being *Rs.* 2. 6. 8. per acre for water given in flow, and *Rs.* 1. 3. 4. for water lifted. After much consideration, it was resolved that the rates should vary for different crops, and be divided into four classes; the scale being for sugar cane, 6 rupees; for rice and gardens, *Rs.* 4. 12.; for wheat, barley, cotton, and indigo, *Rs.* 2. 8.; and for other cereals and pulses, *Rs.* 1. 8. per acre. The number of acres irrigated from the Bári Doab canal, in 1872-73, was 228,796.

Irrigation has not yet been provided for the other Punjab Doabs. In 1862, Mr. Bourne, the managing director of the Oriental Steam Company, proposed a scheme for a joint stock company to construct a canal from the Chenab, and his plan was warmly supported by the Lieutenant-Governor; but, in 1864, the Supreme Government informed Mr. Bourne that they were not prepared to give him any definite encouragement. Colonel Crofton, however, pointed out places whence a permanent supply of water could be obtained from the Chenab. In 1860, Mr. Purdon had a project for a canal down the Sind Ságar Doab, from near Mari on the Indus, to the same river about 70 miles above Mithankot, a distance of 220 miles. The reason for the cessation of necessary investigations with reference to these projects, which were commenced in 1864, is stated to be the difficulty of obtaining qualified engineers for the service. A rough reconnaissance was, however made of the River Chenab last year, near Chiniot, in the Jhang district, with the view of ascertaining the feasibility of drawing off water there, for the irrigation of the lower part of the Rechna Doab. As a ridge of rocks here crosses the river, it is thought that a channel might be taken of at small cost, yielding a perennial supply of water. There are 7,000,000 of acres in the unirrigated Doabs waiting for water, and to swell the revenues of the State; while, in the District of Gúrgaira, lying in an unfortunate position in the Bári Doab, below the point to which the English canal reaches, and barely within reach of the inundation canals, only 66,000 acres are watered out of 500,000. Certainly much remains to be done.

One great work has, however, been recently commenced in connection with Punjab rivers. The Satlej or Sirhind canal project was submitted by Colonel Crofton in 1862. At the point where the water parting separates the Jamna from the Satlej, there is an interval where the classic Saraswati once watered the land of Kuru, on its way to the Indus, but where now the streams have ceased to be perennial, while the desert fast encroaches on the once rich kingdom of Thanesar.

In 1840 Sir William Baker ran a line of levels across this region, from Karnal to Ludhiána, finding the greatest elevation above the Jamna and Satlej to be 68 feet, and he afterwards carefully examined the courses of its river beds. In 1841 the same officer reported that the introduction of a stream from the Satlej into an immense cultivable tract, now desert, was physically practicable. The immediate commencement of this work could not be authorised, but Mr. Thomason, then Lieutenant-Governor of the North-Western Provinces, declared that Captain (now Sir William) Baker had been the successful pioneer in this little known tract, and that he had suggested plans which should not be lost sight of, and which hereafter might mature into works of great national value. Twenty years afterwards Colonels Dyas and Crofton again brought the project to notice. The water parting between the Jamna and the Satlej runs close to the former valley, and no streams between those two rivers derive their waters from the snows of the Himalayas. They are all therefore devoid of a perennial supply, hence the necessity for drawing one from the Satlej. The site for the head works was fixed by Colonel Crofton, on an eastern branch of the Satlej, just below the mouth of the Lohind Torrent, the main stream being diverted into the eastern branch by a bund at Thannah Ghat. There will be great difficulties in taking the canal across the Sursa Torrent, which will be overcome by a dam, with sluices for the passage of floods, and piers sufficiently high to retain the canal supply. The canal, with its branches, will then be taken into a hitherto neglected track, where it will water 783,000 acres, of which more than half are in the native states of Patiala, Jind, and Nabha. The total length of channels was to be 554 miles, of which 100 was for navigation only, and the project included a navigable communication, 205 miles long, from the Satlej at Ferozpur to the Western Jamna Canal above Karnal. The estimates were completed and submitted for the orders of Government in February 1872, the total cost being calculated at 2,980,427*l.*, of which sum 1,062,216*l.* were to be paid by the three native states whose territory will be irrigated from the Canal, the British Government having agreed to divide the available water supply of the Satlej rateably among the irrigable lands within reach of the canal, irrespective of the states within which they were situated, a proportional share of the cost being borne by each state. About one-third of the excavation of the main line, along the first division (first 11 miles), was completed by the end of 1872-73, the quantity executed during the year being 44,500,000 cubic feet; 4,500,000 by prison labour. Accommodation for 2,000 convicts has been provided at Rugar. In the second division (26½ miles) 161 millions of cubic feet were excavated.

After the rivers of the Punjab unite at Mithankot the Indus flows for 450 miles to the sea, through the arid rainless country of Sind. Here irrigation is absolutely essential to cultivation. What the monsoons are to other parts of India, the inundation of the Indus, and the canals which distribute its waters, are to Sind. This country is an alluvial plain, almost every portion of which has been swept by the Indus or its branches, at some time or other. Traces of ancient channels are to be met with in almost every direction. The land is highest at the river banks, and slopes away from them on either side. The reason of this is that the river brings down a greater quantity of silt than its stream, moderated in velocity on the nearly level plain, can carry forward. The silt is deposited, and the result is that the bed and banks of the Indus are continually rising. The process is sure, but very slow. Dr. Lord calculated that the Indus annually brings down silt sufficient to form an island 42 miles long by 27, and 40 feet high. When the bed attains a certain height the water falls over, and the river, at intervals of several centuries, changes its course. It has slowly worked its way from east to west. In 710 A.D. the invading Muslims found a Hindu dynasty at Alor, and the ruin of Alor was caused by the Indus moving to the west. Then the seat of Government was moved to the City of Brahmanabad, the ruins of which are now 45 miles from the river.

It is this movement which causes one of the difficulties in Sind irrigation. The river is continually carrying away the banks in one direction, and forming new land in another. This process never ceases; and the falling masses of earth make a noise in the distance, resembling volleys of musketry. From Sakhar to the sea the

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distance is 300 miles, and the banks are permanent only at three places, Sakhar, Jhirk, and Kotri. At Sakhar the river rushes through a narrow gorge in the limestone hills, forming a perfect rapid during the inundation, with a descent of above four feet. At Jhirk the river is not contracted, but there is rock on either side. At Kotri hills approach on both sides, and the clay soil is deep and tenacious. The rise of the Indus commences in May, and subsides at the end of August.

The canals are excavations carried away from the river in an oblique direction, so as to secure as great a fall as possible. They vary from 10 to 100 feet in width, and from 4 to 10 feet in depth. None, in former times, had their heads at the three places where the river bed is permanent, and none are deep enough to draw off water from the river, except during inundations. They resemble natural water-courses more than canals. From the position of the canal heads they are liable to two evils: either the river encroaches and tears away the banks, or it recedes and forms a great sandbank across the head.

The canals cut through the high margin of the river banks, and conduct the water to lower levels, down an inclined plane, where, under favourable circumstances, it flows out on the surface. Thus the cultivation may be divided into three classes: first, the land which can only be irrigated by using Persian wheels to raise the water; secondly, land irrigated by machinery when the canal is low, but over which the water will flow naturally when the canal rises; thirdly, land watered altogether without the aid of machinery. Some of the largest canals were at first natural channels, others were dug by various rulers of Sind. They are rude and simple expedients which attain their object, though less perfectly and at greater cost than if they had been constructed on sound principles. The care of the canal consists in clearing out the silt deposited by the inundations, or washed away from the sides. This was done by statute or forced labour.

Captain (now Sir William) Baker was appointed to the superintendence of canals and forests in Sind, in 1843, and he surveyed the canals and made several valuable reports, especially on the Eastern Nara Canal, on the left bank of the Indus.

In 1844 he made over charge to Captain (now General) Walter Scott, who was the first engineer to take charge of the canal clearances; but in 1849 the Canal Department was abolished, and the Collectors were left without assistance; the records were locked up, and much previous labour was wasted. The canals deteriorated, becoming less wide and less deep. Canal mismanagement culminated in 1853. In 1851 Captain Blois Turner reported on their condition, and in 1856 a separate officer was appointed as Superintendent of Canals. Since that time Colonel Fife has been the most prominent irrigation officer. In 1860 the Canal Department in Sind was again abolished, and in 1870 it was once more reorganised under Colonel Merriman.

Sind Canals may be divided into three classes: first, those of great extent and importance, running 70 or 80 miles; second, those of smaller extent, and branches; third, the distribution channels.

On the western bank, commencing from the north of Sind, near Sakhar, the chief canals are the Sind, Ghar or Lárkhána, Bigari, and Western Nara. All but the Bigari are probably, judging from their tortuous courses, natural channels kept open artificially.

The Sind canal opens from the main stream of the Indus, on the right bank, 21 miles below Sakhar. Its total length is 66½ miles, and at its tail it divides into three branches, the Mutti, Kadu, and Mihshuda, the former connecting the Sind with the Larkhana canal. The course of the Sind is very tortuous, and the fall deficient.

The Ghar or Lárkhána leaves the Indus 23 miles below Sakhar, and has three heads or channels of supply. It is very tortuous, and the fall is thus much reduced. Several smaller canal branch from it, until it divides into two branches, the Núr-wah and Nowrung, and loses its name. The Nowrung again divides into two, the Andra-wah and Muldussî, and these are again divided into several smaller channels.

The Western Nara leaves the Indus 27 miles below Sakhar, and at 40 miles from the head it is 200 to 300 feet wide. This canal is less winding than the Ghar, and the fall is consequently greater. The country is well cultivated on either side of it, and the villages are numerous. It returns to the Indus at Sehwan.

The improvement of these canals, especially of the Ghar, was commenced in 1856 under Captain Ford. A channel of supply was cut from the Western Nara to the Ghar called the Ford-wah, which augmented its supply and raised its level. The

head of the Ghar was also improved. The Ford-wah is considered to be one of the most successful works in Sind. It raised the level of the Ghar three feet, and increased its volume enormously, thus converting a large area from wheel to natural flow irrigation. The lower part of the Western Nara was of course somewhat injured, but not in proportion to the gain of the area dependent on the Ghar.

The Bigari canal, also on the right bank of the Indus, is the most interesting in Sind.

In 1814 it was described by Lieutenant Maclagan as having a total length of 48 miles, with a fall of 35 feet. The head was on a side channel, at a distance of nearly seven miles from the Indus. For the first 23 miles it passed through a country covered with jungle, but presenting frequent traces of former cultivation. It then entered a district where much water was taken by means of Persian wheels, and towards the end of the 48th mile it became a mere ditch. In 1851, General Jacob, Political Superintendent of the Upper Sind Frontier, represented to the Commissioner (Sir Bartle Frere), the great advantage of enlarging the Bigari. It was then becoming yearly smaller, from the defective system of clearing. At the head it was 24 feet wide, with a depth of nine feet. It was proposed to enlarge to 40 feet, with a depth of 11, and to slope the banks to a proper gradient. The Núrwah was the chief offshoot of the Bigari, and had been carried far into the desert north of Khangarh. General Jacob, in 1852, proposed that the Núrwah should also be cleared and enlarged. He entrusted the work to a native contractor, who had to remove enormous heaps of earth, 25 to 30 feet high on the banks, to cut away jungle, and to clear dams out of the bed. The contractor did his work well, though only a common Sindhi Maistri, and completed it in 1854. The capacity of the Bigari was about doubled by the new excavations, and much wheel irrigation was converted into natural flow with a saving, each season, of 130 rupees for every wheel. Villages sprung up along the Núrwah, where a few years before people scarcely ventured to take their flocks, from fear of Balúch plunderers. Jacobabad was founded in the midst of a barren treeless waste. The water of the Bigari canal was brought to Jacobabad, and the tail was extended thence to the Kelat boundary near Khyra Garhi. Now the former desert is a dense forest of babúl and other trees, upwards of 60 feet high, sheltering the houses and gardens of the inhabitants. Within a few miles there is the desert again which skirts the Baluchistan hills, a level plain of splendid, fertile, alluvial soil, but hard, naked, and barren like a threshing floor, without shrub, herb, or grass, except in the vicinity of canals. There the desert is converted into a garden, woods took the place of sand, and the Bigari canal revenue, which amounted to 4,796*l.* in 1852, was 13,594*l.* in 1857, and 17,339*l.* in 1862. The improvements of General Jacob only cost 16,200*l.* In 1860 it was resolved to increase the width of the first 40 miles; and in 1867-68 this important canal was again enlarged and improved.

On the eastern side of the Indus, between that river and the desert, there is an ancient channel the Eastern Nara, which had ceased to flow as part of the Indus since that river, deserting the passage through the rocks at Alor, took to its present channel between Rohri and Sakhar. The Eastern Nara had no direct communication with the Indus, when Sir William Baker came to Sind in 1842, but received a precarious supply of water from a remarkable depression which runs parallel with the Indus from above Bháwalpur, and, being lower than its flood height, receives some water from canals, and a more considerable volume by direct overflow. The channel of the Eastern Nara being also lower than that of the Indus, can easily be filled from the great river on a higher level, and Sir William Baker pointed out the rock at Rohri as offering a site for the head works. Hitherto the overflow of the Indus, in floods, had formed the Nara supply. In 1826 Sir A. Burnes mentions that the Nara, which in its lower course is called the Púraun, was filled by a flood which cut through the Allah-bund, and reached Lakapat. In 1843 Sir W. Baker saw marks of a flood that rose 18 feet, and in 1843 there were only four feet in the same place. The Nara passes through the wild Thur, a country covered with enormous sandhills, with occasional tracts of alluvial soil between them, along a channel on which are formed a series of bottoms locally called *dunds*. There are 400 of these *dunds*, or lakes, supplied from the Nara. The people in the Nara valley gain a livelihood by rearing cattle, feeding flocks, fishing in the *dunds*, and carrying on a grain trade with states beyond the Thur. They eagerly raise crops whenever the Nara supplies water.

The cut from the Indus at Rohri to the Nara is 11 miles long, and the Nara is 20 feet below the river. Sir Bartle Frere strongly recommended its being made, and

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work was commenced in 1853, together with bunds across the channel at intervals, to lead off the water for irrigation. In 1854 the cut was in full progress, beginning just above Rohri; 16 feet deep, 206 feet wide, with a berm 15 feet wide on each side, and the excavated earth distributed in two terraces on either bank, forming admirable garden ground. The Rohri cut or supply channel was completed and opened on 9th May, 1859. Bunds were also constructed across the Nara channel to prevent the escape of water into the large *dunds* among the sandhills.

Two canals branching from the Eastern Nara have also been constructed. The Mitrow Canal was commenced in March 1859. It was to be filled by a branch from the Nara, and in 1866 there were 190 miles open, which irrigated 156,803 acres.

The Thar Canal is another branch from the Nara, intended to water lands at the edge of the desert. It was commenced in 1864, and is now completed, irrigating about 38,000 acres; 50 masonry heads for minor channels were constructed during 1871-72.

The Fullali Canal is the main feeder of irrigation channels from Haidarabad southward and eastward. Originally it was a natural branch of the Indus, joining it again 16 miles below Haidarabad. This was prevented by a dam, in the time of the Amirs, and the water was sent to feed the Gaja, Gúni, and other canals to the south. The chief portion thus fell into the Gúni, after a course of 40 miles, the average width being 350 feet. The improvement of the Fullali was commenced in 1856. Two channels of supply were cut from the Indus, and the effect on the water supply was very satisfactory. One of the most interesting services on which Sir William Baker was employed in Sind, was a survey and levels along the Gúni to its junction with the Púraun (the continuation of the Eastern Nara), and thence to the Allahbund, which he surveyed and levelled. The Amirs of Sind, after an unsuccessful invasion of Kach, cut off the supply from the Fullali and Gúni, which had fertilised one of its provinces. After our occupation of Sind, the Government of Kach requested Sir Charles Napier to cut the bunds and let the water flow again. Sir Charles sent Baker to do this, who took the precaution to take levels first, and found that, owing to certain depressions and elevations caused by subsequent earthquakes, the cutting of the bunds would not restore the water to Kach, but, on the contrary, would let salt water flow back into Sind.

The great administrative question with reference to the Sind canals has always been the system by which they were annually cleared of silt, an operation which is absolutely necessary. The old custom was for the Government to pay for the clearance of the large canals, and for the people to keep up the minor channels. In 1864 the cost of clearances was 41,041*l.* As in the case of the Punjab inundation canals, the Sind canal clearances were effected by *cher*, or statute labour. Every cultivator was forced to furnish a quota of labourers in proportion to the extent of his cultivation. The silt is sometimes removed in baskets, and sometimes by a board drawn by oxen, like a gigantic hoe, trailed along the ground. But usually the only implement is a hoe, with a long blade and short handle. The labourer fills the blade by striking it into the soft soil, and by a jerk throws a shovelful upwards and behind. One man stands behind another and the soil is thus passed on. The canal digging lasts from December to April. But in 1856 statute labour was abolished, and the annual work of clearances became very expensive, while insufficient funds were allowed for it. The canals are deteriorating, solely owing to the sum annually allotted being less than is adequate for the purpose.

There is a special tax, called *hakaba*, of three annas per biga, levied from lands watered by canals cleared by Government, to aid the cost of clearance. Sir William Merewether has represented that the *hakaba* is credited to revenue, and that only a portion, arbitrarily fixed without regard to real requirements, is allotted to canal clearances. He has remonstrated against this, and has represented that the canals will each year deteriorate, in proportion to deficient clearance. The sum required is five lakhs, while only three and three-quarters are granted; yet the *hakaba* amounted to 47,708*l.*, every farthing of which, he urges, ought to have been expended on the object for which it was intended. Sir William Merewether thinks that the *hakaba* should be made an entirely separate fund, for canal clearances. This question was taken into consideration, and the Government of India declared that the *hakaba*, being part of the land revenue, could not be dealt with separately; but that whatever sum was needed for canal clearance should certainly be given. In consequence of the canals not being properly cleared, the condition of the people of Sind is worse and less prosperous now than it was before the country came under British rule.

In the Karachi Collectorate there are 309 canals, of which 128 are properly cleared, 65 insufficiently cleared, and 116 not cleared at all.

Since 1855 Colonel Fife has advocated the construction of perennial canals in Sind, issuing from permanent heads. Sites for such heads can be found at only three points on the Indus, at Sakhar, at Jhirk, 250 miles lower down, and at Kotri. He considers these to be the proper points for canal heads. From Rori he would take one down Eastern Sind, crossing 150 canals to the Fullali, which would become the trunk line for 80 miles. From Sakhar, opposite to Rori, another would be led down the western side, parallel with the river, crossing the Sind and Ghar, and entering the Western Nara to rejoin the Indus at Sihwán. The present canals would be used as distributing channels. From Jharrak two more canals would be taken, one on each side, towards the sea. This scheme would revolutionize the ancient system of Sind irrigation, its advantage being that such canals are permanent, and their supply perennial.

One perennial canal has been undertaken, from the rocky banks of the Indus above Sakhar to Sháhdadpur, a distance of 63 miles. The line crosses the old Sind canal, where there is a regulating bridge of seven arches, each 10 feet span, and the water is regulated by horizontal sleepers. The scheme for this canal was approved in the end of 1861, and commenced; and in 1868 the work had reached the 24th mile. It is the first attempt at a perennial canal in Sind, and is to irrigate 140,000 bigas of land, yielding a revenue of 209,999 $\frac{1}{2}$. It was opened in June 1870.

General Strachey, in 1867, recorded an opinion that the remedy for inconveniences caused to cultivators by uncertain water supply, never under control, was the substitution of perennial for intermittent inundation canals. The area under canal cultivation in Sind is about 1,200,000 acres, and the land-tax and water charge about Rs. 2. 4. per acre. He thinks, if all the water was supplied by flow and none by Persian wheels, this charge might be raised to Rs. 3. 4., and that the cultivated area would be doubled. He thus concurs in the views of Colonel Fyfe, and would take two perennial canals from the Indus at Sakhar and Rohri to Sihwán on the west, and the Fullali on the east side, crossing all the present canals, and using them as distributing channels.

The basin of the Ganges is nowhere within the rainless zone; but nearly the whole of the course of the Jamna is in the dry region, with a rainfall less than 30 inches, while that of the Ganges flows through a country which receives very little more rain, until the two rivers unite at Allahabad. But here begins the great distinction between the Ganges and the Indus. While the Indus, in its lower course, receives no affluents, and passes into an arid belt which is absolutely dependent upon its waters for every blade of grass, the Ganges is joined by numerous tributaries, and passes into the well-watered plains of Bengal; the rainfall being 46 inches at Benares, and 66 at Calcutta. It is the portion of the Ganges basin above Allahabad, therefore, that most requires irrigation. Colonel Greathed divides this upper region, which comprises the North West Provinces, into three zones. First, the tract along the foot of the Himalayas, which is well watered by rainfall and by numerous rivulets from the mountains, most of which dry up after the rainy season. But along the length of this sub-Himalayan tract there is a deposit of sand and boulders forming a continuous belt 15 miles wide, which creates a vast filter-bed, and, being bordered on the down-hill side by a band of clay, it becomes a covered reservoir. The natural pressure augmented by the rapid slope, across which the filter-bed lies, forces water under the clay, and produces a line of springs on the other side of the clay band, which feed numerous streams, and refresh the country. The local name of the belt of boulder is *bahbur*, and of the tract which it waters by filtration, *terai*. The second zone comprises the great plain through which flow the Ganges and Jamna; and the third is the province of Bandalkhand, sloping northwards from the high plateau of Central India towards the Jamna.

The climate of the North West Provinces is very dry, and from April to June, when westerly winds prevail, the vegetation of unirrigated plants is almost suspended. In June the winds bring the rain-clouds up the valley of the Ganges from the Bay of Bengal, and the season of agriculture commences; but the rainfall diminishes as the distance from the sea increases.

From the earliest times the people have practised well-irrigation, the depth at which the water is found on the plains being from 10 to 50 feet; but the method is expensive, for it employs six men and three pair of bullocks every day to keep five acres watered. Colonel Baird Smith, in 1860, reported that there were 70,000 masonry and 280,000 temporary wells in the Doab between the Jamna and Ganges,

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irrigating 1,470,000 acres. But it is from the water of rivers that the main supply must be drawn by means of State canals, which are far beyond the means of private enterprise in India; and hence the water which, if raised to the proper level, would have fertilized the whole land, has for centuries rolled useless to the sea. Yet the native rulers did not wholly neglect this great source of supply. The Emperor Firuz Shah, between 1351 and 1388, drew a canal from the Jamna to water his favourite hunting ground at Hissár; but there are no marks of irrigation works along the line of his canal, which fell into disuse on his death. For a hundred years no water had flowed to Hissár, when, in 1568, the Emperor Akbar issued a decree, ordering the canal of Firuz to be restored. It is singular that the *Ayin Akbari* makes no mention of this work of Akbar, and we are indebted to Colonel Yule for our knowledge of the original *sanad*, which places the fact beyond doubt.* In 1626, the Emperor Shah Jehan projected a branch from the canal of Firuz, to convey water to the city of Delhi, and Ali Murdan Khan was his engineer. The Delhi canal crossed the low land by a masonry aqueduct, traversed the Arávali hills by a channel cut through the solid rock, 60 feet deep at the crest, and flowed through the city in a masonry bed, throwing off innumerable minor streams. Throughout the great halls and courts of the palace a plentiful supply was carried in numerous channels, filling the graceful fountains and marble baths, and watering the gardens. For 150 years it continued to be efficient, but in 1753 this Delhi branch ceased to flow. Ali Murdan also made a canal in the Doab, but it was abandoned almost as soon as it was made, probably owing to the difficulty of maintaining a passage across the mountain torrents at the head.

Thus, when the English came into possession of the country, all these works of former rulers had fallen into ruin. "We found the country desolate, the cities burnt, when the sons of strangers came to build up the walls, and the rulers to minister."

The North West Provinces comprise a region which seems designed by Nature as a great field for artificial irrigation. The rivers, after leaving the last gorge of the Himalayas, enter upon plains with a rapidly-decreasing slope; and, flowing parallel to each other, they divide the country into sections, which, both as regards soil and declivity of surface, offer every requisite for irrigation. The steep slopes at the mouths of the mountain gorges in many cases enable the engineer, by a proper adaptation of levels in his artificial channels, to obtain a command of water which places the whole country under his command. The chief difficulties under such conditions are in the neighbourhood of the steep slopes, and in the management of the mountain torrents. Occasionally, however, it becomes necessary to adopt other expedients for bringing the water from the river beds to the level of the land to be irrigated, and very heavy excavations are frequently necessary, besides weirs and other works, to regulate the distribution and velocity of the water.

The first undertaking of the English was the restoration of the Firuz and Delhi canals, which was commenced in 1823; and the Western Jamna Canal system was fully developed by Colonel Colvin and Captain (now Sir William) Baker, between that date and 1843. The supply is derived from the Jamna, at the point of its debouche from the Sawálákh hills, where the stream is rapid, the fall great, and the bed consists of shingle and boulders. In the cold weather the stream is generally confined to one or two only of the numerous channels into which the bed is subdivided, which are all filled by the high floods of the rainy season. One of these branches was appropriated to the Western Jamna, which leaves the river at a point called *Hathni Kund* (the Elephant's pool), nearly opposite the old palace of Badshah Muhal, returning to the main stream after a course of 25 miles. The supply is increased by deepening the channel, and throwing out a spur into the main stream, which was extended right across in seasons of drought. Additional supplies are thrown into this western branch by two feeders, one called "Colvin's Cut," the other natural. The materials used for the dams were boulder stones and gravel, filled into large gabions of coarse basket work. The canal, continuing along the *khádar*, or low land, near the river, first follows a branch of the Jamna; then a channel excavated to the Putralla river, and then occupies the bed of the Putralla to its confluence with the Somb. Here was the main difficulty, in restraining and regulating these torrents, and forcing them to allow the fertilising flood to pass on its way in peace. The Dadupur dam was built across the united Somb and Putralla, here occupied by the canal, just above their junction with the

* J. A. S. B., No. 171, March, 1846.

Jamna. Originally it was carried across this channel by an earthen dam annually renewed; but in 1830 Colonel Colvin obtained sanction for the masonry Dadupur dam, providing a flush flow across the bed of the Somb, divided into 60 openings, the total width being 777 feet. The dam is closed by planks hooped with iron, with an eye for an iron hook, by which they are lifted. The Putralla made an attempt to turn the east flank of the dam, which was frustrated by a series of spurs placed *en echelon*, in 1842. Then the Jamna itself commenced an attack upon the left bank, which was defeated by means of a new channel, and a series of crib spurs *en echelon*. But the Somb still threatened destruction to the works. Lieutenant Durand surveyed the country drained by it, and made a beautiful map of the Somb and Putralla drainage, in the hope of mitigating the force of the Somb floods, by turning a portion into one of the Satlej tributaries. But this was found to be impracticable. Then a new channel, called "Baker's Cut," was excavated, to check the encroachments of the Somb. After a prolonged battle between Colvin, Baker, and Durand, on one side, and the Jamna, the Somb, and the Putralla on the other, the victory was finally secured by the skill and perseverance of the engineers. The turbulent enemies were made captive, and the precious stream was safely convoyed past the dangers which are common to all the canals when they first leave the head-works, and have to encounter the lawless mountain floods and torrents.

The canal is then taken through an excavated channel parallel to the Jamna, into an old nulla near Burea, and thence partly down natural ravines, to Karnal, 60 miles below Dadupur, still in the *khádar* or low lands of the Jamna. At Karnal it gains the level of the high country, and soon afterwards separates into two branches, one passing on to Hansi and the other to Delhi. The Delhi branch has a very winding course, the size gradually diminishing, as water is taken off by the numerous irrigation outlets. It enters the *khádar* land of the Jamna, through which it is embanked, crosses the valley of the Najafgarh drainage by a massive aqueduct, traverses the rocky hills round Delhi by a deep irregular excavation in the solid rock, and enters the city near the Kabul gate. One branch flows in a masonry channel down the Chandni Choke; others water the gardens and supply the houses, and finally pass, through four sets of water mills, to the Jamna.

The Hansi branch follows the line of Firuz Shah's engineer, and the pastoral villages of Hissar are entirely dependent on it for the means of watering their cattle. At Hissar a travelled courtier of Firuz Shah erected a building to give his master an idea of a ship ("juhaz"). It is now used as a store house for the canal, for which purpose its ample "hold" renders it very suitable. The Rohtak branch is taken off from that of Hansi, and there is another short branch, that of Butana, to irrigate villages near the Jhind boundary, which was excavated in 1835.

The united length of the main lines of the Western Jamna Canal is 445 miles, and in the famine of 1837-38 the value of the crops saved by its water was 1,462,800*l.*, supporting the inhabitants of 500 villages, who would otherwise have died of starvation. In 1866-67 the water-rate on irrigation yielded 70,000*l.*, and the area irrigated was 447,171 acres (797 villages), the aggregate length of watercourses being 728 miles. The canal has also had the effect of raising the level of the water in the wells. The total outlay up to 1872-73 was 31,693*l.*, and the net receipts for that year 92,500*l.*, being, including both direct and indirect returns, 31 per cent. on the outlay. The total area irrigated in 1872-73 was 351,820 acres.

The system of water distribution on the Western Jamna Canal was complicated by old rights. On the Delhi and Rohtak branches there were many distributing watercourses, the proprietary right to which was well understood by the people. As regarded new channels, it was made compulsory on all villages bordering on the canal to permit excavations for such watercourses as were approved by the superintendent. The *rajbuhas* are joint stock channels, executed by the canal officers, for the use of two or more villages. The original cost was formerly defrayed by the Government, and ultimately recovered from the villages. But this system has been abandoned, and all the main watercourses are now constructed at the cost of the Government. The distribution of water in the branches has to be regulated with reference to the probable demand. Fixed gauges are established at certain points, and the height of the water is regularly reported.

It was found difficult to estimate the value of a given outlet, but a system prevailed until 1833 of letting out these outlets on contract, the rates being fixed at 2 rupees per annum per square inch of area for natural flow irrigation, and 1 rupee for wheel irrigation. But the discharge of the outlets varied with reference to the inconstant height of the canal. It was, therefore, determined to assess the outlets

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on the average of their irrigation for three or more years, the period of contracts being fixed at 20 years. The other system is to measure the irrigated land. It has been argued that the contract system has several advantages over that under which the irrigated lands are measured. Under it the villages are free from minute interference of canal officers; they are supplied first in times of scarcity; they can irrigate all crops at the same rate; while the advantages to Government are a steadier revenue and a smaller measuring establishment. There are, however, sufficient reasons for commencing with a system of measurement, as the basis of the assessment of the canal rates, though under certain conditions the contract system may be usefully adopted. Certain villages near the canal heads contribute labour in exchange for a supply of water for irrigation and for working *girats*, or rude corn mills.

Colonel Colvin's scale for water rates on the measured land was sanctioned in 1827, and again in 1845 (Act VII.) These rates discriminate the nature of crops and the method of employing water, whether *for* or *darul*, that is, natural flow, or artificial raising by Persian wheels or otherwise. But from 1st November, 1866, the rates were considerably increased. The rate, for each acre per annum, is 5 rupees for garden lands irrigated by natural flow; 3 rupees for sugar-cane and indigo crops requiring water for 10 months; Rs. 2 4. for rice, cotton, and wheat crops; and Rs. 1. 10. 8. for the khurif crops of grain, barley, bajri and jawari. When the irrigation is from water artificially raised, the rate is about a third less.

Of late years the necessity for dealing with the Western Jamna Canal has been much felt, with a view to remove the swamps which had formed along its banks and in the country which it irrigates; to remedy the evils caused by *reh* efflorescence, which destroys all vegetation; to increase the volume of its waters; and to improve its navigable character. During 1871 Colonel Crofton matured a scheme which was partly sanctioned by the Secretary of State, the works so approved being the new permanent head across the Jamna, distributaries from Indri to Delhi and Jhind, and drainage works. The estimate amounts to 214,267*l*. The permanent dam across the Jamna is a most important work, as it is intended to supply both the Western and Eastern Jamna Canals, and to secure a due apportionment between the two systems. Large quantities of material have been collected for this work. The construction of reservoirs for the storage of a supply of water for the cold weather cultivation in the arid tracts of Sarsa, is also under consideration.

There is a system of irrigation from *jhils* or large lakes which is in some degree connected with the Western Jamna system. The range of hills round Delhi is of inconsiderable height, and has few streams. The watercourses in the country to the east and west are dependent on the drainage of the country for occasional floods. The land is disposed into a series of natural hollows, each lower than the one next to it, and all connected by channels; a chain of natural reservoirs is thus formed, the largest of which is the Najafgar jhil, which receives the drainage of slopes from Delhi to Badshahpur. The villagers keep their cotton crops on the high ground while their sugar cane and wheat fringes the whole jhil; but the land, both on this and other jhils was subject to be submerged, and the supply of water required regulation. Of late years the whole area of the Kotila jhil has been drained, and 4,500 acres brought under cultivation during the cold weather; embankments have been formed, and the drainage of the whole system passes under the great aqueduct of the Delhi Branch Canal into the Jamna. The area irrigated, by what are called the Delhi and Gurgan works, is 11,087 acres.

The Eastern Jamna Canal was originally projected by Shah Jehan between 1628 and 1659, and had been partially restored in 1764 by a Rohilla chief named Zabitha Khan. In 1823 Captain Robert Smith reported upon its restoration, the scheme being to carry it centrally along the high land between the Hindaun and the Jamna, and excavation was commenced at the close of 1823. In 1825 the late Sir Proby Cautley joined the canal establishment as assistant to Captain Smith. The canal was opened on 3rd January, 1830, by Sir Proby Cautley, and the water reached the Jamna again, after traversing its whole length, on the 14th. Rapids formed in the sandy sections, which were remedied by falls of masonry. In 1836 the bunds of the Western and Eastern Canals were placed across the Jamna, and the river was laid entirely dry. The Nayashahr dam, for the Eastern Canal, was formed on the Budhi Jamna with 30 sluices and a regulating bridge in the canal. The dam was built of ancient bricks brought from the old palace of Badshah Muhul. The Eastern Jamna Canal passes, from the main river, down the shingly bed of the Budhi Jamna for four miles to Nayashahr. From this point it enters upon the difficulties peculiar to these lines, which have to cross mountain drainage at right angles to their courses.

The Raipur, the Jatowala, Naugong, and Muskurra mountain torrents of greater or less dimensions, are passed within a distance of ten miles from the deep cutting at Nayashahr. These torrents are provided with masonry dams for floods during rains. The canal then continues on the high land of the country. Large plantations of sál, sissú, and other trees were formed at Nayashahr for planting the banks of the canal. The *rájbuha*, or distributing arrangement, was for the landholders to subscribe for watercourses to be dug from the canal by the superintendent, the expense being charged to the applicant, except that of the masonry outlets in the canal, of which there are 592. The water rates for the Eastern Jamna and Ganges Canals are the same: for natural flow; *Rs.* 5 for sugar-cane *Rs.* 3. for tobacco, rice, and gardens; *Rs.* 2. 4. for indigo, cotton, and rubbi crops; and *Rs.* 1. for khurif crops. For lift irrigation the charge is *Rs.* 3. 5. 4., *Rs.* 2., *Rs.* 1. 8., and *Rs.* 1. for the above four classes.

The embankments to retain the canal in its bed are 40 miles long, and the canal flows between them at a height of from six to 12 feet above the surface of the country. The canal system consists of 130 miles of channel and 625 of distributaries, watering a tract about 120 miles long by 15 broad, between the Hindaun and the Jamna. The net revenue in 1872-73 was 30,774*l.*, giving a return of 16.6 per cent. on the outlay. The area irrigated was 184,154 acres. A portion of the Eastern Jamna Canal was remodelled in 1854; and, in the part where it crosses from the Saháranpur into the Muzafarnagar districts, the new line crossed the Shamli-nulla, an affluent of the Hindun, in several places; and three cuts were made for the escape of water, which have affected the Katha, a tributary of the Jamna, in whose valley large swamps have formed. In 1872 Captain Harrison was deputed to report upon a remedy for these evils, which very injuriously affect the land, and the health of its inhabitants. The scheme is to carry off the water, which lies like an incubus on a wide tract of country.

The Ganges Canal, a purely British work occupying a field previously untouched, is the greatest work of irrigation ever constructed. In 1836 Sir Proby Cautley examined the country, and in 1848 the work was commenced.

The head of the canal is two and a half miles north of the town of Hardwar, close to the foot of the Sawálákh mountains, where a well-trodden footpath once led down a ravine to the water's edge in a branch of the Ganges. At the head of this ravine, and overhanging the river was a large peepul tree, and at its foot a lingam. The spot was called Gunes Ghat. Here a bridge was constructed with 10 openings across the mouth of the canal with shutters, and a line of revetments connect the bridge with a dam across the branch of the Ganges. The Gunes Ghat was converted into an extended line of stone steps, washed by a running (among the many) stream, offering conveniences for pilgrim bathers.

After leaving the Ganges, the canal had to encounter the difficulties of the mountain torrents, analogous to those which were overcome by the engineers of the Jamna canals. There are three methods of meeting and passing these torrents. They can be made to flow across the canal channel on the same level, or taken over it by a super-passage, or the canal can cross the torrent on an aqueduct. All three ways were adopted by Sir Proby Cautley on the Ganges Canal. At Dhanairi, about 14 miles from the head works, where the canal is still in the khádar land, the Rutmú torrent is encountered. Here a masonry inlet and a dam was constructed. The flood waters enter the canal channel through the sluices of the inlet, and are discharged through 47 sluices in the dam. They bring down branches, roots, whole trees, and masses of grass, and no obstruction, except the piers of the dam, is offered to their passage across the canal channel. Further on, the flood waters of the Ránpur and Putri torrents are conveyed over the canal channel, without coming in contact with the canal water, by means of well protected and parapeted masonry super-passages. The next great work on the canal is the aqueduct, which takes it over the Solani river, which is 18 miles from the head works.

The Solani aqueduct is 920 feet long, in 15 arches of 50 feet span each, connected on either side with an earthen embankment, raised nearly 30 feet above the valley of the Solani, which it traverses for a length of about three miles. The canal continues along the centre of the country between the Ganges and Jamna, throwing off branches at intervals, all adapted for internal navigation as well as for irrigation. The main line is 181 miles long, divided at Nanún, in the Allygurh district, into two branches, each 170 miles long, that on the right falling into the Jamna in the Etáwah district, and that on the left into the Ganges at Cawnpur. There are also two smaller branches, 83 and 10 miles long respectively. The whole length of main canal and branches is therefore 614 miles; and the length of distributaries is 3,111

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miles. In 1872-73 they irrigated 685,170 acres. There has been a rapid and steady spread of indigo cultivation on the Ganges Canal, and the area of sugar cane crops has also increased. But, until water mills are supplied for crushing the cane, the sugar cane area must be limited by the bullock power available for working the native sugar mills. Irrigation commences 22 miles below the head works and is diffused over an area 320 miles long by about 50 broad. The Ganges Canal was opened by Lord Dalhousie on the 8th of April, 1854.

Experience has shown that, in the original design, too great a slope was given to the bed of the Ganges Canal, and considerable erosion in the bed has been the result. In 1863 Colonel Crofton was appointed to report in detail on the whole question, and his conclusions have been generally adopted by the Government. The main point to decide was whether the existing canal should be modified, so as to be able to carry with safety the whole volume of water for which it had been originally designed, or whether a second channel should be made to carry that part of the supply which the canal in its existing state could not carry with safety. The remodelling of the canal was shown to be the most economical alternative, and it was adopted. In August 1864 an outlay was sanctioned for the protection of the falls that were most injured, and the precautions taken were so successful that the full supply has been maintained in the canal, for a considerable period, without any appearance of renewed injury. Meanwhile projects are in preparation for the re-arrangement of the Cawnpúr, Fathigarh, and Etáwah branches of the canal, and the remodelling of the first was sanctioned in 1868. The net profits of the Ganges Canal for 1872-73, were 70,764*l.*, or 2.74 per cent. on the capital sunk; and the navigation returns were 3,237*l.*

The Agra Canal is a project, now approaching completion, for watering the thirsty lands of Delhi, Gurgáon, Mattra, and Agra from the Jamna. A weir, 2,428 feet long, has been built across the Jamna, below Delhi, at a point where a spur of quartz from the Arávali range abuts upon the river. It consists of two parallel masonry walls, 26 feet apart, resting on the fine sand of the river bed, with stone packed between them, with slopes and scouring sluices. The Agra Canal is designed to irrigate 350,000 acres, and will probably be partly opened this year. It was to be partly opened in March 1874.

There is also a project for completing the system of the Ganges Canal, by the construction of a Lower Ganges Canal, with a capacity equal to that of the present Upper Canal, on an estimate of 1,825,000*l.* The scheme has been sanctioned by the Secretary of State, and work was commenced in 1872-73. This, with the Upper Ganges and Eastern Jamna Canals, will complete the irrigation of the whole country between the two rivers. The weir across the Ganges, for the Lower Canal, is to be at Rajghat.

An Eastern Ganges Canal is to be constructed, taken off at the foot of the boulder formation at Sámpur. The tract of country which is to benefit by it, lies between the Ganges and Rám-ganga rivers, forming Western Rohilkhand, and comprising the districts of Bijnáur, Murádabad, and Budáon. The canal, after passing through several miles of cutting, will come to the surface at the 21st mile, and then will command the whole of the irrigable area of the country. Five hill torrents will be encountered, of which two will be diverted from the canal, the two next will be passed over, and the fifth under it. The country, especially Bijnaur, is well adapted for the cultivation of rice; and the whole irrigable area between the rivers is 3,132 square miles in extent. The scope of the project has not been finally determined.

The Rohilkhand Canals are for irrigating the belt of country along the *terai* where much rice is raised. On the failure of rain, water can only be obtained by damming up the hill streams, and leading small canals over the country, on which the *rubbee* crop depends. The system now consists of a number of ancient, badly designed lines, which are maintained only until a better system has been constructed. For the year 1872-73 they caused a loss of 2,398*l.* In 1824, there were 1,930 dams, and 915 canals. All the country between the Rám-ganga, which passes by Murádabad, and the frontier of Oudh, is intersected by numerous hill streams whence canals could easily be led. The Naginah Canal was taken from the right bank of the Koh, and opened in 1840, and there are Murádabad Canals. Two others, the Paba and Kailas, have recently been sanctioned, and are in course of construction, and a project is to be prepared for utilising the waters of the Rám-ganga. But, with regard to a general and comprehensive scheme for Rohilkhand irrigation, the present orders of the Government are only of a character to elicit further and more complete information. The area at present irrigated by these canals is 52,244 acres.

There is a compact little system of irrigation in the Dehra Dun, between the

Ganges and Jamna, and confined on the north by the Himalayas, and on the south by the Sawálákhs. The valley is 48 miles long, and in the centre it is considerably elevated, the ridge extending from the Himalayas to the Sawálákhs, and dividing the valley into two portions with two distinct slopes of drainage to the east and west. The Asnu and Súsua rivers rise on this central ridge, the former going to the Jamna, and the latter to the Ganges. All the elements of a good system of drainage are here naturally provided. On the Asnu side there is a torrent called the Tonse, across which a dam is thrown, and watercourses are carried in various directions from the other streams, to irrigate the valley. There are five canals, aggregating 67 miles in length, and irrigating 11,523 acres. The net profits for 1872-73 were 2,434*l.*

In the Arávali hills, there are no such rivers as water the Dehra Dun. Isolated and surrounded by the parched-up plains and deserts of Northern India, the cultivation on these hills mainly depends on water stored in tanks, and some of the landholders preserve the thorny scrub on the hill sides, in order to regulate the filling of the tanks from rain. The district of Mairwára, in the Arávali, was brought into subjection by Colonel Hall, in 1820; and his successor, Colonel Dixon, in 1835, constructed tanks and reservoirs on a large scale. Between 1836 and 1846, as many as 2,065 tanks and 9,915 wells were constructed in Mairwára. The tanks have a total area of 8,675 acres, and irrigate 14,826 acres of land. The once wild and unruly Mairs became a thrifty, peaceful, and industrious peasantry, under the influence of these improvements, and of such men as Hall and Dixon.

For Bandalkhand large schemes of irrigation have been devised. The rainfall is carried off with great rapidity, owing to the granite and trap formations, leaving the river beds almost dry soon after the rain ceases. One proposal is to build a weir across the river Betwa, which flows near Jhansi, to retain the water, and a canal will then irrigate 120,000 acres in the Jálaun and Humirpur districts. Other weirs are projected across the rivers Desán and Ken, with granite weirs and canals; while 15 lakes, now irrigating 1,300 acres, will be made to water 22,000. These measures will secure Bandalkhand and Jhansi against famine, and restore this region to its pristine fertility. There is every prospect of these anticipations being fully realised. A survey has also been prepared for a canal to be derived from the river Sardah, to irrigate the western part of Oudh and eastern Rohilkhand; but in deference to the expressed wish of the landholders, the construction of this work has been abandoned.

Such has been, and still are, the efforts to supply irrigation in the upper part of the basin of the Ganges. They cannot be considered insignificant, seeing that there is nothing that in any way approaches them in magnitude and importance in any other part of the world. The area irrigated by the canals of the North West Provinces in 1872-73 was 940,586 acres, yielding a canal revenue of 231,264*l.* This is an increase on the previous year, owing to there having been 5½ inches less rainfall. The average water rate per acre irrigated was *Rs.* 2. 25. The total capital invested in canals in the North West Provinces is now 3,311,384*l.*; of which 2,928,649*l.* is in works in operation and yielding revenue. The gross receipts are 231,264*l.* and the working expenses 129,826*l.*; leaving a profit of 3.46 per cent. on the capital sunk on works in operation. There is also an indirect income from the enhancement of land revenue resulting from the operations of the canals, calculated at 55,406*l.*; which raises the percentage of profit to 5.3.

As the Ganges approaches the sea, the rainfall increases, and the general need for irrigation becomes less and less; but the variation of rainfall in different districts is considerable, and the local conditions of climate are such, that a great scheme for utilising the waters of the Son, the chief southern tributary of the Ganges, for the irrigation of part of the province of Bahar, has long been under consideration, and its execution has now been commenced. It was originally undertaken by the East India Irrigation Company, on a plan proposed by Colonel Dickens, and their project was accepted by the Government in 1867, on the understanding that the agreement must end if the company did not make satisfactory progress with the works. An application of the company for a guarantee of interest on their capital was rejected; they never commenced work, and at length they were induced to agree to an arrangement by which they were bought off. The Government then took up the Son project with energy. It consists of a dam across the river, and two main canals led off from it, which will supply irrigation for 2,000,000 acres in the districts of Patna, Gaya, and Sháhabad. The estimated cost is 3,775,000*l.*

The works at present in progress are the weir across the Son at Dehri, and the head works of the two main canals, also a portion of the main canals on each side of

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the river, and the Arrah and Patna Canal. The weir will be two and a half miles long between the abutments, and eight feet high. In 1870-71 the well blocks of masonry which form the foundation of the upper or breast wall were sunk right across the river. In 1871-72 those for the second wall were also sunk, and good progress was made with the head and under sluices, and with the head locks; but the operations were hampered by the unusually large volume of water in the rivers. The stone is brought from quarries at a distance of seven miles, on the left bank of the Son, 200 waggons and four locomotives being employed to convey it. The western main canal was nearly completed, to the dimensions already sanctioned, for a length of 22 miles, by the end of March 1873; and the bridges and siphons were in progress. The eastern main canal is nearly completed for 8 miles. On the Arran Canal, which is to be 70 miles long, and to irrigate 430,000 acres, ground had been broken over 60 miles, and six locks, two bridges, and seven siphons are in progress. The Patna Canal is to connect the Son with the Ganges at Patna. It is to be 84 miles long, and to irrigate 390,000 acres. About 67 per cent. of the earthwork has been executed during the year 1872-73. On the whole, the progress of the Son works, during the last three years, has been most satisfactory.

The Midnapur Canal, part of which was open and in use in 1871-72, supplies a country which is within the zone of 60 inches of rainfall. This canal is 52 miles long; 23 of which, comprising the lower section, connect the Rivers Kusi, Rúpbarain, Dámodar and Hugli. It is now practically complete in regard to its main channels, and connects the town of Midnapur with tide water in the Hugli, 16 miles below Calcutta. The distributaries and drainage channels are, however, still incomplete; but the canal is now capable of affording irrigation to about 72,000 acres. The scheme comprises the irrigation and drainage of 200,000 acres, as well as a navigable canal from Calcutta to Midnapur. The estimated cost is 931,300*l*. But smaller branches to villages are much needed. They could not be made by the people, or at least the people would not make them, so it was determined, as an experimental measure, that Government should do so for the first 50,000 acres in the upper reach of the canal. The people did not care for the channels, grudged the land, and viewed their construction as a grievance. Irrigation is not popular in Midnapur, a proof that the rainfall is abundant.

This completes a review of the chief irrigation works in the valley of the Ganges; and the Orissa canals and embankments, in the delta of the Mahánadi, next claim attention, as they, with the Son and Midnapur works, are under the jurisdiction of the Lieutenant Governor of Bengal.

The Mahánadi river drains the fertile plain of Chatisgarh, in the Central Provinces, and falls into the Bay of Bengal. It is 529 miles long, and its basin covers an area of 45,000 square miles. But the Mahánadi basin is extraordinarily compact. It has a mean diameter of 225 miles, excluding the neck, so that but a very moderately wide spreading rain storm will ensure rain falling on every square inch of the area simultaneously. The form of the basin is that of a round and compact body, with a narrow neck and bell-shaped mouth, like a water decanter, than which it is difficult to conceive one more calculated to empty itself rapidly, while the position is one of very close proximity to the sea, the source of rain clouds. Thus the Mahánadi is pre-eminently fitted to produce what are actually met with, namely, floods ranging extremely high, but of brief duration. The Province of Orissa, at the deltas of the Mahánadi and Bráhmáni, has long suffered from these periodically devastating floods, and the maintenance of its embankments has always been of the first consequence to the inhabitants.

The East India Irrigation Company undertook the execution of the necessary works for the irrigation of Orissa, and the protection of the country from floods, with an unguaranteed capital. Their offer was accepted by the Government; Colonel Rundall, an eminent Madras engineer, was allowed to act for them as chief engineer for five years, and they commenced work in 1862. One of the most serious evils suffered by Orissa at that time arose from its isolation. The one little harbour at False Point was scarcely ever visited, there was no proper survey of the coast, and the road to Calcutta was barely passable during six months in the year. The leading principles to be observed in projecting the works were means to prevent the recurrence of drought, protection of the harvests from being destroyed by floods, and the opening of communications.

The region in question extends along the coast from the Chilka lake to the Sálándi river, and is traversed by the deltas of four rivers, the Mahánadi, Bráhmáni, Baitarni, and Sálándi, which, in time of floods, may be looked upon, as one vast delta; while

immediately above the point where these rivers begin to overflow their banks, the country begins to slope up steeply to the hills. The limits of the area within which the works should be confined are thus clearly marked out. This area is perfectly flat, and the staple crop is rice, grown during the monsoon months. The amount of rainfall averages 57 inches; but as the whole dependence is on the monsoon crops, it is not the quantity of rain, but the time of its fall that is all important. If the rains cease early, a famine is inevitable. In 1865 the rains ceased on September 14th, and the crops consequently perished. The main object of the works must be to secure the principal crop of the district from all risk of failure from drought.

Immediately upon issuing from the hills, the Mahánadi bifurcates, one arm retaining the name of Mahánadi, and the other taking that of Katjuri. The Beropa branches off from the Mahánadi opposite Cattack, and after 35 miles joins the Bráhmáni, whose estuary is called the Dhamrah. The head works were planned to consist of three weirs across the Mahánadi, Katjuri, and Biropa, 6,400, 3,900, and 1,980 feet long respectively; the two first 12½, and the third 9 feet high. The canal for the country between the Mahánadi and Katjuri, called the Central Delta, is taken off from the right flank of the Mahánadi dam, and a junction canal is to connect it with the Katjuri. Two canals are led off from the Biropa dam, that on the left bank being the high level canal to connect Cattack with Calcutta, and that on the right being intended to irrigate the country between the Mahánadi and Bráhmáni. Embankments are built round the city of Cattack to protect it from floods.

The Kendrapara Canal takes off from the right flank of the dam across the Biropa, to irrigate 270,000 acres of what is called the Northern Delta, at the rate of one cubic yard per hour per acre; it is 160 feet wide, and seven deep. The distributaries measure in all 171 miles, irrigating 85,000 acres, and there is a branch called the Pattamundi, taking off from the fourth mile and passing down the right bank of the Beropa and Bráhmáni to Pattamundi, the port on the Dhamrah, a place of export for grain. This branch irrigates 113,000 acres. The Taldundah Canal takes off from the right flank of the Mahánadi dam and runs to Taldundah, the limit to tidal navigation, to which the steamer brings goods and passengers from the anchorage; it has a branch called the Machgong, and the two are to irrigate 155,000 acres of the Central Delta. They can now irrigate 30,000; being in use for about one third of their length, of 52 miles in the former, and 53 in the latter. The high level canal is designed as a line of navigation from Cuttack to Calcutta, while its power as an irrigating canal is limited. The first portion from Cuttack to the river Bráhmáni is open, 32 miles in length; and the greater part of the distributaries are completed for an area of 80,000 acres. The works are now being vigorously pushed on from the Bráhmáni to the Salandi, so as to be ready for use in 1876. The whole cost of the Orissa works was estimated at 1,120,963*l.*; but the total sum has since been placed at 2,598,200*l.* to irrigate 1,600,000 acres. Of this 1,389,500*l.* have been spent up to March, 1873.

The Company was unable to carry on the works, and they were handed over to the Government in 1868, together with the Son project, for the sum of 1,050,000*l.*, since which time the gradual prosecution of the Orissa scheme to completion has been sanctioned. The three great weirs had already been constructed by the Company, and have since been maintained in perfect order and security. But there is a want of appreciation of the value of irrigation on the part of the cultivators of Orissa; the available supply is even now out of proportion to the demand, and there is a disposition only to resort to irrigation when the rain fails. The Company asked for a rate of five rupees per acre, which was refused by the cultivators; the Company then lowered the rate, but the ryots still refused the water. It was again lowered, and is now one rupee per acre. Only 14,740 acres are irrigated in Orissa, and there is great difficulty in collecting the water rate. The assessments were disputed at every step, and howling mobs followed the canal officials, representing their grievances. There is indeed a story that the ryots were charged for water rates when banks burst and the inundation damaged their crops. Demand after demand had to be abandoned, and finally the net income in Orissa on account of irrigation for 1871-72 was only 1,772*l.*, out of an original demand for 12,982*l.* The Ooryas are slow and conservative, but at the same time shrewd and suspicious, and the Lieutenant Governor considers that they must not be harassed by charges, and that the water rate must be settled for a period of years, five at least. This has been done, the water being supplied, on written application, at the rate of one rupee per acre, which rate is not to be altered for five years.

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On the other side of the hills which bound the basin of the Mahánadi are the fountains of the Narbada and of tributaries of the Godávari. The Narbada and Tapti flow across India, confined on either side by ranges of mountains; the Vindhyan range, with its steep cliffs bounding the Narbada valley on the north; the Sátapura range separating the Narbada and Tapti, and the Deccan plateau confining the Tapti and its affluent the Purna to the south. These streams flow through the richest cotton districts of India to the Gulf of Cambay; in a country the rainfall of which is from 30 to 50 inches. The area of the Narbada basin is 36,400, and of the Tapti 27,000 square miles. Irrigation is necessarily on a small scale in these comparatively confined valleys. The district of Nemar, in the Narbada valley, was acquired from the Peishwa in 1818. The lake of Lachma, a tank three miles round, which was found in ruins, was restored, and 105 other tanks were put into working order within two years. In 1845 and 1846 Captain French, then in charge of Nemar, made a masonry dam across the ravine of Chuli, opening on the Narbada, and another large earthen dam across the Chapri, thus forming the great Chuli and Mandleswar tanks. The reservoirs and system of irrigation may be roughly described as being on the Madras system. The portion of Nemar north of the Narbada has now been made over to Holkar, together with Mandleswar, formerly the head-quarter station, which is now transferred to Kandwah, where the Holkar State Railway branches to Indor.

In their lower courses the Narbada and Tapti flow through the cotton-growing districts of Gujráat and Khandesh, where much attention has been given to well irrigation, and to improved methods of raising water from the rivers, as well as to works on a large scale. A project for the irrigation of 194,632 acres from the river Tapti, in Gujráat, has been sanctioned, and several works are either under construction or projected in Khandesh. A dam for the storage of water in the Girna valley has been commenced. The Jamda canals have been opened, and water was admitted in June 1869. The Mukti reservoir is under construction near Dhulia, the main dam being complete, and an outlet tunnel excavated to an extent of 80 feet. The Hurlola tank is nearly completed.

As regards rainfall, latitude, and jurisdiction, the country drained by the head waters of the Warda and Wainganga, tributaries of the Godávari, in the Central Provinces, may be classed with the Narbada region. No great works have been completed in this region, but surveys have been made for the Kanhan irrigation project at Nágpur, which consists of a great storage reservoir, covering an area of 41 square miles, of a main canal 142 miles long, and minor canals with an aggregate of 400 miles.

The main features of the Madras system of irrigation are the dams or *anicuts* over rivers flowing across the peninsula from the Western Gháts, just above their deltas, and the innumerable tanks. The river deltas, which have been the scenes of these excellent and highly remunerative labours, are those of the Godávari, the Krishna, the Ponnar, and the Kaveri, besides some smaller works. The rainfall along this western shore of the Bay of Bengal is moderate, and insufficient for the satisfactory production of rice, the crop which is most abundantly cultivated. At Vizagapatam it is 45 inches, at Madras 50, but further south only 30 and 22.

Commencing from the north, the projects for the Godávari works were sanctioned in 1844. At the head of the delta, at Dhauleswaram, the deep bed of the river is 22 feet above high water mark, and the highest part of the delta requiring irrigation is 30 feet above the same level. From Dhauleswaram the river flows to the sea, on the crest of what may be termed a great natural embankment, 6 to 24 feet above the level of the country. The bed of the river, therefore, only required to be raised 10 or 12 feet to give a perfect command and establish a working and efficient head of water. This is effected by a dam or *anicut*, 12 feet high, at Dhauleswaram, where the river is three-and-a-half miles wide, 1,000 yards of which is occupied by four islands. The *anicut* is a substantial well-protected mass of stone, in lime cement, 130 feet broad at the base, 12 feet high, and two-and-a-half miles long. The delta, from the Kolair Lake to Samalkota, is a noble expanse of rich alluvial land, with an irrigable area of 2,000 square miles; and the Godávari can supply 3,000 cubic feet of water during the low, and 12,000 during the high period of the river's volume. The larger quantity may be depended on from July to October, when the rice-crop requires a constant supply of water (40 acres of rice to one cubic foot per second of water). The delta is divided into three natural sections, the first between Samalkota and the Eastern Godávari, the second between the two branches of the river, and the third from the Western Godávari to the Kolair Lake. In the first section there is a

channel along the river, and another, separating into two branches, to Samalkota and Cocanada. These and all the other main lines of canal are adapted for navigation, as well as for the supply of water for irrigation. The second section consists of 352,000 acres of a rich alluvial soil of surpassing fertility. A main channel passes down the left bank of the river, and, at the eighth mile, branches into two. The right-hand branch is again sub-divided, six miles further on, and one line crosses a minor branch of the Godávári, by the Gunnarum brick aqueduct constructed by Lieutenant Haig, 2,248 feet long, on 49 arches. The third section has a main channel carried out for eight miles, when it breaks off into several branches, having a united length of 220 miles. Altogether there are 840 miles of main channels to irrigate 780,000 acres. In 1864 an extension of the Godávári line, completing the water communication between the Godávári and Krishna works, was sanctioned, and since that improvements have been executed from loan funds. The traffic on the canals of the Godávári is of much importance to the district, and in 1872-73 was carried on by 51,957 boats and rafts.

The Krishna enters the low country at a distance of about 80 miles from its mouth; and both its banks, below Bezoarah, spread out into rich alluvial plains. The site of the anicut at Bezoarah is flanked by the last hills; thence the plain stretches uninterruptedly to the sea, and to the Godávári. The two rivers have formed the alluvial plains of the deltas; but half way between them is the Kolair Lake, a low swampy tract representing the work the Krishna and Godávári have to do before this alluvial plain is complete. The English acquired the Krishna delta in 1766, and for 80 years they did nothing, while famines periodically desolated the land. When the rains failed in 1833 not less than 200,000 people died of hunger, and the Government lost revenue to the amount of 900,000*l*. The Krishna delta covers an area of 10,000 square miles, with 1,100,000 inhabitants. The river flows to the sea on an elevated central ridge, with the country falling off gently to right and left, and a general inclination to the sea. Bezoarah is exactly at the apex of the delta, where the river is 1,300 yards wide, flowing between two hills. The anicut consists of a broad basis of stone thrown into the river, and allowed to assume its own natural shape, 3,750 feet long, and 305 broad; faced with a casing of masonry, with scouring sluices at the flanks. From the east side the main channel is divided into two branches, one to Masulipatam and the other to Ellor. The main western channel divides into the Nizapatam and Comamur branches. In 1866 estimates were submitted for widening the channels, so as to ensure a supply for 250,000 acres, making a total of 430,000. This work of enlarging, which is designed to develop and perfect the system of irrigation and navigation in the Krishna delta, was progressing in 1872-73 by means of loan funds.

The construction of the Ponnár *anicut* was first proposed in 1849, at the ferry at Nellor, where the river is 520 yards in width; it was completed in 1855, but in 1857, during a hurricane, the *anicut* was breached for 282 feet, and the repairs were not completed until 1861. The area irrigated by the water thus obtained was 32,874 acres in 1863. The supply from the Ponnár is precarious, so that it is obliged to be supplemented by water kept in reserve in the Nellor and other tanks; and the water is only given out on one side of the river, the levels on the northern bank being too high. There is now a project to enlarge the main or Survapali channel from the Ponnár anicut, and so develop the irrigation.

The Kaveri and Kalerun works are the most ancient, both as regards the native original portion and the English improvements. At the head of the island of Seringham, near Trichinapalli, the main river divides into two branches, the southern retaining the name of Kaveri, and the northern being called the Kalerun; which latter has a larger volume, a more rapid slope, and a more direct channel, and the tendency was for the smaller stream gradually to silt up, and the whole volume to pour into the Kalerun. This would have ruined the irrigation of Tanjor. The ancient native work, called the grand anicut, was a solid mass of rough stone 1,080 feet long, and 40 broad, stretching across the bed of the Kaveri in a serpentine form at the lower extremity of Seringham Island. It was built upwards of 1,600 years ago.

Colonel (now Sir Arthur) Cotton's plans for the development of the Kaveri irrigation were sanctioned in 1836. Before the construction of his works the area of irrigation dependent on the Kaveri and Kalerun was 669,000 acres. The great object of Sir Arthur Cotton's plans was to send the excess of water in the Kalerun back into the Kaveri; by throwing a masonry anicut across the Kalerun, the crown of which should ensure about half the supply of that branch passing into the Kaveri. The Kalerun anicut is 750 yards long, divided into three parts by two

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islands. The brick and stone mass rests on three lines of wells, six feet in diameter, sunk to a depth of six feet in the sandy bed of the river, and there are 22 sluices. The effect of this work was to deepen the bed of the Kaveri, and a masonry regulating dam was carried across that river in 1845. This has given regularity of current and decrease of violence in the Kaveri, and has also caused a clearing of the Kalerun; the two streams are thus controlled in a most satisfactory manner. The Kalerun is the great drainage channel of the delta, while the Kaveri branch is a channel of irrigation only. All the numerous channels are solidly embanked, and an anicut was thrown across the Kalerun in 1836, 70 miles below Seringham, to regulate the supply for South Arcot. In 1836 the area irrigated from the Kaveri and Kalerun, in Trichinapalli, Tanjor, and South Arcot, was 630,613 acres. In 1850 it was 716,524 acres. The returns on the outlay may be estimated at 23½ per cent.

It is difficult to give the exact effect on cultivation of the great Madras delta works, because the irrigated areas are given by districts, not according to separate works, and may be due in part to supplies from tanks not receiving water from the delta works. But the areas of irrigation in the Godávári, Krishna, Nellore, and Tanjor districts, no doubt represent, very nearly, the areas irrigated by the Godávári, Krishna, Ponnár, and Kalerun delta works. This was in 1872-73—

Godávári district	-	-	-	264,717	acres.
Krishna district	-	-	-	169,897	„
Nelore district	-	-	-	169,073	„
Tanjor district	-	-	-	748,673	„
				1,352,360	

This is probably below the truth, as the Kalerun works also irrigate tracts in Trichinapalli and South Arcot. The total area of irrigated land in the Madras Presidency amounts to 3,124,480 acres.

South of the Kaveri lies the district of Madura, which depends for its supply of water, other than the direct rainfall, from the river Vaiga, rising in the hills of Travancor. The streams which form it have their sources in the slopes immediately overhanging the eastern valleys, so that their volume is very little affected by the south-western monsoon, and the Vaiga, as it flows by Madura into Ramnad, is never able to meet the wants of those districts, while none of its water reaches the sea. Both in 1864 and 1865 the channel was dry 24 miles below the town of Madura. Ramnad looks in vain for water to irrigate its fields, while the supply is quite inadequate to meet the wants of Madura. Yet, while a scanty and insufficient supply reaches the thirsty eastern plains, the great river Periaur, with a volume far beyond the possible wants of the western coasts, runs to waste in the Cochin backwaters. By a cutting 140 feet deep, and a quarter of a mile long, and a dam 60 feet high, it is believed that the river Periaur might be turned over from the well-watered western to the parched-up eastern coast. This would change the whole face of the country, and a garden would soon extend from the mountains to the sea. The plans and estimates are not yet matured, but in another year we may hope to hear more of this interesting Periaur project.

Tinneveli, the southernmost district of Madras, is watered from the Tambrapurni river, by means of anicuts placed at intervals across the stream, whence channels are led either directly for irrigation, or to supply tanks, the number of which in this district is exceedingly large, giving some index to the demand for irrigation. The anicuts are earth embankments, with masonry sluices; they are very ancient native works, the largest being the Kanadien channel, running parallel with the river from Popanassum to Shermadevi, the land between the river and the channel being one sheet of paddy. As some portion of the water of the Tambrapurni still escaped to the sea, the construction of the new anicut, below all the others, was sanctioned, so as to secure this surplus for irrigation, and to supply the port of Tutikorin with water; these works are now well advanced.

There remains the second zone of dry country, with a rainfall under 30 inches, extending down the centre of the peninsula to leeward of the western ghauts. It comprises the eastern half of the Bombay Presidency, great part of the Nizam's territory, the Ceded Districts of Madras, Mysore, and a great part of the Carnatic; it is watered by the upper courses of those rivers, the Godávári, Krishna, Ponnár, and Kaveri, the deltas of which have been so admirably fertilised by Sir Arthur Cotton and his great school of Madras engineers; it is emphatically the region of tanks.

The Nizam's territory, Mysore, and the Carnatic are covered with thousands of

tanks. In the fourteen districts of Madras there are said to be 43,000, all of native origin, with probably 30,000 miles of embankments, and 300,000 separate masonry works. The revenue dependent on tanks was 1,500,000*l.*, yet, in 1853, not one new one had been made in Madras by the English, though many had been allowed to fall into disrepair. In Mysore, until quite lately, the arrangements for their maintenance were also far from satisfactory. Tanks are formed in various ways, according to the accidents of the ground. Embankments are thrown across the gorges of valleys, high enough to retain a volume of water proportioned to the irrigable acres situated below. Descending terraces of land are occupied by a succession of reservoirs, the higher feeding the lower from its surplus supply. Long slopes have portions embanked on three sides, and the included space forms a storage area for such volume of water as local wants may call for; some of these works are very ancient. The Viranum tank has an area of 35 square miles, and an embankment 12 miles long, still in full operation after an existence of fabulous duration; it secures an annual revenue of 11,450*l.* The Chembrumbaukum tank, in Chengalpat, looks like a picturesque natural lake. The embankment is over three miles long, and the tank maintains a sheet of rice cultivation, nearly 10,000 acres in extent. Its safety, during floods, is secured by six waste weirs (*calingulas*) with a total width of 676 feet of escape channel; the supply is from rainfall, and merely local drainage. The enlargement of this fine tank was sanctioned in 1867, at a cost of 41,000*l.*, and the excavation and earthwork is completed. The Kaveri-pauk tank, in North Arcot, is also of great antiquity. It is fed from the Pallair river, and has an embankment nearly four miles long, riveted along its entire length with stone; it irrigates nearly 7,700 acres. In 1872 the water rose higher than had been known for many years, and several considerable slips in the bund took place, due to its saturation by the infiltration of tank water. Remedial measures have been adopted. The most formidable cause of injury to tanks is the action of waves on the embankments during gales; it is counteracted by long slopes on the water face of the bank, and protecting coverings of rough stones. Most tanks are supplied with an outlet, called a *calingula*, generally of masonry, built in the land near one end. It is so much lower than the land itself that any superabundant water can pass over it. Towards the end of the rainy season, the *calingula* is closed, so as to keep the tank quite full. This is done by means of straw and turf, the crown of the *calingula* being usually supplied with a row of rough granite posts, three or four feet high, to support the wall of turf built up in front.

In Mysore there was much activity with reference to the repair of tanks during 1872-73. By the Tank Restoration Scheme the Irrigation Department selects specific series of tanks for immediate work, brings them up to a certain standard of repair, and then leaves them to be kept in repair by the ryots, under the revenue officers. In this way all the tanks in the province are gradually being dealt with. Owing to the undulating nature of the surface of Mysore there are very few large tanks, and, except in the neighbourhood of the Kaveri and its tributaries, the country depends for its irrigation on numerous chains of small tanks, in which a process of silting up is always going on, and which require constant inspection and repair. During 1872-73 as many as 249 tanks were breached. The chief new irrigation work in Mysore is the Sriramadevara anicut over the Hemávati, which was completed in 1870-71. The supply of water is ample, and it will secure extensive rice crops.

The three rivers in Bhima, Krishna, and Tungabudra, rising in the western ghauts, drain the greater part of the southern dry region, and unite to form what is usually called the Kistna, a short distance below the town of Karnal. On first issuing from the mountains, they and their tributaries traverse the thirsty lands comprised in the eastern section of the Bombay Presidency, the Deccan, and the Southern Mahratha country. Considerable activity has been shown, of late years, in suggesting and maturing projects for utilising the water of the rivers as they flow across the Bombay territory. But the difficulties are not trifling. The rivers have so slight a slope that their fall would not gain much on that of a canal, while the steep transverse slopes of the valleys prevent canals from getting to any distance from their parent streams. The rivers are filled at the time of rains, but during the long dry season of eight months they become mere threads. The two objects to achieve are the retention of the copious supplies which run to waste during the rains, and the command of the barren lands on the sides of the valleys. The natives in this region left the main rivers untouched for storage purposes, for the most part, and were contented with the construction of small tanks on tributary streams.

The largest of the works in the Bombay Presidency that is completed is the

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Krishna (the name of the upper part of the Kistna river) canal. A masonry dam is thrown completely across the river, on a rocky bed. A canal is excavated from above the dam, which is near Kurvar, in the Satara district. Its bed is four feet lower than the crest of the dam, and it is provided with scouring and regulating sluices. It then meanders along parallel to the river, with a slope of a foot a mile, being carried across the drainage of the country by suitable works, and eventually recedes from the bank, so as to command a larger area of land. It is now in working order, and has ensured the safety of valuable crops over a considerable area.

The Ekruk tank is four miles north of the town of Sholapur, on the Adéla, a tributary of the river Bhima. The dam of earthwork, with masonry flanks, is thrown across the Adéla valley, and is 7,200 feet long, and 72 feet high in the centre, with a waste weir at the east end. A lake is thus formed, with an area of six and a-half square miles, which submerged five villages, two of them in the Nizam's territory, causing an annual loss of revenue amounting to 100*l*. On the other hand 35,840 acres are brought under the influence of the tank by three channels, two of them on a high level, to be used when the tank is full, for monsoon crops, which are 4 and 18 miles long respectively; the other a permanent channel, 28 miles long, for perennial irrigation. One of the high-level canals is now complete, and the permanent canal has been carried to the twenty-fourth mile. The dam was completed in 1869, and the Ekruk tank is now in working order. The water was given free of charge in 1871-72, it being the first year.

The Púna and Kirki water-supply works, also within the basin of the Bhima, consist of a masonry dam of great height, and 2,900 feet long, across the valley of the Muta river, to form a reservoir. Two open ducts lead the water to Púna and Kirki, where it will be distributed by iron pipes. This work was designed by Colonel Fife, and is now progressing rapidly. The centre portion of the dam has been raised for a length of 250 feet, to a uniform level of 53 feet above the river bed; most of the masonry work is complete, and the Púna canal is well advanced. The Mudduk tank, with canals, in Dharwar, is a scheme which has been carried out, as well as that of the Kalhola nullah; and several others are engaging the attention of the Bombay Government. Such are the proposals for a canal from the Gokak river in Belgaum, for a canal from the Mulpurba river into the Dharwar plains, and for carrying out the Churdi project, which was suggested by Sir George Wingate many years ago. The valley of the Yerla, a tributary of the Krishna, has also been surveyed for storage tanks, and the new canal from the Yerla is now in working order, as well as the Chikli canal, both in Sátára.

There remain the Ceded Districts of Balari, Karnúl, and Cuddapa, in the midst of the dry zone, with a rainfall at Balari of only 22 inches. The Tungabudra flows round the northern borders of Balari and Karnúl, and offers the food-giving water to those who know how to get it. But the country beyond the mere valley of the river has thirsted for lack of sufficient water during long centuries. Often the monsoon rains fail, and then people die of hunger by scores. Yet on the banks of the Tungabudra, and within the Balari district, stood the famous city of Bijayanagor, where the old travellers Conti and Cæsar Frederick saw cool channels flowing through the streets, and groves and gardens concealing the suburbs. The Rajahs of Bijayanagor constructed dams across the Tungabudra in 1521, and in subsequent years, by throwing enormous stones on the rocky ridges in the river bed, and leading off canals. Nine such anicuts were built, and channels with a total length of 89 miles were led into the valley, to increase its fertility, and water the crops. But they were never brought to the country above, which really requires water; and this problem remained for us to solve.

The arid plains of the Ceded Districts continued to thirst for water. At last it was resolved that an English company should have an opportunity of trying whether the employment of private enterprise and English capital could be advantageously adopted in aid of Governmental action, in the construction of works of irrigation in India; and these Ceded Districts were selected as the scene of the experiment. In 1860 the agreement was made with the Madras Irrigation Canal Company; but one important element, the enterprise, was omitted, for the Company's capital of 1,000,000*l*. was raised by means of a Government guarantee to pay interest at 5 per cent.

The final project, which was sanctioned in 1861, is to divert, by means of an anicut at Sankasala, 17 miles above Karnúl, a portion of the flood waters of the Tungabudra into the valley of the Ponnár, through a capacious canal along the right bank of the former river, and across high land, forming its watershed to the east; also to complete a line of water communication to the coast, by improving the beds

of the Kunder and Ponnár to fit them for navigation; and by excavating canals, overcoming the slopes of the country by a succession of locks, and providing water for the dry season by constructing reservoirs. The irrigation of the Balari district was also a part of the original plan.

At Sankasala a reef of rocks forms a barrier in the river, and furnishes a base on which to erect an anicut. Its height is 12 feet, and the length 1,500 yards. From its right flank, the main canal is carried parallel to the river for 17 miles, with only one bank from 16 to 34 feet high, the other being formed by the natural rise of the ground. Thus a quantity of land is submerged, while the single bank is subject to violent action from waves, owing to the extensive spread of water. Close to Karnúl, the canal is taken across the Hindri river on a fine aqueduct. At Metacondal, 72 miles from Sankasala, there is a cutting a mile long, which takes the canal from the Tungabudra basin, across the water parting, into that of the Ponnár, descending the valley of the Kolair, to the Ponnár itself, by a succession of locks, in a fall of 236 feet. From June to November there is plenty of water from the Tungabudra, but from November to June not a drop can be abstracted from that river without injury to the Krishna delta irrigation, so that capacious reservoirs for storage are essential to the success of the scheme. The scheme was to continue the canal down the Ponnár valley, with an anicut in the Somaishweran gorge, to the sea at Krishnapatam. The canal is completed from Sankasala to the Ponnár, 143 miles, but not so as to be capable of bearing the full amount of water, owing to weakness of construction. Another defect is that sufficient waterway is not provided for the passage of flood waters, either under the canal or by surplus weirs in its banks, for the escape of storm waters entering it when full.

The contract between the Secretary of State and the company was signed on the 3rd of June 1863, and on the 10th of July 1864 water was first admitted from the Tungabudra into the main canal at Sankasala. In July 1864 a flood undermined a part of the anicut, and the body of the work was breached for 22 yards, right down to the rock. The damaged part was rebuilt in the following dry season. By May 1865 the company had a balance of about 130,000*l.* out of their guaranteed 1,000,000*l.* It became apparent that the project could not be completed for the original sum, and on the 2nd of October 1866 the Secretary of State granted a loan of 600,000*l.*, at 5 per cent. interest, to the company, on the condition that if the works were not completed and placed in perfect working order by the 1st of July 1871, the company, if so desired, should surrender the whole of the works to the Government, which would pay the capital laid out on them. By that date the main canal was made, all the sluices in it were built, and the channels for distribution were in a more or less advanced state, 216 miles of them being finished, commanding 91,567 acres. But it appears that if the full amount of water was admitted into the canal the embankments and walls would fail at many places. Moreover the anticipation that water would be eagerly utilised by the ryots, as soon as available, has certainly not been fulfilled. The total collections on account of irrigation and Karnúl water supply during 1872-73 were 9,750*l.*; and the area supplied with water was 11,029 acres, for which 5,000*l.* was paid, an average of *Rs.* 4.9 per acre. The total expenditure on the canal was 21,197*l.* No project for a reservoir has been completed; and the irrigation of the Balari district is still unprovided for, two estimates, amounting to about a million and a half each, submitted in 1867 and 1870, not having been sanctioned.

Yet the main canal and works are considered by the company, in a general sense, to have been completed by July 1871; and the company propose to continue them, and to pay back the Government loan.

The experience of the Madras Irrigation and Canal Company is not generally considered favourable to the employment of companies, with guaranteed interest on their capital, to execute irrigation works in India. The company in Orissa, without guarantee, was unable to carry on the works it had undertaken, and sold them to the Government. Lord Lawrence, in 1864, decided that the State should undertake directly all the irrigation works that it could practically carry out, in preference to entrusting them to private companies, and that the funds for their construction should be borrowed, if necessary. The famines of 1837-38 and 1860-61 in the North West Provinces, and of 1865 in Orissa, had shown the urgent necessity of securing the country, by the provision of irrigation works, wherever it was possible to do so, from the recurrence of such calamities; and in 1867 the Secretary of State fully accepted the principles advocated by Lord Lawrence since 1864. In order to give the greatest possible efficiency to the action of the Government in relation to the

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spread of irrigation, an Inspector General of Irrigation Works was appointed, and Major General R. Strachey was nominated to that important post in January 1867; he has since been succeeded by Colonel Rundall, who had previously had charge of irrigation in Bengal. In March 1867, Colonel Fife was appointed Irrigation Secretary in Bombay, and Colonel Anderson was nominated to a similar post in Madras. Colonels Greathed and Crofton received similar appointments in the North West Provinces and the Punjab. On the new system the first step is to fix the sum to be assigned for irrigation works from the ordinary revenues of each year, which is not to be transferable to any other classes of works. The grant thus made must first be wholly expended before any charge can be allowed to be thrown on the loan fund. Then the works to be aided by borrowed funds must have been sanctioned on regular designs and estimates, and the cost for any such work must not be less than 10,000*l*. They must also be of a nature which will admit of a proper revenue account being drawn up, from which the exact results of each work can be seen. In special cases minor works may be grouped together to bring them within the requirement of the rule respecting the loan funds. Thus very great activity has been shown in the prosecution of works of irrigation; existing works have been watchfully maintained and extended; numerous important projects have been matured and commenced; and efficient machinery exists for the continuous prosecution of these great undertakings.

In the moist belts, where there is a superabundance of rain, works of irrigation are superfluous; but works of equal importance, as regards the welfare of the people, become necessary in their place. Instead of bunds and channels to raise the water and spread it over the land, embankments are needed to preserve the crops and villages from destructive floods.

The maintenance of the river embankments in Lower Bengal is an important part of the duties of the Irrigation Department, for the cultivation of the land is entirely dependent on their efficiency. Vast tracts of thickly populated country are below the level of high tides on the lower part of the Hugli, and below the flood levels of the rivers, in every part of the valley of the Lower Ganges. There are 2,100 miles of embankments under the charge of the Irrigation Department in Bengal, most of them maintained at the expense of the State. An idea may be formed of the importance of this charge from the fact that a single breach in the embankment of the Cossye inundated 36 square miles, and completely destroyed the crops. The embankments have to be made up to the proper height and section during the dry months, and carefully guarded in the rainy season.

A very extensive series of embankments is under construction along the banks of the Irawadi, in British Burma. During the year 1870-71 the works were in abeyance, but surveys were in progress on several lines on both banks of the river. In 1871-72 work was resumed, and during 1872-3 two important portions of the embankments were completed, by which it is estimated that no less than 200 square miles of land have been reclaimed, which were formerly inundated by the spill water of the Naurin river. Two embankments were sanctioned (the Leymyethna and Zalun) which will afford protection to 150,000 acres at a total cost of 4*s*. per acre, and the earthworks of the same are now almost completed; iron sluices were provided in the Henzada embankment for passing off water lying against it after the subsidence of the floods, and several surveys were in progress.

COMMUNICATIONS.

The subject of Indian communications includes railways, roads, navigable canals, and harbours. For sea-borne traffic, as was shown on the occasion of the Orissa famine, is quite as important as that by land.

The main system of Indian railways is nearly completed; and the State railways which are now under construction or proposed, will, for the most part, supplement the existing trunk lines. There are now open in India 5,872 miles of railway, which have cost about 97,000,000*l.*, giving an average expenditure of 16,536*l.* a mile. Of this length 727 miles are laid with a double line, and 5,725 miles on the 5 ft. 6 in. gauge. A further extent of 1,850 miles is now in course of execution, of which 817 miles will be on the 5 ft. 6 in. and 1,033 on the metre gauge. As no more lines will be entrusted to companies, all railway construction will eventually be in the hands of the Government. Lines are now open from Calcutta to Multan and Bombay, and from Bombay to Madras. The completion of the latter line was effected on the 1st of May 1871, on which day the Great Indian Peninsula joined that from Madras, by opening the piece between the Krishna and Raichur. The bridge over the Krishna was completed during the year under review. The piers are wrought iron cylinders filled with concrete, and the superstructure consists of 36 spans of 100 feet Warren girders. In 1871 the chord line of the East India Railway was also opened, 124 miles long, and the branch (23 miles) to the Kurhurbari coal fields. Upwards of 4,000,000*l.* was expended in the construction of railways during the year 1873, the expenditure being nearly equally divided between the Government and the companies. The whole amount of guaranteed capital which had been raised to the 31st March last was 94,725,000*l.*, of which 92,417,000*l.* had been expended. The sum expended direct by the Government amounted to 5,398,000*l.*, making a total expenditure of upwards of 100,000,000*l.* The passenger traffic increased from 20,332,823 to 22,243,220, and produced 2,194,515*l.*, instead of 2,085,942*l.* The goods amounted to 3,266,062 and the minerals to 669,826 tons, and the receipts were 4,294,160*l.* compared with 3,964,614*l.* The miscellaneous traffic was 254,114*l.* as against 301,061*l.* The expenses of maintenance amounted to 786,453*l.*, and of working to 2,771,268*l.*, being at the rate of 53 per cent. of the gross receipts as compared with 55 per cent. in the previous year. On the East Indian the rate was 38. On the Scinde, Punjab, and Delhi it was 69. The net revenue derived from the railways amounted to 3,185,000*l.*, being upwards of 315,000*l.* in excess of the previous year. The gross receipts were 6,742,000*l.* compared with 6,351,000*l.*, and the expenses 3,557,000*l.* compared with 3,482,394*l.* The guaranteed interest advanced by the Government was 1,428,442*l.* in excess of the revenue.

But the railways are now almost completed, so that, with the cessation of heavy outlay on construction, the financial position may be expected to improve. The East India Railway, with its chord line, and Jabalpur branch, altogether 1,504 miles, is all open for traffic. The Great Indian Peninsula Railway (1,278 miles) is completed, with the exception of the bridge over the Krishna. (The Madras Railway (857 miles) is all open, including part of a short branch to the foot of the Nilgiris. The Bombay and Baroda Railway is finished for 406 miles; and the Great Southern of India is opened for 168 miles out of the 383, which will complete it to Tuticorin. Sanction was given in August 1871, for its extension, by Dindigul and Madura to Maniachi, with branches thence to Tinneveli and Tuticorin.

The Oudh and Rohilkhand Railway is progressing, and was opened for traffic for 523 miles, 42 from the Ganges at Cawnpur to Lucknow, 209 of main line on to Sháh-jehánpur, and 81 of branches. Between Lucknow and Murádabad the railway crosses 32 rivers and 60 miles of inundated valley. There will be a branch from Murádabad to Ramnagar, at the foot of the Kamaun hills, 48 miles in length, and an extension from Murádabad to Saháranpur. A branch about 35 miles in length was projected from the terminus of the Ramnagar branch to Nynsee Tal, and the necessary survey was made by Mr. Black, railway engineer; but the expense of making even a light railway up the Nynsee Tal hills was found to be too great, so the project was abandoned. The large bridges are making fair progress. The most important are those over the Ganges and Rám-ganga. The cost of the railway up to March 31st, 1873, was 4,104,666*l.*, or 6,910*l.* per mile. The traffic receipts for 1872-73 were 55,502*l.*, mainly made up from carriage of third class passengers, and of food grains, seed, timber, salt, and military stores.

Numerous State railways on the narrow gauge, either commenced or under consideration, will complete the network of communication over nearly every part of

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India. The most important State railway, is that from Lahor to Pesháwar (270 miles). The principal works on this line are the large bridges over the Punjab rivers Rávi, Chenáb, and Jhílam. The Rávi bridge, with 33 spans of 90 feet clear, will cost 196,617*l.* It consists of 32 piers, each founded on three 12½-foot-diameter wells, sunk to a minimum depth of 70 feet below low-water level, with abutments and parallel retaining walls founded on 10 feet wells. The whole 32 piers and both abutments are now in progress, and the wells are all sunk to the prescribed depth. If the girders were delivered by October 1873, the bridge might have been made ready for traffic by June 1874. The Chenáb bridge, with 64 spans of 133½ feet, will cost 419,397*l.* Its 63 piers are to rest on triple wells sunk to 70 feet. Most of the wells were sunk during the year, and the piers completed, and at the end of the working season a quarter of the bridge was ready for its superstructure. It may be ready for traffic early in 1876. The Jhílam bridge is of 50 spans of 85 feet clear, and the cost is 147,807*l.* The progress made with the well sinking has been slow, as there is great difficulty and uncertainty in sinking through the boulder bed; and the works have been damaged by heavy floods. Good progress was made during the year on the other work connected with this railway. A large part of the line is completed on the narrow gauge of 3' 3¾", which will be the same as that of the other State railways, but involves a change at Lahor, as the line from Calcutta is on the broad gauge up to that point. The narrow gauge had been adopted for the sake of economy, but it has recently been decided that the whole line shall be constructed on the broad gauge. The next State railway in order of importance is what is called the "missing link," the Indus Valley Railway (480 miles), running from Multan to Bháwulpur and Rohri, and thence to Kotri along the right bank of the Indus, which it crosses at Rohri. This railway will be on the broad gauge. Work during 1872-73 was almost entirely confined to the section of 270 miles between Multan and Sakhar; where 187 miles of bank are complete, and 32 out of 649 culverts have been built. Much material has also been collected. This line will complete the railway communication between the port of Karáchi and the districts of the Punjab.

The Rájputána State Railway (370 miles) is to run from Agra, by Bhurtpur and Jaipur, to the Sambhar lake, being joined at Khera by a branch from Delhi. The portion from Delhi to Riwari, with the salt branch, has been completed, and the first train ran to Riwari on October 21st, 1872. The Holkar Railway (86 miles), which has been begun under contract, is to connect Indor with the Khundwa Station of the Great Indian Peninsula Railway.

The East India Railway has now a total length of 1,503 miles, including the Jabalpur extension; and the earnings from the passenger traffic increased 4 per cent. during the year 1872-73. The whole number of passengers who travelled was 5,812,277 in 1872, against 5,626,589 in 1871. The great bulk, nearly 99 per cent. of native passengers, travel in the 3rd and 4th class carriages. The increase was greatest at places where the pilgrim traffic comes. There was also an increase in the goods traffic. The Eastern Bengal Railway is 156 miles long, and in August 1873 an extension to Chitpur was opened, to connect it with the Hugli river and its shipping. The chief work in connection with this line has been the repairing of damage done by the floods of 1871, which has been carried on with great energy and promptitude. The Mutlah line is economically managed, and just pays its way. This and the Nalhati line, each 28 miles long, are the two State railways of Bengal. Both pay their expenses. The Government of India has sanctioned the immediate commencement of work on the projected Bengal Railway, which is to pass from the Ganges to the foot of the Darjiling hills, and to have a length of 204 miles. Extensions are proposed into Assam and Kuch Bahar, and up the Tista valley, to some place which would serve as a point of departure for the Central Asian Trade.

In the Central Provinces the short State railways are very important, as completing the system of communications in the cotton and coal yielding districts. Those from Khamgaon and Amraoti, seven and a half and five and a half miles, are completed; and a portion, 15 miles long, to the coal beds of the Warda valley, is sanctioned. The work was commenced in March 1872, with the construction of the first 15 miles of the line. It will eventually be extended for 28 miles, on the narrow gauge of 48 inches, to the coal shaft at Warora. In the Nizam's territory lines of railway are sanctioned from Gulbarga to Haidarabad, from Haidarabad to Chanda, and from Warangal to Masulipatam. Surveys have been made for two alternative lines from Nágpur to the great corn-producing district of Chattisgarh, which will tap a country of great importance, where food has often been wasted for want of

consumers. This district produces very largely in excess of the wants of its population, and a railway opening it to the rest of the world would be one of the most important works of communication that could now be undertaken. The northern route was finally approved of, and detailed estimates were to be ready by the end of 1873.

In the Southern Mahratta country, through which the cotton of Dharwar and the Raichur Doab has long wanted rapid and convenient means of transport to the ports of shipment, the necessary lines of railway have been projected. The survey of a line from the port of Karwar to Hubli and Gadak (144½) has been completed, and extensions from Gadak to Balari, and from Hubli to Sholapur, are also being surveyed. A committee has reported upon this proposed railway from the port of Karwar, by the cotton marts of Hubli and Gadak in Dharwar, to Balari; and the Government of India has now recommended its construction. The traffic is expected to increase very largely, and it is certain that the line will prove highly advantageous as a means of developing the southern districts of the Bombay Presidency. The line from Bangalore to Mysore has been indefinitely postponed, after 13,600*l.* had been expended on surveys, in order that the surplus revenue of the State may be expended on the far more important work of repairing the tanks.

Plans and estimates have also been prepared for a railroad from Rangún to Prom.

The great undertakings connected with the construction of roads have, for the most part, been completed; and some of them have even been superseded by the railways. The Grand Trunk Road up the Ganges valley is parallel with the East Indian Railroad; and the monument recording the construction of the road up the Bhore Ghaut, by Sir John Malcolm, must be a strange commentary, to the few who ever now see it, on the rapid changes typified by the adjacent wonderful line of railroad up the zigzag incline. But other great roads will not be superseded by the railways. The splendid engineering works leading to the Himalayan sanatoria, to the coffee districts of Wynaad, and to the Nilgiris, will be used for many a long year; as well as such a line as that called the South Western Trunk Road, from Calcutta, through Orissa, to Ganjam in the Madras Presidency, which is now declared to be fully completed throughout.

Most of the new roads have been undertaken with a view to forming feeders to the railways, and the local roads have been maintained and constructed by local cesses. In Eastern Bengal roads, except in the hill tracts, are in competition with excellent water carriage, so that, as a rule, it is not considered necessary to spend very large sums upon them. This is the decision the Lieutenant Governor has come to with reference to the Silhet and Cachar Trunk Road. In Western Bengal a road has been commenced, and pushed on rapidly, 27 miles long, to connect the Girhidi station of the East India Railway with the Grand Trunk Road at Dunwi, and the Chota Nágpur districts; and the Bugodur and Hazaribagh road, which is to be completed, brings the latter station in direct communication with the railway. Much progress has also been made with a feeder to bring the Purulia, Ranchi, and Chaibasa districts into communication with the railway. The Ganges and Darjiling road is now completely bridged, the timber bridges being replaced by iron structure on screw piles, with the exception of the Mahánadi at Dingughat, where there is a first-class timber bridge. The road is metalled throughout. The hill portion is largely used for trade purposes. In the North West Provinces the principal work has been the completion of the Naini-Tal cart road, and of that from Sháhjehánpur to Sitapúr; and the progress made on those from Banda to Ságar, from Sursa Nadi to Rewári, and from Almora to the Ránikhet road. In Garhwal 123 miles of road from Srinagar to Niti pass, have been completed to a width of 10 feet, where, four years ago, there was a mere path, in many places almost impassable; it is bridged throughout, and is an important line of communication for traders from Tibet. In the Punjab the trunk line of road from Delhi, by Jallandar, to Lahor, was maintained in a fair state of efficiency; but the section between Lahor and Jhílam is being reduced in width. Many repairs and improvements have been effected, especially on the Kangra valley road, and on those from Ráwalpindi to Umwi, and Pesháwar to Kohat. In the hills the Hindustan and Tibet road was kept open from Simla up the Satlej valley as far as Pángi, a distance of 150 miles. The grain markets show that the roads have provided a means of intercommunication in the Punjab, which is sufficient to equalise prices in a great measure, and to ward off distress when the failure of crops is local. In Oudh, also, much work was done in metalling and improving roads, and planting trees.

In Berár three principal lines of road, in addition to the branch railway, have been under construction for some years; namely, from Akola to Málígán and

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Hingoli, from Murtizapur to Karinja, and from Badnera, by Anraoti, to Morsi, with a branch to Elichpur. The first has been completed as far as Basim. The need for good cotton roads in the Berárs, leading from the railway stations to the chief cotton marts, has long been felt; and as long ago as in 1863, 20,000*l.* were granted with a view to making them passable during the dry season of seven months. A committee in 1861 had recommended the construction of 14 roads across the Purna valley, averaging a length of 25 miles each. The black cotton soil of this valley is 40 to 100 feet deep, and the country is almost impassable during the wet season. Besides the above three lines, to be completed as first-class roads, the fair weather tracts will be available during the cotton season.

In 1862 there were not 18 miles of road fully opened throughout the Central Provinces. Now, two great trunk lines, called the northern and eastern roads, start from Nágpur as a centre. The northern road leads to Jabalpur, through Seoni, a distance of 165 miles. This route has ceased to be of more than local value since the railway has been opened through the Narbada valley, from Khandwah to Jabalpur. But for many years the north-east terminus of the Great Indian Peninsula Railway was at Nágpur, and that of the East Indian Railway at Jabalpur; and in those days the line between Calcutta and Bombay passed over this so-called "northern road," which was a very important link of the chain of communication. The Seoni plateau is about 1,500 feet above Nágpur, and, until this road was made, its products could only be brought to a market by carriage on pack animals. The road, as regards engineering and alignment, is one of the best in the interior of India. The eastern road leads from Nágpur to Raipur, in Chattisghar. Except a small gap of some 29 miles, it has been completed and opened for traffic in the past year. In 1873 an important girder bridge, and a ten feet arch, in the 68th mile, were completed. Heavy expenditure was incurred in re-metalling this road, owing to the damage done by the narrow tires of the wheels of country carts. The Sagar road is under construction, as the connecting link between Bandalkhand and Western India. The portion at present in hand is that from Sagar to the Kareli Station of the Great Indian Peninsula Railway, 12 miles west of Narsinhpur. This road is eventually to be continued up to Jhansi, but it will fully task the Central Provinces Budget for some years to come to make it up to Kareli (75 miles). Sagar is much higher than the Narbada valley; and the ascent, with the crossing of many streams, will involve a very heavy outlay. Hitherto there has been no line of communication between Bandalkhand and Western India.

On all the roads of the Central Provinces foundations are easy, the mountain passes present no engineering difficulties, but the one serious obstacle, common to all, is insufficiency of funds. Numerous district roads have been completed or improved, and the bridge over the Kanhan river, 80 feet long in 12 spans, is completed.

In the Bombay Presidency much progress was made in completing the communications across the western ghauts from the sea to the Great Indian Peninsula Railway. The embankment of the Konai nulla at the port of Karwar is nearly completed, and the metalling of the Arbyle ghaut road thence to Dharwar is approaching completion. On the Parpuli ghaut road, in Belgaum, all the large bridges had been completed; and in the Kolapur district great activity was shown in road making, no less than nine roads having been constructed or improved. In Sátára a road is in progress from the Konkan up the ghaut to Mahabaleswar; and a bridge was completed across the Krishna at Wái. A great deal of work has also been done in Khandesh. The bridges over the Quoina, Shirwal, and Yerna in the Sátára district have been completed. In Mysore there are now 1,817 miles of road, of which 529 miles are first-class, metalled and bridged; and the completion of two new ghaut roads, makes six outlet for cart traffic between Mysore and the western coast.

The amount of water communication in India is very great; and a part of it has been indicated in the chapter on irrigation, for several of the canals are also adapted for navigation. As soon as the Sirhind canal works are completed there will be navigable communication from Calcutta, up the Ganges, by the canals to the Satlej, and down the Indus to Karáchi. The delta canals of Madras are also much used for boat traffic, as well as the high level, and Cochrane's canals. But it is in the belts of greatest rainfall, the delta of the Ganges, the valleys of the Brahmaputra and Irawadi, and on the coast of Malabar, that water is most largely used as a means of communication. The rivers in the Bengal district of Naddea, namely, the Bhagirathi, Mattabangah, and Jalangi, have long been used as fluvial highways; and a least depth of 4 feet, and a least width of channel of 150 feet, is maintained on the Bhagirathi. The whole outlay on Bengal canals during the year was 20,828*l.*, and the income 38,145*l.*, showing the existence of a great and increasing traffic. There

are two steam navigation companies running steamers on the Irawadi, which made 60 trips in the year. There are also 19,400 boats employed in the Irawadi carrying trade.

One great scheme, which has occupied much attention during the last 20 years was after an enormous expenditure, finally abandoned in October, 1871. This was the famous Godávári Navigation project, which was first urged upon the notice of the Government by Sir Arthur Cotton in 1851. Up to 1861 the sum of 20,000*l.* had been spent on preliminary surveys and other arrangements. The drainage system of the Godávári includes the river Wurda, rising in the Satpura hills, and separating the Berárs from Nágpur, which is joined by the Painganga a little before reaching Chanda. The united stream flows on until it receives the Wainganga; and 90 miles lower down is the Godávári, which joins the other rivers after a course of 650 miles from the Western Gháts. From this point to the sea is a distance of 250 miles. There are three great obstructions to the navigation, caused by rocky barriers. The first is 90 miles above the anicut at Dhauleswaram, at a place called Badrachallham, and is 20 miles long. The second is 14 miles long, and is 68 miles above the first barrier. The third is 75 miles above the second, and is 35 miles long; while the distance of the third barrier from Chanda, in the Central Provinces, is 75 miles, and from the cotton mart of Hinganghát 115 miles.

There never was any hope of the Godávári being made navigable all the year round; but it was thought that a boat might make a trip down in 10 days, and return the same season, by being towed up, in 2½ months. Hinganghát is halfway between Bombay and the mouth of the Godávári, and it was calculated that the river would convey cotton at one-third the rate of the railroad. Linseed, ghi, and gingelly, it was thought, would also be sent by the river; while the importations up stream would be salt, cocoa-nuts, some European goods, and military stores. But these hopes have since been abandoned, so far as a remunerative return on the outlay is concerned.

The Godávári works consist of dams or anicuts, canals and locks round the barriers, and clearances of rock in the river bed, including a cutting through a ridge of sandstone rocks at Albaka, between the first and second barriers. The preliminary work consisted of a survey of the river, and a complete profile of the river as far as Chanda. This was commenced in 1854, and the works at the first barrier were begun in 1861. Temporary tramways were constructed round the barriers, in anticipation of the completion of the canals. When Sir Richard Temple inspected the works, in January 1863, 700,000*l.* had already been expended. He recommended that the works at the first and second barrier, and in the river up to the foot of the third barrier, should be proceeded with, at an estimated cost of 255,000*l.*, so that the navigation might be open to the foot of the third barrier by May 1865. The road from Nágpur to Chanda was to have been extended to this point. By August 1865, two-fifths of the anicut at the first barrier, with masonry works, were completed. But in 1871, although the canal was almost completed, the anicut remained unfinished. A channel had, however, been cut through the Albaka reefs. The second barrier works were entirely suspended, and in an incomplete state. The third barrier works were not commenced. There was a steamer towing boats from the second barrier to the coast, which carried a total of 188,312 tons of cargo; and the "Wainganga" steamer continued the communication between the second and third barriers; but the amount of traffic was small.

In a despatch, dated August 1871, the Secretary of State proposed that the navigation works should be completed on the smallest possible scale as far as the foot of the third barrier, whence a road should be made to Chanda. But in October of the same year, at the request of the Government of India, the whole scheme was abandoned, as involving expenditure which did not give promise of any adequate return.

The important line of water communication, parallel to the western coast of India, which is included in the Malabar and Travancor backwaters, was reported upon by Mr. Robertson in 1871. By the completion of the cut through the Warkallai barrier, and by making another cut from the Venjali lake to the Tirur station of the Madras Railway, there will be a continuous line of water communication from Budagivi, north of Iepur, to Trivandram, the capital of Travancor, whence the Victoria canal extends southwards towards Cape Comorin for 15 miles, which is to be extended 30 miles further. The great value of this system of natural canals is best shown during the south-west monsoon. In its centre is the harbour of Cochin, which is capable of being made the finest close harbour in the world; 10 miles broad at its southern end, and from 10 to 48 feet deep. The canoe boats on the backwaters draw half a foot of water, and carry 2,000 to 3,000 lbs. each. The only obstruc-

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tion is the Warkallai barrier, between Cochin and Trivandram, a spur of the ghauts, consisting of a ridge of laterite hills, about six miles wide, with a summit level of 180 feet, ending abruptly in a line of cliffs washed by the sea. From the south a ravine, covered with paddy fields, and lined with cocoa-nut and jack trees, runs up to within half a mile of the summit ridge; and there is a similar ravine on the north side. The sea-cliffs are of soft laterite, intersected by five ravines, and contain a remarkable deposit of lignite. There have been four distinct plans for cuttings through the Warkallai barrier; but the one finally adopted is that of Mr. Barton, the engineer to the Travancor Sarkár. It consists of a cutting through the hill, which, when the depth reaches 70 feet, is to become a tunnel. This happens in two places, and the length of the two tunnels is 2,000 feet. The canal is 25 feet wide and four deep. The work is progressing towards completion, when there will be a continuous water highway for the whole distance from the Madras Railway, at Tirur, to Trivandram, with a large and increasing traffic.

As a means of communication between India and the outer world, the harbours and anchorages have been the subject of much attention from the Government during the last few years; and in September 1870, Mr. Robertson, a civil engineer of eminence, was appointed to prosecute inquiries with a view to the improvement of some of them. During 1870-71 he examined the Madras anchorages on both sides of the peninsula, and in 1871-72 he was on the Bengal and Bombay coasts, and also investigated the schemes for a ship canal between India and Ceylon. The trade ports of India, if every place frequented by native craft be included, are exceedingly numerous. In a list of Indian ports and harbours, prepared for Dr. Forbes Watson by Captain Taylor, as many as 656 are enumerated and described. But it will only be possible in this place to pass the more important ports of India in review in their geographical order, from Karáchi to Chittagong.

The harbour of Karáchi, a few miles to the west of the mouths of the Indus, occupies a most important position as the port of Sind and the Punjab, with a large and rapidly increasing trade. Its western half is formed by a long narrow strip of sand ending with the rocky promontory of Manora Head; and its eastern by the island of Kiamari. Thus, there are two openings, one between the main land and the east end of Kiamari, called the Chinna Creek, and the other being the main entrance used by ships, between the west end of Kiamari and Manora Point. A bar had formed across the entrance, stretching for nearly a thousand yards, and the depth over it, at low water spring tides, was from 9 to 12 feet. This bar is the result of the waves raised by the south-west monsoon acting on the loose sand lying immediately off the extremity of Manora Point. For the improvement of the harbour of Karáchi, the problem was to remove this bar and produce a deep channel. The depth upon the bar appeared to depend on the velocity and quantity of tidal water passing in and out of the harbour at each tide.

In 1856, the late Mr. Walker, the eminent harbour engineer, was consulted on the subject, and he reported in conjunction with Mr. Parkes, the works being carried out under the immediate direction of Mr. W. H. Price, C.E. Mr. Parkes, who was the consulting engineer of the harbour works, visited Karáchi in 1858 and again in 1864, 1868, 1871, and 1873. The main objects of the design were to increase the volume of water that passes through the entrance at each tide, to give it the right direction, and to shut off, as much as possible, the heavy south-west seas from the mouth of the harbour. Sir Charles Napier had constructed a mole across without openings, from Karáchi to Kiamari Island. The first object was to be gained by blocking up Chinna Creek, and opening a passage in the mole, so that all the water might flow in and out at the same entrance. The second point was to be secured by running out a long groyne from Kiamari Island to seaward, so as to guide the whole force of the scour on to the bar; and the third by a breakwater extending from Manora Point.

This diversion of the Chinna Creek waters, including the bridge over the opening in the mole, the new channel for the tidal waters, and the closing up of Chinna Creek cost altogether 129,981*l.* The new native jetty, near the town, where goods are landed and shipped, cost 43,061*l.*, all exclusive of plant and establishment. The Kiamari groyne was commenced in November 1861, and completed in 1865, at a cost of 48,317*l.* The closing of Chinna Creek, 980 feet across, was completed in 1873.

The present west entrance channel began to deepen and open out about three years after the Kiamari groyne was finished, and a spit off Deep Water Point, on the opposite side, had been removed. The construction of the Manora breakwater was then commenced, in 1869, and completed on 22nd February, 1873, at a cost, exclusive of plant and establishment, of 69,489*l.*

This work is especially interesting as being the first that has been constructed in deep water, to break the force of the heavy seas raised by the south-west monsoon on the west coast of India. The breakwater runs in a S.S.E. direction from the southern extremity of Manora Point, and extends 1,500 feet from low water-mark. For the first 500 feet the water is shoal, and the bottom irregular, consisting of conglomerate rocks wholly or partially imbedded in sand, and having a depth of water upon them of 12 to 16 feet at low tides. For the remaining 1,000 feet the bottom is sand, resting on a bed of clay a few feet below the surface, and the depth at the outer end is 30 feet at low tides.

The mode of construction adopted was novel. It consisted of throwing a bank of rubble stone out of boats, until its top reached the level of 15 feet below low water. The surface of this bank having been levelled by divers, a superstructure was built upon it consisting of concrete blocks, each 12 feet long, 8 high, and 4½ wide, weighing 27 tons. They form a wall 24 feet high and 24 feet wide, the top being at about the level of high water-mark. These blocks were made on shore, in moulds, of suitable proportions of conglomerate and sand, mixed with one-eleventh of the total bulk of Portland cement, in Messent's patent concrete mixers. After being allowed a few weeks to harden, they were lifted by a specially designed hydraulic press on to the trucks, and conveyed to the breakwater. The trucks were then run under the "Titan," a strong framework of wrought iron, resting on eight wheels, which ran on rails on the finished part of the breakwater. The top of the "Titan" consists of a platform, the outer end of which projects 25 feet beyond the foremost wheels, so as to command that distance in advance of the finished work. This projecting platform carries a "traveller" and "crab," capable of moving forward and sideways, which lifted the blocks from the trucks, and lowered them into their places. The whole is worked by a six-horse power steam-engine placed at the landward end of the platform, to which additional stability was given by a tank capable of containing 40 tons of sea-water, to counterbalance the overhanging weight of the blocks and machinery. When a sufficient length, about three rows of blocks, was completed, the "Titan" was bodily advanced into a new position, to set another length.

The force to which the blocks are exposed by the weight of water falling upon them, when the sea breaks over the work, is enormous. A few of the harbour-side blocks (about 30 in all, out of 1,850) have been drawn out from this cause, but the damage has been confined to the part over the irregular foundation near the shore, and has been repaired at small cost. The work proved very successful as a shelter from the heavy seas on the bar, the depth (20 feet at low water) dredged during the previous fair season having been for the first time fully maintained during the south-west monsoon.

The total cost of the Karachi harbour works up to the end of the working season of 1873-74 has been about 450,000L., including establishment, and taking credit for value of plant and of land reclaimed. The works are nominally completed, though, as the results are developed, some additions will be required. They have effected considerable increase in the capacity of the harbour for shipping. The direct entrance has now permanently superseded the old circuitous channel, and its depth has increased every year. In 1868 it was 10 feet. In 1872 it was deepened to 17 feet before the monsoon, but it was shoaled by the action of the sea to 15½ feet. It was dredged in 1872-73 to 20 feet throughout, and that depth was fully maintained during the ensuing monsoon. Mr. Robertson reported favourably upon the works in June 1872, and was of opinion that when the works are complete the Government may be congratulated upon having an excellent harbour in Karachi, 500 miles from the nearest good harbour on either side, and out of the track of cyclones. During 1871-72 the number of vessels that arrived at Karachi was 1,021 (tonnage 129,508). New sailing directions, recognising the improvements, were issued under the authority of the master attendant in August 1873.

But besides Karachi there are at least eight ports on the west coast of India which are capable of being converted into first-class harbours; namely, Poshetra, Seria, Shalbet, Bombay, Jyghur, Viziadrug, Karwar, and Cochin.

The two first are in the Gulf of Kach. Captain Taylor, who surveyed the gulf, describes them as being sheltered from all winds, and capable of receiving the largest ship in the navy at any time of the tide. They are 300 miles to windward of Bombay in the south-west monsoon, when the cotton crops require carriage to Europe, but no use has hitherto been made of them. The third harbour, called Chuch Bunder, is on the south coast of Katiwar, about 30 miles east of Diu Head.

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It is formed by Shalbet Island, within which there is a perfectly sheltered harbour, with good holding ground in five or six fathoms. These excellent harbours were passed over by Mr. Robertson, who, however, visited the ports in the Gulf of Cambay, where the Malacca banks and the rushing tides render navigation very dangerous. He recommends that the mouths of the Narbada and Tapti should be surveyed, but thinks that nothing can be done to improve the approaches, either at Súrat or Broach. On the opposite side of the gulf, Bhonágir has almost extinguished the trade of Gogo, from which it is distant about 15 miles. The former port is a broad creek in which small vessels can lie without grounding during all tides, and can cross the bar at half tides. Kurbunder, the port of Dholera, a name well known in connection with the cotton trade, is a creek into which the tide rushes with great rapidity, but dry at low water; and Mr. Robertson pronounces it to be the most wretched looking place he ever saw. There is no prospect of these ports being improved; and, indeed, the railways into Katiwár, and from Ahmadabad to Bombay, will very much reduce their importance as places of export for cotton.

Bombay harbour is the best on the west coast, but it still wants suitable accommodation to enable ships to load and unload alongside wharves. The problem of sufficient dock accommodation for cleaning and repairing has, however, at length been solved by the erection of one of Mr. Clark's hydraulic lifts at Hog Island. The old docks at the Government yard, as well as the fine new dock at Mazagon for the Peninsular and Oriental steamers, have one fatal defect; they are on the foreshore of Bombay Island, which cannot be approached by large vessels except at spring tides. The requirements of the case were the means of frequently docking and undocking with rapidity, at any time of tide, and with everything on board, vessels of at least the dimensions of the Government transports, which are 381 feet long, with an extreme beam of 49 feet, a load draught of 21 feet, and 4,173 tonnage. Even the iron-clads, which on an even keel are brought down to 15 feet, can only enter the Government old docks at spring tides. These requirements have been provided by Clark's hydraulic lift dock, which has been set up at Hog Island, on the opposite side of Bombay harbour. The Bombay Government are fully sensible of the value of this work; for the use of which there might, in their opinion, be at any moment the greatest need. It was, however, only in operation for three months during the year 1872-73, when H.M.S. "Wolverine," the steamer "Sind," of the Bombay Marine, and the merchant steamers "Neera" and "Sir Bartle Frere" were docked upon it.

The number of vessels in 1872-73 that arrived in Bombay harbour was 3,043, and 1,839 vessels sailed.

South of Bombay there are four good ports. Jyghur affords facilities for a commercial port, accessible during the south-west monsoon; and Viziadrúg is an excellent harbour with similar advantages, and at a trifling expense it might be made a first-class harbour of refuge. Karwar is the port for North Canara, and for the cotton district of Dharwar. It is protected by a point of granite, under the shelter of which there is a safe anchorage during the south-west monsoon, and it is capable of considerable improvement. By throwing out a breakwater from Karwar Head for a mile and a half a perfectly quiet harbour might be formed, four square miles in area, with a depth varying from 14 to 32 feet. Mr. Abernethy, C.E., submitted plans for these works in 1860. Nothing, however, has been done beyond the construction of a landing place and wharves, of an iron screw pier, and of a lighthouse on the Oyster Rock.

Jyghur, Viziadrúg, and Karwar were not visited by Mr. Robertson, but he examined the more southern ports in 1871. He proposed some works at Mangalore, with the object of fixing the harbour mouth; but thought that nothing could be done at Cannanor and Calicut, and little at Bepur. He was, however, much struck with the advantages of Cochin, and its splendid backwater. The backwater is of great value as a tidal reservoir to keep the entrance clear, and renders it independent of flood waters for scouring purposes; and every foot of water gained in depth over Cochin bar is permanently retained, and kept almost unvarying by this splendid tidal reservoir. Until 1862 the only communication between the backwater and the sea was at Cochin, but in that year the sea burst through at a place called Cruz Milagre, a mile and a half to the northward, and the opening is now 720 feet wide, with a strong current. Yet the body of water in the backwater is so great, that the escape at this gap has only a trivial effect on the scour at Cochin. In order to improve Cochin harbour, Mr. Robertson's advice is to strengthen the current and confine it, so that it may be concentrated on the bar. With this object he would project long groynes on each side of the entrance, 3,000 and 2,300 feet long, which would

have the effect of keeping a depth of 20 to 21 feet, at low-water springs, in the approach to Cochin. He would also stop up the Cruz Milagre gap. In the backwater, the entrance to which would thus be made accessible, there is room for 50 ships of 700 tons, and any amount of area can be got by dredging. The rise and fall is so small that the backwater is practically a wet dock of greater area than all the docks in Great Britain put together. On either side of Cochin harbour, to the north and south, there are the very remarkable mud banks of Narakal and Alepy, which are most useful as natural harbours of refuge subsidiary to Cochin. No other harbour in the world has such adjuncts. Thus Cochin is admirably adapted to become the great western outlet for the trade of South India. In July 1873 the construction of a new groyne close to the mouth of Cochin Harbour was completed, and two other groynes were lengthened. They hold the coast well. Cruz Milagre gap has been closed by a sand-bag dam run directly across it.

Kolachul is a port on the Travancor coast, near Cape Comorin, which has never been properly surveyed by the authority of Government, but was practically discovered by the coffee planters in the adjacent hills. They found that large ships could sail between some outlying rocks, and ride at anchor to leeward of them in still water. The first ship called there in March 1871, and since that date two other ships have loaded at the port of Kolachul. The place was not visited by Mr. Robertson.

He, however, examined Tutikorin, in the Gulf of Manaar, the port for all the large trade of Tinnevely. Here vessels are obliged to lie two and a half miles from the shore, and the cargoes are brought out in boats carrying 20 tons. The harbour is well sheltered, but it only has a depth of eight feet; and when the railway extension reaches to Tutikorin, it should be completed across the harbour to Hare Island, when the terminus will be brought much nearer to the ships in the roadstead. There is a stretch of water, seven miles long by four and a half, a short distance from Tutikorin, and on the south side of the Rámnád Promontory, where stands the famous temple of Rámeswar. It is completely sheltered by reefs and islands, and has an average depth of from 20 to 30 feet; but the entrance between Musel and Muli Islands only has a depth of $2\frac{1}{2}$ fathoms, with a sandy bottom. If this entrance was dredged out, so as to admit large vessels, there would be a splendid harbour, infinitely superior to Tutikorin, for shipping the produce of South India. At present it is only occasionally used by coasting craft, and the shores are uninhabited. This harbour has been named Port Lorne.

The question of cutting a canal for large ships between India and Ceylon has recently been investigated with much care. The Rámnád Peninsula is separated from the Rámeswar Island by the Pamban Passage. Rámeswar Island is divided from that of Manaar by the shoals and rocks known as Adam's Bridge; and the whole line is so shallow, or so occupied by land, that a railroad could be made, without much difficulty, from India to Ceylon. But the problem was to construct a canal from the Gulf of Manar to Palk Strait, so as to save the distance round Ceylon. In 1822 Ensign (now Sir Arthur) Cotton proposed alternative schemes, and that for improving and deepening the Pamban Channel was selected. From that time the work has steadily progressed in the hands of the Madras sappers, with a gang of convicts. The passage now consists of two tortuous channels, the northern one, 4,232 feet long, through a sandstone reef, dry at low water, with a depth from 11 to 14 feet, and a navigable width of 80 feet; and the southern one 2,100 feet long, and 150 wide, through a sandbank which has been dredged out to a depth of 12 feet. Blasting and dredging operations were carried on during 1872-73, with a view to deepening the channel from 12 to 14 feet. It would be useless to make the channel deeper, because there is no greater depth in the approaches on either side. But the Pamban Channel has long been of use to the native craft, and to this extent it must be considered a great success, for 12 feet is sufficient for the local trade. The average number of vessels annually passing through the channel during the last 10 years is 2,100, with a tonnage amounting to 173,894.

If a canal for large ships is to be constructed, the line must be sought for elsewhere; either across the promontory of Ramnad, as urged by Sir James Elphinstone and Captain Taylor; or across the Island of Rámeswar, as proposed by Sir William Denison and Mr. Robertson. The site selected by Mr. Robertson is across Rámeswar Island. The southern entrance of the canal would be from a well-protected piece of anchorage nearly a mile long, with a depth from 29 to 26 feet. The surf breaks on the reef between Curesadi and Shingle Islands, leaving

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still water between them and the shore. The line of the canal, from this point, crosses the island, where it is one mile and one furlong in width, about a mile east of Pamban lighthouse. It traverses a sandy plain only 6 to 7 feet above high-water mark; but as the 30 foot line, on the north side, is at a distance of a mile and a quarter from the shore, a large amount of dredging will be necessary there. Mr. Robertson estimates the cost of this ship canal at 440,000*l.*; and he mentions that it will be the only point, from Calcutta to Karachi, where a large vessel will be able to land and discharge her cargo direct on to a quay, without the intervention of a cargo boat.

He preferred the Rameswar project to that of the Rámnád Promontory, because the cutting would be longer across the Rámnád Promontory; the level above the sea is higher, and there is probably much rock. The distance from the shore to deep water on the north side is also greater. On the other hand, it is more conveniently situated as regards railway communication, and represents a more complete and grander scheme; but he is in favour of the Rameswar plan, in preference to that of Rámnád, because it is more economical, and on the whole the cheapest satisfactory short cut to the eastern side of India. But Captain Taylor maintains that no practicable entrance to a ship canal can be found except by Port Lorne or Mutapeta; and that, therefore, the canal must take the line across Toritory Point, the east end of Rámnád. When a ship canal is made, the short cut will save a steamer 350 miles in the voyage from the Red Sea to Madras, and will bring Madras nearer to Bombay by about 370 miles.

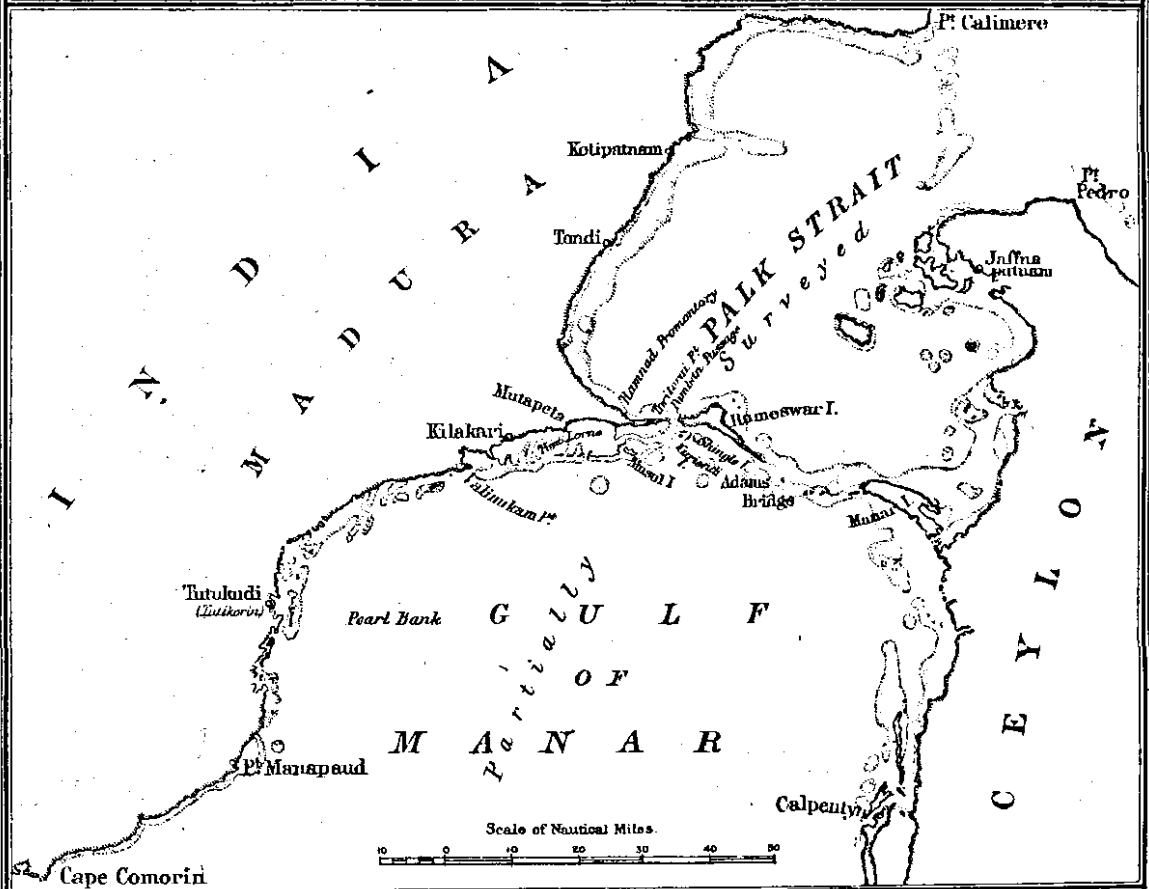
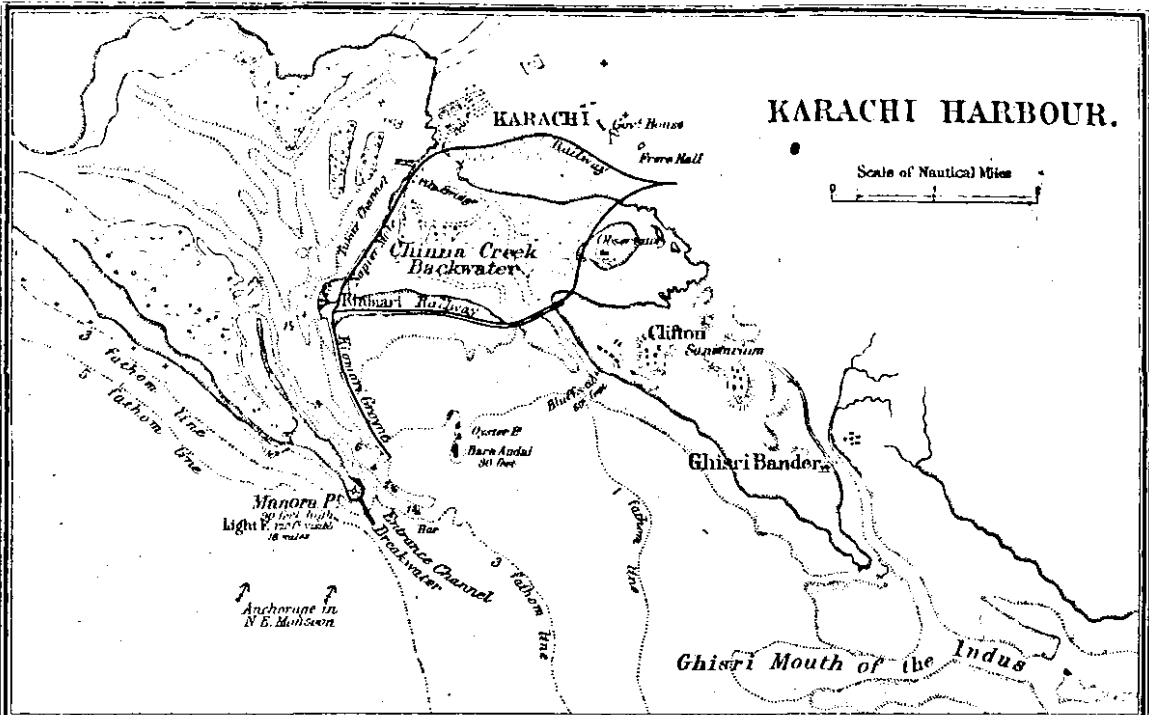
Mr. Robertson took an unfavourable view of the practicability of improving the harbour of Nágapatam, and reported that the gradual silting of Koringa Bay by mud brought down by the River Godávári could not be arrested. The improvement of the port of Madras, and of Blackwood's Harbour, also engaged his attention.

A Committee appointed in 1868 recommended a breakwater as the only practicable improvement for Madras Roads. Mr. Robertson concurs in preferring it to a closed harbour, but he says that it should be in at least seven fathoms, perfectly straight, and 2,000 yards long, and also that a screw-pile pier must be run out to the site of the works while under construction, with two lines of rails. His estimate of the cost is 1,311,000*l.*, and he thinks the breakwater could be completed in six years. In place of a breakwater, however, a close harbour has since been proposed by Mr. Parkes, who visited Madras in the autumn of 1873, and made a report to the local Government, who have recommended its adoption to the Government of India and Secretary of State. Two piers, constructed on the same principle as the Manora breakwater, would be run out, 1,000 yards apart, for a distance of 1,200 yards, where they would approach each other, leaving an entrance, and enclosing an area of nearly 250 acres. The cost is estimated at 565,000*l.* Mr. Parkes calculates that the saving on the cost of landing and shipping cargoes would be equal to the interest on the cost of the harbour.

About 55 miles north of Madras is Blackwood's Harbour, a sheet of water between the coast and Armegan shoal, which protects it from the heavy ground-swell. A breakwater on the shoal, three miles long, might easily be constructed, and would completely shelter a fine stretch of water.

The harbour for the province of Orissa, called False Point, at the mouth of the Mahánadi, is analogous, as regards position, to Koringa Bay at the mouth of the Godávári; but fortunately the action of the Mahánadi does good, while that of the Godávári is most mischievous. Point Reddie, which protects the anchorage at False Point, has increased more than two miles in length since the survey of 1835, and this increases the deep-water area and the shelter for boats. Mr. Robertson pronounces False Point to be the most sheltered anchorage on the east coast of India, and to be of incalculable value for the development of Orissa.

The Hugli involves a question of expenditure so enormous that there is little chance of its improvement being undertaken on an adequate scale. The river is so large, the floods in it so great, the nature of the bottom so soft, the quantity of silt brought down so immense, that any attempt at improving even a single shoal should only be undertaken when it becomes a matter of absolute necessity. The river is not one for experiments. Mr. Robertson was consulted respecting the removal of the Moyapur shoal. At present spurs have been thrown out from the river banks. He pronounces this measure to be a mistake, and dredging is out of the question as too expensive. The widening out of the river permits each of the scouring agents, flood and ebb, to take distinct courses, leaving a strip of river never fully acted upon. The way to improve Moyapur shoal is to confine the two scouring



From Saunders, India Office.

powers in one channel, so that there should be a coincidence in the curves of direction of the flood and ebb. Mr. Robertson would effect this by a longitudinal training wall nearly parallel to the left bank, and 1,100 yards from it, about 1,500 yards long, to train the young flood and the last of the ebb into the same channel, but the cost would be enormous. The traffic on the Hugli is very considerable and is increasing. In 1872-73, 1,118 sailing vessels and steamers (total tonnage, 992,211) arrived in the river, of which 342 were steamers and 161 native craft. Of the steamers, 91 came by the Suez Canal. There were 68 Government and 46 licensed pilots in active service, and during the year there were 77 cases of vessels grounding and 6 collisions. The gradual substitution of steam vessels for the brigs and pilot boats now doing the work of the port is in contemplation. Six sailing vessels and two steamers are registered as belonging to the port of Calcutta (tonnage, 6,050).

Chittagong was the easternmost port visited by Mr. Robertson. The port is 10 miles up the River Kurnofali, which enjoys the peculiarity of having no bar. The efforts of the waves to throw one up are counteracted by the strong flood and ebb coast currents sweeping up and down the estuary of the Meghna. Instead of a bar, the river at once falls into deep water, and the mouth is kept clear by the scour of the coast currents; but there is a shoal or flat at the entrance, and extending nearly three miles up, which is probably caused by deposits of silt in suspension in the river water. It is kept to a depth of 10 or 11 feet by the action of the scour in and out, and the depth might be increased by raking. Mr. Robertson considers Chittagong to be one of the best ports in India.

The Bengal Government employed three sea-going steamers during 1871-72; the "Undaunted" at the Andaman Islands; the "Celerity," unsafe in any sea, and fit only for calm weather; the "Nemesis," employed in British Burma, and a sailing ship called the "Czarewitch." There are also 8 Government river steamers, 4 pilot vessels, besides 5 light vessels.

The Bombay Marine consists of the "Comet," on the Tigris; the "Amber-Witch," employed in connection with the Indo-European Telegraph Department; the gunboat "Clyde," dismantled;* the gunboat "Hugh Rose," under the orders of the Political Resident in the Persian Gulf; the steamer "Quantung," under the orders of the Political Resident at Aden; and the "May Frere," and "Dalhousie," despatch boats, the only two vessels available for employment wherever required. The two turret ships, "Mágdala" and "Abyssinia," for the defence of Bombay Harbour, are in every respect efficient for service. The "Constance" schooner is employed surveying in the Persian Gulf.

The lighting of the coasts of India is not perfect, is not even in so complete and satisfactory a state as the lighting of the coast of Spain, or that of Greece; but a good deal has been done, and on the coast of British Burma the system of lighting is admirable. At Bombay the long spit, called the Prongs, running out from Kolába, has bristled with wrecks, owing to the lighthouse being built, not at the extreme end of the danger, but far within it, on Kolába Island. Now a new lighthouse has been erected at great expense, but in the wrong place, so that the evil is as great as ever. It is not at the extreme end of the danger, but half way between that point and the old site on Kolába Island. The masonry works are completed. It may be added, that there is one on Manora Point, 40 feet high, lighted in 1848, for Karáchi. It is, however, very inefficient, and a new light-house is urgently needed for Karáchi harbour. The Rao of Kach has established a lighthouse at Mandavi, the lantern, a fixed dioptric lens apparatus, being fixed on a tower 127 feet high. There are six lights in the Gulf of Cambay. Besides the Prongs Lighthouse, the entrance to Bombay Harbour is shown by two light vessels, a light on Dolphin Rock, and, on the south side, the lighthouse on Kundari Island. This is an octagonal tower 75 feet high, with a dioptric light of the first order, 161 feet above the sea. It was first lighted in 1867. A lighthouse has been constructed on a projecting headland to the south of Jaitapur on the Ratnágiri coast. One was finished at Karwar, on the Oyster Rock, in 1864. The latter is a circular tower, 45 feet high, with the light 205 feet above the sea. Lights are also much needed at Dwarka Point, on Diu Head, at Shalbet Island, and at Viziadrúg. Along the shores of the Madras Presidency there are 19 lighthouses, besides the fine tower, 90 feet high, with dioptric light of the second order, built by Mr. Crawford, at Alepy. Another is much wanted at the Crocodile Rock, 17 miles to the west of Cape Comorin. It has now been resolved to erect a column on high land near the Cape, and to exhibit thereon a first class revolving light, as

* The "Clyde" is to be employed as one of the squadron for marine surveying.

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well as a first class light on Cadiapatam Point, to warn ships off the Crocodile Rock. A new lighthouse 82 feet high, with a white fixed light, has been erected on Hare Island, for Tutikorin, and was first lighted on April 13th, 1874. There is a light in good order at Pamban, and there ought to be another on Point Calimere. At Negapatam there is a fixed white light, two French lights at Karikal and Pondicherry, a flashing catadioptric light on the north esplanade at Madras, a red fixed light at Pulicat, and a white one at Armaghon, a white light (to be converted to a red one) at Point Divi, and a white light on Masulipatam. On Hope Island, at the mouth of the Godávári, a new tower is being built five miles north-east of the old one, in consequence of the silting of Koringa Bay. At Coconada there is a fixed harbour light, and two white fixed lights to the north, one on a hill 150 feet high, and three-quarters of a mile from the sea, at Santapillay, and another at Gopalpur. On the Bengal coast there is a light at False Point, and a tower 82 feet high on Ságar Island, at the mouth of the Hugli, made of iron, with a copper roof. The lighthouses on the Burmese coast are mainly due to the skill and energy of Colonel Fraser. The Alguada reef lighthouse, at the mouth of the Bassein River, 160 feet high, with a dioptric light of the first order, was commenced in 1859, and completed in 1865. The others, to guide ships to Rangún, are the Cocos, Double Island, Krishna Shoal, China Buckir, and Eastern Grove lights.

The great ocean and coasting trade of India renders the provision of accurate charts on adequate scales of the coasts and anchorages, a very important part of the duty of the Government. But since the abolition of the Indian Navy, nothing has been done, except a survey of the mouths of rivers in Orissa and at Chittagong, and no proper arrangement has been made for the execution of much-needed marine surveys. New surveys are urgently required of the Tenascriim coasts, of the coasts between Calicut and Bepur, from Santopillay to Point Palmyra, from Nizampatam to Cocanada, and of various shoals on the Coromandel coast. A survey is also much needed of the new port of Colachul, and another of Palk Strait and the Gulf of Manaar; and there should be a periodical examination of the river mouths of Mangalor and Cochin, and of the mud banks off Narakal and Alepy. Mr. Robertson has pointed out the need for surveys of the mouths of the Narbada and Tapti, and several others are much wanted. The adoption of effective measures for securing the due execution and continued revision of marine surveys and charts on a systematic imperial plan, is a question which yearly becomes more urgent. In a despatch, dated March 30th 1871, the subject of marine surveys was brought to notice by the Secretary of State as one of very great importance, and as deserving of early and serious attention; and in December 1873 Captain Taylor, of the late Indian Navy, who surveyed most of the west coast of India, proceeded to Calcutta to advise the Government on the subject. The best means of restoring this branch of the service to efficiency had received the careful attention of the Government of India, in communication with Captain Taylor; and the measures that have been adopted with this end will be announced in the Report for 1873-74.

Efficient organisation is needed to execute surveys of localities not yet sufficiently surveyed; to work up the results of these surveys, and of other existing surveys, the materials of which have never been fully utilised; and to maintain the accuracy of the charts by recording and bringing to notice all changes of buoys and lights, and of the configuration of the coast consequent on the continuous action of natural causes. At present the charts are extremely inaccurate, and there is not even a correct list of the lights in the Bay of Bengal. The most urgent work to commence with is a survey of the coast from Point Palmyras to Bimlipatam, and the sea face of the Sunderbuns, with the mouths of the Ganges and Brahmaputra.

The urgency of thoroughly surveying the coasts of India is mainly caused by the increasing littoral traffic. Former surveys, which were sufficient when ships of large draught merely frequented the principal ports, are quite inadequate now that other ports are being opened for the export of produce, year by year, and that a line of powerful steamers runs round the whole coast of India, touching at every port where the traffic gives the smallest inducement. This Section on the communications of India would indeed be very incomplete without some notice of the enterprising company which has done so much to complete them, and to develop the latent commerce between the ports of India.

Eighteen years ago there were, upon the eastern side of India, no steamers but those of the Peninsular and Oriental Company performing the overland mail service, a few Government transports, and occasional steamers employed in the opium trade. On the western side the Peninsular and Oriental Company had the mail services to Suez and China. The home trade was divided between native vessels which put to

sea only in fine weather, and square-rigged ships, carrying native crews and officered by Europeans. The first operations of the British India Steam Navigation Company date from 1857, when two small steamers of 600 tons commenced a semi-monthly service between Calcutta and the ports of British Burma, under contract with the Government of India. In 1858 a third steamer was added. But it was not until 1862 that the present scheme, embracing the whole coasting service of India, was matured. In that year the Company undertook to run a fortnightly mail service between Calcutta, Akyab, Rangún, and Mulmein; a monthly service to Singapore; a monthly service between Rangún and the Andaman Islands; a fortnightly service between Bombay and Karáchi; a service to the Persian Gulf once in every six weeks; and a monthly service between Madras and Rangún. Hitherto the ports of India had been considered to be unapproachable during the stormy monsoons, but the Company had undertaken to maintain regular communication with them at all seasons of the years. By the end of 1863 the Company had 17 steamers afloat, and 4 more building; and in 1864 it was found that the regularity of the services had created wants previously unknown, and that the monthly coasting line between Calcutta and Bombay must be converted into a fortnightly one. These extensions were provided for by the Company steadily adding to its fleet, and increasing the capacity of the new steamers. They are ventilated by the most approved methods, and provided with all new improvements, especially with surface condensers. In November 1869 the opening of the Suez Canal produced a revolution in the shipping trade of India; and this Company's steamer 'India,' with cargo from Calcutta, was the first steamer to arrive in London, with an Indian cargo, through the Suez Canal. In 1872 the Company arranged to extend its operations to the East Coast of Africa; and a service every four weeks was commenced between Aden and Zanzibar, which has since been regularly maintained. This service will have the effect of gradually opening up the trade between East Africa and India. Many natives of India are already settled at the ports on the Eastern African coast, and trade is increasing. The British India Steam Navigation Company now possesses a fleet of over 40 steamers, with an aggregate tonnage of about 52,000 tons. The mileage annually to be traversed, under its contracts with the Government, exceeds 1,100,000 miles, and it employs in the service of its fleet over 500 European officers and engineers, and more than 5,000 natives.

The Madras Administration Report is the only one which furnishes detailed information respecting disasters at sea. In the cyclone of May 1872 there were 7 ships, 11 barques, 3 brigs, 1 sloop, 1 schooner, and 5 dhoneys driven on shore at Madras; the extreme character of the disaster being attributed to the ships in the roads not having been warned in time to slip their cables and run out to sea. There were 19 lives lost. Besides the wrecks caused by the Madras cyclone, 23 others were reported, on the coast of the Madras Presidency during the year 1872-73.

A wreck chart and a statement of wrecks and casualties has been received, showing that during the year 1873 twenty-one wrecks and the same number of casualties occurred on the coasts of British India and Ceylon. Probably this does not include all the native craft, of which more are lost than of any other class of vessel. The largest number of casualties occurred in the Rangún River and its approaches. A good number also occurred on the Madras coast, where there is a great increase of trade, and where the frequent visits paid by vessels of the British India Steam Navigation Company to places but little known has made a survey of the coast from 17° 50' N. to False Point a crying want.

The electric telegraph is now in working order along every line of railway, and connects every important place in India. But no general report of its operations has been received since 1870-71. No figures have been supplied to the Bengal Government, nor to that of Oudh, nor is there any information in the Administration Reports of the North-West Provinces, Central Provinces, or Mysore. In the Punjab the number of electric telegraphs messages during the year was 49,201 of which 33,706 were private. In the Bombay Presidency there were 161,123 private and 9,482 official messages; the whole value being about 45,000*l*. It is stated differently in the body of the Report and in the Tables in the Appendix.

India has now three lines of telegraph whereby to communicate with England, and for a short time even had a fourth, by China and the Great Northern Company's line, which, however, is now interrupted. There are alternative lines of telegraph from England to India, through Turkey and Persia. The first leaves the European system at Constantinople, and, traversing Asia Minor, passes through Mosul to Baghdad. This section was constructed by the Turkish Government in the year

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1863. In 1864 a line, on iron standards, was erected by the Indian Government, from Baghdad to Fão, at the head of the Persian Gulf, which was subsequently transferred to the officials of the Porte. From Fão a single submarine cable was laid to Karáchi, in the spring of 1864, repeating stations being established at Bushire, Ras Mussendom, on the north-east extremity of Arabia, and Gwadur in Baluchistan. A land line had previously been erected along the coast from Gwadur to Karáchi by the Government of India, to ensure communication in case of interruption to that section of the cable which might be endangered by the gales that rage on that part of the coast during the south-west monsoon.

The wire from Baghdad to Fão, passing through a country where the Turks have little or no authority, was considered to be the most unsafe portion of the line; and in 1863 a line was constructed by British officers to supplement it, at the expense of the Persian Government, from the cable station at Bushire to Tehran, and thence to Baghdad.

This complete system of telegraphic communication between Europe and India was planned and carried out by the late Lieutenant-Colonel Patrick Stewart, of the Bengal Engineers, on the failure, a few days after completion, of the cable laid from Suez to Bombay in 1859, capital for which had been raised by a company on a 25 years' guarantee from the Government of India. Colonel Stewart did not, however, live to see the successful result of his labours. He died at Constantinople in January 1865, from the effects of exposure and over-exertion, a very short time before the lines were formally opened.

The main line above described remained the principal means of telegraphic communication with India until the spring of 1870. During the interval, the Turkish Government, having refused to allow British officers any share in the management of their lines, permitted them to fall into disrepair. The greatest abuses were allowed in their office management, and, although the cable from Fão to India continued to work well, delays and errors were the rule on the Turkish section. This evil was partially mitigated by an extension of the Russian Government lines from Tifis to the Persian frontier, and thence by the Persian Government to Tehran. The new line, however, did not work much better than the Turkish; though the section from Tehran to Bushire was kept in good order by the exertions of the officers and men of the Royal Engineers, who were in charge of it.

In the spring of 1870 a new era dawned on the history of Eastern telegraphy. Almost simultaneously with the successful laying of the Red Sea cable, the Indo-European Telegraph Company's line was opened to Tehran. The submarine cable between Suez and Bombay was opened on the 6th of March 1870. The line of the Indo-European Telegraph Company is carried from Tehran to London by way of Tabriz, Tifis, Kertch, Warsaw, Berlin, and Nordeney, and is constructed in the most solid manner. The Anglo-Persian line, from Tehran to Bushire, had previously been much improved, and a second wire erected. An alternative cable had also been laid from Bushire to Cape Jask, whence it was continued by land wire to Gwadur. The Turkish Government was stimulated by this competition to improve their telegraphs, but they have not hitherto succeeded in attracting more than 10 per cent. of the traffic, although they carry messages at lower rates.

By these three routes the English and Indian public enjoy facilities for the transmission of intelligence, which leave nothing to be desired on the score of rapidity and correctness. On financial grounds, however, none of the lines can be considered successful.

Up to the date of the completion of the Red Sea cable in 1870, the Government lines in the Persian Gulf earned not only enough to clear their own working expenses and to leave a small surplus, but also to support the heavy charges of maintenance of the lines through Persia, to which the Government of that country contributes little or nothing. Since 1870 the lines from Suez to Bombay pay only 8 per cent. on a capital of 1,200,000*l.*, a per centage which does not exceed the yearly depreciation in the value of the cables. The Indo-European Company, with a capital of 450,000*l.*, has not hitherto earned enough to pay its working expenses, after deducting the heavy tax payable on each message to the foreign Governments through whose dominions its wires are carried. It must, however, be added that it is not worked up to a tenth of its powers of transmission.

The Indian Government, since 1862, has expended upwards of 1,150,000*l.* on telegraphic communication with Europe, in addition to 18,000*l.* a year, being half the guarantee on the original Red Sea cable; but since 1868 it has obtained no immediate return for this large outlay. The tariffs have been revised twice. The charge for a single message of 20 words, originally fixed at 5*l.*, was at one time lowered to

2*l.* 18*s.*; and again raised to 4*l.* 10*s.* without any successful result from a financial point of view. The rate of 4*l.* 10*s.* lasted but a very short time. The charge fixed at the conference at Rome in 1873 was 4*l.* for 20 words; and in November 1873, it was fixed at 2*l.* for 10 words, with 4*s.* for every word beyond 10.

The cable from Madras to Penang and Singapore was opened on the 4th of January 1871, and from Singapore to Hong Kong on the 10th of June, 1871. The Australian cable to Madras was opened on the 21st of October, 1872; and during 1872-73 there were 37,809; to and from Madras, to the far east.

The Post Office returns are one means of judging of the results of improved means of communication; and complete returns, giving a general review of the correspondence throughout British India, would be very instructive. In Bengal as many as 21,277,749 letters and newspapers passed through the Post Office during the year under review, the increase being 4·8 per cent. over the previous year. In the North-West Provinces and the Punjab there was also a large increase in the private correspondence. The total number of letters was 14,797,338. In the Punjab the number of letters was 10,135,521, and of newspapers 1,000,693; against 9,486,305 and 850,523 in 1871-72. There were 526 post-offices, 273 letter-boxes, and 587 rural letter-carriers in the Punjab. In Oudh the increase of correspondence and newspapers was equally marked; but for the Central Provinces and Madras no information is given. In the Bombay Presidency the number of letters during 1872-73 was 15,873,064, and of newspapers 1,472,259. There were 447 post-offices. In Mysore the number of letters was 1,007,398, and of newspapers 14,126. Thus the number of letters which passed through the post-office in Bengal, the North-east Provinces, Oudh, the Punjab, Mysore, and Bombay, was 53,606,492, and newspapers 5,495,788. The whole yearly correspondence of India probably reaches nearly 65,000,000 letters; and the transmission of newspapers to 6,500,000; while the work of all the post-offices is annually increasing.

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THE Forest Departments in most provinces of India have not been in existence for more than 16 years, and much will have to be done, many difficulties and obstructions must be removed, before they will be in thoroughly effective working order. The importance of their work is, however, beginning to be understood, and when the forest revenues largely increase, the value of conservancy will be recognised even by the numerous class which looks upon any thought for future generations as a waste of time and money.

Forest conservancy effects many objects, among which the natural influence of trees on the drainage of a country is probably of most importance. Though every grove and clump in the dry tracts is a blessing, the value of which cannot be too highly estimated, yet Dr. Brandis, and other officers of great experience, are doubtful whether there is sufficient evidence to show that a material deterioration of climate has been the result of denudation in any part of India, or that the preservation and extension of forests will increase the rainfall. But there is one obvious consequence of the destruction of forests which does not admit of doubt. Where the mountains are bare, the rain rushes down in torrents, giving rise to sudden and destructive floods at the outlets on the plains, and to most injurious freshes in the irrigating rivers; and the supply is uncertain and capricious during the dry season. The same rapid surface drainage destroys roads and bridges, and does other injury, both in the hill tracts and on the plains. On the other hand, where the forests are preserved, the superficial drainage is gradual, the springs are better supplied, and the dry weather discharge is gradual; so that the water is husbanded, either to supply tanks and lakes, or to ensure regularity and safety to great irrigation works in the plains. These are the indirect, though most important, objects of forest conservancy.

The direct objects are, first, to meet a rapidly increasing demand throughout India for enormous supplies of timber and fuel. The cultivators, as their condition improves, require to exchange miserable huts for better built houses and better furniture. There is an immense demand for railway sleepers, for fuel for steamers and railways, and for timber and fuel for large towns. The interests of trade, which have a direct bearing on the prosperity of the people; also require consideration, in order to meet the demand for teak, sandal wood, catechu, lac, caoutchouc, and other forest products. The rapid increase in the magnitude of these demands is strikingly shown by the effect it has had on the export timber trade in some parts of India. The export of timber in North Kanara was formerly all to seaward; but now there is a great demand in the inland provinces, and a brisk trade in timber and bamboos with the Southern Maratha country. In the *dangs*, or forest tracts along the foot of the Khandesh gháts, a similar change in the direction of the traffic has taken place. Unless the small extent of remaining available forest is very carefully managed, there will be great difficulty in meeting the demands for timber, bamboo, and fuel, which are increasing everywhere, and extensive plantations, as well as careful management of existing trees, are necessary.

The urgency of adopting measures for forest conservancy in India has been very gradually perceived. In 1846 a department was organised in the Bombay Presidency, under Dr. Gibson, mainly with a view to ensuring supplies of timber for the dockyard. In the following year the question of forest conservancy was first raised in the Madras Presidency. General Fred Cotton, in 1847, pressed the necessity for taking some steps to preserve the forests on the attention of the Madras Government. They were, at that time, being rapidly denuded of timber by the Malabar merchants, who supplied the Bombay market. These men, having access to the neighbouring private forests of Cochin, and of the Kolungode Numbidy, had the free run of the Anamallay hills, which were then almost unexplored. General Cotton was executive engineer in Malabar, and he asked for Lieut. (now Colonel) Michael as his assistant, who commenced exploring, conserving, and working the Government forests. In 1848, the Kolungode Numbidy was induced to lease his forest for 16 years—a lease which has since been renewed in perpetuity. At the same time all the minor leases were bought from the Malabar timber merchants; so that, the door being once shut, conservancy and systematic working of the forests became practicable. Between 1848 and 1853 such results were attained as to be appreciated by the Government of Madras. In 1853, General Cotton withdrew from the superintendence.

and Colonel Michael, as forest officer, was placed under the collectors of Malabar and Coimbatore. On March 29, 1854, the Court of Directors sent out a despatch in the Financial Department fully recognising the success of the work; but in 1855, seven years' service in forest pioneering told upon Colonel Michael, and he was obliged to give up the appointment. By that time the importance of forest conservancy had become apparent; and Dr. Cleghorn succeeded Colonel Michael, and became Conservator of Forests in the Madras Presidency. Dr. Brandis arrived in British Burma in the same year. Dr. Cleghorn not only continued the work of Colonel Michael in Madras, but also laid the foundation of forest administration in the Punjab, and was subsequently associated with Dr. Brandis in organising the Forest Department in the Bengal Presidency. His great scientific acquirements were combined with judgment and tact, through which he succeeded in extending the operations of the Department in the Madras Presidency over 20 forest ranges before his final retirement in 1867. In 1864 Dr. Brandis was appointed Inspector-General of Forests to the Government of India.

It has been found necessary to retain as many important forest tracts as possible in the hands of the State for exclusive management, as it is impossible to control the forests efficiently when in private hands, and the Government forests offer the only means of training an experienced body of foresters with practical knowledge. In some provinces the establishment of the absolute right of the State in forests has been easy, owing to local causes, and this has especially been the case in Sind and the Central Provinces. In others, much tact and conciliatory treatment of the people has been required to secure a gradual adjustment of rights, and to save at least a portion of the forest tracts from destruction. Many are still burdened with heavy rights of pasturage and other prescriptive demands. The reserved forests are under the exclusive management of the department.

But the largest portion of the forest area is still unreserved, and the people retain rights of pasturage, of destructive burning, of desultory cultivation, which is equally destructive, and of collecting products. These unreserved forests are generally under local district officers; and, when well managed, they yield a good revenue available for roads and other public improvements.

Thus the forests under the control of Government are divided into three main divisions, reserved forests, unreserved forests, and plantations. The forests reported to have been reserved and secured to the State, cover 6,200,000 acres, as compared with 6,000,000 acres in Prussia, 2,500,000 in France, and 112,000, comprising the Crown forests in England. Much time must elapse before the Forest Department in India can reach a really prosperous condition as regards financial results.

The great mass of the forests, owing to past neglect, is in a poor and exhausted state; and large sums must for a long time be annually spent on surveys, demarcation, boundaries, roads, and plantations. The total revenue of Indian forests in 1872-73 was 477,167*l.*; and the expenditure was 294,686*l.* The surplus amounted to 182,480*l.* against a surplus of 108,398*l.* in 1871-72. The objects of forest conservancy are not those of an opium monopoly or a salt tax. They are to protect the land from destructive floods, to ensure supplies of timber and fuel for the use of posterity as well as of the present generation, and to increase the well-being of the people. The surplus is a satisfactory incident in the management of forests, and it is a sign of that management being good and efficient, but an immediate revenue is not the object in forest conservancy.

The existence of forests, and their character, mainly depends on climatic conditions of temperature and rainfall. In the arid tract of Sind and the Punjab, forests of babúl (*Acacia Arabica*) line the Indus at various points, which in Middle and Upper Sind are mixed with tamarisk and the Euphrates poplar, while *jhund* or *kundi* (*Prosopis spicigera*), an acacia-like tree, *Salvadora*, and an arborescent leafless caper (*Capparis aphylla*), occupy vast tracts in rear of the bebúl forests. The dry belt of the Punjab has woods, on the high land between the rivers, called *rakhs*, also composed mainly of *Prosopis*, *Capparis*, and *Salvadora*. The woodlands of a portion of Rájputána are mainly composed of a beautiful tree, with small leaves and drooping branches, a species of *Anogeissus*; and the southern dry belt, in Mysore, is the region of sandalwood. Outside the dry zones, the teak extends over the peninsula to the northern slopes of the Vindhya Hills, while the sal (*Shorea robusta*), the most important timber tree of India next to teak, forms extensive forests along the foot of the Himalayas in the eastern part of the Central Provinces, the Rewah territory, and the adjoining districts of Bengal. Luxuriant evergreen vegetation is only met with in the two moist belts, the first extending along the Himalayan range to Burma

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and Tenasserim, the second along the western coast, and thence to the summit of the ghats. From the Himalaya come the supplies of pine and other coniferous trees. The deodar has its eastern limit in Kamaun, but it is succeeded by other coniferous trees, one of which, the *Pinus Khasiana*, extends into Burma. The *Ficus elastica*, yielding caoutchouc, is found along the foot of the Himalaya from Sikkin to Asam, and more sparingly at the foot of the Khasia and Cachar hills. In Burma there are extensive forests of *Pinus Khasiana* on the high mountains; famous teak forests between the Salween and Sitang, and magnificent evergreen forest vegetation in the moister valleys, where trees grow to a height of 200 feet. The western gháts are the region of teak and blackwood trees, of poon spars, and of other trees, such as angelly (an *Artocarpus*), vengay, and irul, yielding excellent timber.

Forest conservancy has had to struggle against numerous difficulties arising from the immemorial practices of the natives, as well as from natural causes. The two worst of these obstacles to progress are jungle fires, and the clearing and burning the jungle for cultivation. In the spring the leaves and grass of the deciduous forests dry up, and everything becomes inflammable. The smallest spark is sufficient to create a conflagration, and fires are intentionally made every year either for cultivation or to cause fresh tender shoots of grass to spring up as fodder for cattle.

The thriftless system of jungle cultivation is most destructive. It is called *kumari* in Mysore and Kanara, *jhúm* in Bengal, *kil* in the Himalaya, *dhya* in Central India, and *loungya* in Burma. A patch of forest is cut down and burnt, and a crop is raised in the open space, no ploughing or digging being necessary. In the following year the field is abandoned, and another patch of forest undergoes the same wasteful and lazy process. The damage done by these fires is incalculable. Millions of seeds and seedlings are destroyed, the bark of the trees is scorched, the wood is exposed to the air, and the trees become hollow and useless for timber. Thus a large proportion of trees in Indian forests are unsound, mainly owing to these fires. Steps have been taken to prevent them by isolating the tracts to be protected, and in the Central Provinces the active exertions of Colonel Pearson have achieved the exclusion of fire from the valuable Bori Forest, in the Satpúra range, for the last eight years. But much damage is still done by forest fires in most parts of India, though Dr. Cleghorn obtained the prohibition of *kumari* cultivation in Mysore and part of the Madras Presidency.

Another difficulty of the Indian forester is to clear the valuable timber trees of huge creepers, which stretch over them, and completely smother the crowns of the trees with their foliage. The creepers eventually enclose the trees with a network of branches, destroy their growth, and finally kill them.

The only legislation for the management and preservation of Government forests is comprised in Act VII. of 1865, passed by the Governor-General in Council. By this Act forest tracts may be rendered subject to the provisions of the Act by Government notification, provided that no existing rights are affected; and the local governments are empowered to make rules, applicable to such tracts, for the preservation of trees by prohibiting girdling, lopping, or felling, the kindling of fires, the collection of products, and the grazing of cattle. Rules may also be made for the regulation of the use of streams within the forests, for the safe custody of timber, and for levy of dues and infliction of penalties. Forest rules, under the provisions of Act VII., have been drawn up for Mysore, Curg, the Central Provinces, Berár, Oudh, and Burma. There are also local rules for Assam and the Chittagong forests, and for the Hazáribagh district, but these forests are administered by the civil officers, who have forest officers placed under them for carrying on the executive work. Forest affairs are not yet sufficiently advanced in Bengal for any codified form of rules. In the Punjab there are rules for the Hazára, Ráwl Pindi, Kangra, and Chamba forests, and for the regulation of waif and drift timber on the rivers. In the North-West Provinces there are rules for the Kamaun and Garhwal forests. The Act does not apply to Madras or Bombay, and the Madras Government has always declined to legislate on the subject, but Bombay has prepared a draft Forest Act of its own, which is under consideration. A more complete draft of an Act was drawn up in 1871 for the management and preservation of forests in India, but there is no prospect of its receiving sanction at present.

Meanwhile the main principles of forest conservancy are the definition and demarcation of reserved forests, the prevention of jungle fires, the exclusion of cattle, the opening of roads, and the cutting and clearing away of creepers and grass round the young trees.

In Bengal the principal forest tracts are in Kuch Bahar, Bhutan, Assam, Cachar,

Silhet, Chota Nagpur, Chittagong, and the Sunderbuns. In Sikkim, on the Himalayan range, at 6,000 to 8,000 feet, the chesnut, oak, walnut, cherry, and magnolia abound; while along the Tista Valley, and in the Terai, at 3,000 feet, there are forests of *sal* and *sissu*, and in Bhutan, the *sissu* occupies half the area of the forests. In Assam it is intended that the Forest Department shall eventually have the management of the reserved forests only, the open forests being under civil officers. Orders were issued to demarcate the Kamrúp, Duars, the Nambur, and Dhunsiri, and Naugong forests, which are to be made into forest reserves; and much progress has been made by the Department in Assam, in selecting, demarcating, and mapping reserves, care being taken not to trench upon the rights of surrounding villages. Seven reserves, containing 214½ square miles, have been formed. In Kuch Behar the forests had been marked off on the revenue maps, and placed under the Department; but in June 1872 they were declared to be open, except as regards certain kinds of trees. The forests of the Sikkim Terai, which were declared to be reserved in 1866, are also to be thrown open. The Sunderbuns are forest-covered mud banks, permeated by channels and lagoons, lying between the Bay of Bengal and the cultivated land of the Ganges Delta. Here are 3,108 square miles of dense and impenetrable forest, with an undergrowth, 6 to 12 feet high, of *goran* (*Cerriops Roxburghiana*), mixed with seedlings and saplings of larger trees. Above there is growth of mature trees of no great size, interwoven with heavy creepers. These forests are said to reproduce themselves in from 12 to 15 years. The best timber is the *sundri* (*Heritiera littoralis*); and it is calculated that one-twentieth of the forest area would yield 700,000 tons of firewood and small timber a year. The jungles of Chittagong are extremely dense, and, owing to unrestricted felling and jím cultivation there is no large supply of big trees near the rivers. A scheme for raising revenue from the Sunderbun forests, through a preventive establishment, was rejected as entailing harassing annoyance on the people; but it is in contemplation to close the Chittagong forests on certain rivers, periodically, and so to work them in some sort of rough rotation.

One of the most important products of the Assam forests is caoutchouc, obtained from the *Ficus elastica*, and there have been three proposals with respect to the conservancy and working of the trees. One is that Government shall annually sell the right to collect india-rubber; the second, that the india-rubber should all be purchased by Government; and the third, that Government officers should manage the forests. But much of the rubber is brought in from forests, by wild and half-subjugated tribes, and still more by tribes that are under no subjection at all; so that conservancy is impossible, and a Government monopoly very difficult. Only two courses seem possible, either to allow speculators to make their own bargains with the hill men as they liked, or to enforce an effectual Government control. Sir George Campbell considers the latter course to be the right one. The exports of caoutchouc, which amounted to 21,000 maunds in 1871-72, was only 11,000 in 1872-73; the falling off being due to the closing of the Luckimpur forests, with a view to preventing frontier complications. Another valuable tree in Assam, from its supporting the *moonga* silkworm, is the *soom* (*Michilus odoratissimus*). There are calculated to be 300 square miles of *soom* forest; and the out-turn of silk is 101,940 lbs., employing 43,800 persons.

In Bengal the receipts from the sale of timber and other sources were 14,985*l.*, and the expenditure 9,961*l.*, leaving a surplus of 5,024*l.*

Excepting in Jhansi, the forests of the North-West Provinces are within or at the foot of the Himalayas. In Kamaun and Garhwal the characteristic trees at 3,000 to 8,000 feet are the chil (*Pinus excelsa*), the chir (*Pinus longifolia*), but very little deodar. Below lie the great sal and bamboo forests, which have been much worked, millions of bamboos being annually exported down the Ganges. But there is still a fair amount of native timber near the Kosi and Kamganga rivers. The demarcation of these great sal forests was completed, some years ago, by Colonel Ramsay, then Commissioner of Kamaun. This demarcation went hand in hand with the clearing and settlement of the Bhabar, a tract the nature of which has been explained in the section on irrigation. The scattered population was easily induced to leave the forests and settle in the irrigated region below. A broad road was then constructed from the Ganges to the Sarda, for 160 miles, as a boundary to the forest, above which all cultivation was interdicted. The result of these measures has been that the forests are rapidly recruiting themselves, while the Bhabar tracts shows many thousands of acres of rich cultivation.

North of the Delira Valley, near the sources of the Tonse and the Bhagirathi, lie

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the deodar forests of Gangotri and Jaunsar. The Tonse deodar forests are now demarcated, the people being compensated by grants of certain portions for their sole use. A valuation survey has been made of most of the principal deodar forests in Jaunsar; and demarcation work is being carried on in the Rhanikhet forests. In the Dehra Dún 17 miles of boundary line have been marked out; and 8 square miles were cleared of sleepers. The Bhagirathi deodar forests have been leased from the Tiri Rajah. In Gorakhpur *sal* is the characteristic tree, mixed with *terminalia* and *acacia*, but there is very little timber left, the forests being mere coppices and utterly exhausted. In Dehra the forests have been felled and re-felled until they are quite worn out, this having been the chief source whence the Upper Doab has drawn its supplies of timber for centuries. In Jhansi, too, the forests contain mere scrub. But in Gorakhpur and Jhansi the Government forests have been clearly defined by the settlement survey, and progress has been made in the Dehra Dún. The deodar forests in the North-West Provinces are the main source of supply for sleepers for the Rájputána State Railway, from Delhi to Agra and the Sambhar lake, a distance of 400 miles, requiring 800,000 sleepers. Much timber has been felled, many sleepers delivered, and others sawn in the Tonse forests, ready to be floated down. The cost of each sleeper delivered at Delhi, from the Tonse and Bhagirathi, is Rs. 3. 9. 6., including dues, floating, and cartage. The *sal* sleepers from Kamaun will cost Rs. 1. 2. each at the depôts outside the forests, and an extra rupee for conveyance to Agra. The receipts of North-West Provinces Forest Department, for 1872-73, were 164,286*l.*, and the expenditure 101,901*l.*; giving a surplus of 62,385*l.*, caused by the demand for sleepers on State Railways. From the Jaunsar and Bhagirathi forests 407,678 sleepers were supplied, and 39,015 of *sal* wood from Kamaun and Garhwal. Much damage was caused to the forests by fires, owing to the dryness of the season, especially in Kamaun, Ranikhet, and Gorakhpur.

In the Punjab the principal forests of deodar are in the valleys of the Satlej, Bias, Ravi, Chenab, Jhilm, and their tributaries.

In the Kashmir forests, on the Ravi and Chenab, the number of accessible full-grown deodars is estimated at 117,000, but a most wasteful system of working prevails.

The forests of the Chamba and Busahir States are leased by the Government, and managed by the Forest Department. The Chamba forests, at a height of 5,000 to 9,000 feet in the Ravi and Chenab valleys contain deodar only on steep mountain slopes. The Busahir forests, also containing deodar, are on the Satlej. A large proportion of the deodar in the north-west Himalaya is on the top of high precipices, in side valleys and gorges, and cannot be worked without an expensive system of roads and slides, but there seem hopes that what remains will, for some time at least, suffice for the requirements of the Indus Valley railways, as well as for those of large cities and public works in the Punjab. For the future, however, a permanent supply of deodar can only be secured by plantations on a large scale.

A large portion of the *rakhs*, in the Doabs between the rivers, consisting of about 8,000 square miles of jungle, have been made over to the Forest Department within the last three years. Much progress has been made in the adjustment of claims between the Government and the people, as regards these *rakhs*; the principle being for the Government to concede definite rights to certain portions, whence the village communities can take fuel at their pleasure, on condition that the Government right to the rest is to be considered absolute.

The general want of wood throughout the Punjab was so much felt that great exertions have been made, of late years, to make up for past neglect. The Changa Manga plantation, in the Bari Doab, is on the canal, and 44 miles below Lohor. It is supplied with water from the canal for irrigating the young trees; 4,200 acres have been planted with *sissu*, *ber*, and *kikar*, and the whole area is doing well. It has been completed to 7,200 acres, and in 1881 is expected to yield 33,000 rupees. Plantations are also being established on the Jhilm, near Ludhiána, and near Delhi; and there are avenues along the banks of most of the irrigation canals. The forest receipts in the Punjab amounted to 65,300*l.* in 1872-73, besides about 7,800*l.* as excess of value of stock over the previous year; but the expenditure was 79,594*l.*

In Oudh the forests in the Kheri, Bharaiçh, and Gonda districts, are on high ground, along the Nepal frontier, and are in reality only strips cut off from the great Nepal jungle. They consist of *sal*, *Terminalia*, and *Conocarpus*, interspersed with open glades of grass land. These forests have been demarcated, and the trees have been thoroughly cleared of creepers. The Oudh and Rohilkhand railway will run chiefly on iron sleepers, but fuel for the locomotives will be required from the

forests, as well as for the towns. Fires were successfully kept out of twenty square miles of forest in the Kheri division; but they burnt through the Bharach and Gonda forests. The Oudh forest receipts were 29,626*l.*, and the expenditure 14,342*l.*; giving a surplus of 15,284*l.*

In the Central Province there are enormous tracts covered with jungle, but only a comparatively small portion is properly forest.

The forests in the Mandla district, at the head of the Narbada river, contained comparatively of teak trees, but in 1860 they fell into the hands of speculators and the trees were ruthlessly felled. Thence to Raipur there are most extensive sal forests, but they are very distant from the markets. Lower down the Narbada there is an extensive forest called Dela Kari, near Pachmari, which is the most westerly position of the sal tree in Central India. Still further west, in Baitul and Hoshangabad, are the forests of teak, from which the cities of Ujjain, Indor, and Malwa were built, but there is little now left. The hills, between the Narbada and Nagpur, though covered with forest, contain little timber of any value.

The vast forests to the eastward, the magnificent teak along the Godavari, and the great sal belt round Chatisgarh, extending across the centre of India from the head of the Narbada to Cuttack, are also far from the centres of demand. Proper supervision is impossible, and the jungle tribes cut down and destroy at their own will and pleasure.

But the demarcation of the accessible forests has progressed favourably. A tract of 125 miles has been reserved and demarcated to the north of Nagpur, in the Seoni hills, to supply that city with buildings, timber, and bamboos, while Jabalpur is supplied from the Narbada jungles. The 22 reserve forests of the Central Provinces grouped in five divisions, the most important being on the slopes of the Satpura hills, comprise a total area of 1,832½ square miles. Broad demarcation lines have been cut through the jungles, pillars erected to define boundaries, and fires successfully excluded from selected tracts.

The open or unreserved forests in the Central Provinces are managed by the Deputy Commissioners, and are the property of the Government. Housholders take out a license, enabling them to obtain from the forest lands, the products they require, and the herdsmen take out licenses for grazing. The forest receipts for 1872-73 were 48,167*l.*, and the expenditure 24,784*l.*, showing an increased income and a diminished expenditure compared with last year.

In Berar there are 646 square miles of reserves, consisting of the Bhairagarh Forest to the north, and five smaller tracts in the southern division. The demarcation of the Bhairagarh reserve is complete, and some progress has been made with that of the reserves in the south of the Berars. It is reported that the inhabitants begin to show a decided interest in the protection of their forests. The Berar forest receipts for 1872-73 were 25,986*l.*, and the expenditure 8,308*l.*, leaving a surplus of 17,680*l.*

In Mysore and Curg there are three great forest belts, the evergreen, the mixed, and the dry. The first is on the western ghauts, and yields wild jack (*angeli*), pun, ironwood, and blackwood. The second is a belt on the eastern slopes of the ghauts, from 10 to 40 miles wide, yielding teak and sandalwood, the latter being a Government monopoly. The third comprises the eastern part of Mysore, where the *Hardwickia*, *Terminalia*, and *Conocarpus* grow. The area of reserved forests in Mysore is 428 square miles. There are 7,564 acres of fuel reserves, and 3,366 miles of road have been planted with avenue trees. The Mysore forest receipts were 38,704*l.*, and the expenditure 19,212*l.* The collections of sandal wood for the year amounted to 445 tons, and sales to 429 tons. A map of the Mysore forests has recently been published.

In Curg there are 375 square miles of State forest, the demarcation of which is being pushed forward. During the year 88 miles of new lines were cut; 20 acres have been planted with teak. The Curg receipts were 8,881*l.*, and the expenditure 2,966*l.* In Curg there are *Devada Kadu*, or sacred forests, which are the residences of demons, and the hunting-grounds of departed heroes. They are never entered, and it seems very desirable that this belief should be encouraged, as it is most conducive to forest conservancy.

In British Burma the forest land covers 4,480,000 acres out of a total of 60,000,000. Of this, the teak-producing forests take up 1,534,080 acres, the forests devoid of teak, but in similar localities, 2,945,920, and there are also low-lying forests not included in the above estimate. In Arakan, forest conservancy is restricted to rules for the protection of the ironwood tree (*Xylia*

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dolabriformis). In Pegu are the four main forest divisions of Rangún, Tharrawaddi, Prom, and Sitang; the richest teak localities being on the hills between the Irawadi and Sitang. The teak forests in Tenasserim, which are now much less valuable in mature timber than those in Pegu, form another divisional charge. After Tenasserim was annexed in 1826, a system of licenses for felling timber was introduced, which would have eventually led to the extermination of the teak trees. Rules were promulgated at various times, intended to secure the preservation of the forests, but without much real success. On the annexation of Pegu, all forests in that province were declared to be the property of the Government, and the felling of teak timber without a license was prohibited. In 1856 Dr. Brandis became superintendent of forests in Pegu, and in 1857 the forests of Tenasserim were added to his charge. Rules for preserving the forests were promulgated in 1856, which were afterwards embodied in the Forest Rules drawn up under Act VII. of 1865.

Great progress has since been made in the demarcation of reserved forests, and up to 1872 a total area of 85,538 acres, or 133 square miles, had been sanctioned as forest reserves. Next to teak the most important forest product is the *cutch*, from *Acacia catechu*, of which no less than 138,142 maunds, valued at 135,330*l.*, were annually exported from the province, being collected within British territory. The *cutch* manufactories of the Prom and Thayetmyo districts find employment for 4,000 persons with their families, so that the preservation of the supply is a matter of some consequence. Yet there is no restriction on the felling, and the destruction has been most reckless. The demarcation of the more valuable *cutch* tracts has been sanctioned for treatment as reserved forests.

The teak plantations commenced in 1856 are in large compact blocks on the river, above Rangún, with a separate system on the Sitang, near Tounghu. They are eventually to extend over 30,000 acres; and up to 1871-72, 1,648 acres had been planted. The calculation is, that after the plantations arrive at maturity, the yield will be 1,200,000 cubic feet, or 24,000 tons per annum.

The timber trade of Mulmein is regulated by the establishment of the Kado Depôt on the Sálween river, six miles above Mulmein. Here all timber imported from independent territory is stopped under charge of the Forest Department until it is sold. It is stored on the banks of the river, and a duty of *Rs.* 2. 12. for each log of 5 feet girth and upwards, and *Rs.* 1. 6. for timber below that standard is paid to the British Government (about 6*s.* a ton). The amount of timber from foreign territory at the Kado Depôt in 1871-72 was 81,343 tons, paying a duty of 20,857*l.* By the Sitang river 15,252 tons came down, and by the Irawadi, 1,814.

During 1871-72 the out-turn of the teak forests in British territory was 56,204 logs (52,126 tons), which is considered satisfactory. The whole receipts of the Burma Forest Department were 82,757*l.*, and the expenditure 33,620*l.*, showing a net revenue of 49,137*l.*

The forests in the Bombay Presidency are spread over a very large area, from Kanara in the south to the Mahi river in the north, a distance of nearly 500 miles.

The best forest tracts are, as a rule, near the line of the ghauts. Kanara, Thana, Colába, and Khandesh are the districts which contain the largest and most productive Government forests.

In the revenue survey, a certain area of each village was set aside as forest land, and the people also enjoyed privileges connected with the public forests, such as cutting grass and brushwood for manuring rice fields, cutting firewood, and free grants of wood for agricultural and building purposes. The two first privileges have been disposed of by assigning to each village a tract of common and of grazing ground; and the other two were provided for by marking off certain forest tracts as special Government reserves, and granting the ryots free access to the rest, with a restriction as to cutting seven valuable kinds of timber trees for firewood.

In accordance with these arrangements, the work of demarcation has been pushed forward, and in 1870 it was nearly completed in the Thana and Kolába collectorates. It is also proceeding in Sátára and other districts.

Forest business, in Bombay, is thus closely connected with revenue administration, and in accordance with the advice of Dr. Brandis, who was employed at the request of the Bombay Government in 1870 to visit the forests in the Bombay Presidency, and to submit proposals for their administration, a district forest officer is appointed to each collectorate, subordinate to the Collector, but corresponding with the Conservator of Forests in his division on all technical subjects connected with his work. There is a Conservator of Forests for each division; Mr. Shuttleworth in the north, and Colonel Peyton in the south, besides the Conservator of Sind. The

general control of all forest business rests with the Conservators, and they will take the initiative in forest matters, but their orders to district officers must be sent through the Collector. These new arrangements came into operation during the year 1871-72. The receipts from the two divisions for 1872-73 were 87,652*l.*, and the expenditure, 55,860*l.*, so that the net forest revenue was 31,792*l.* Plantations have been formed in Kanara and Dharwar. A forest school has been established at Birchi in Kanara, where inspectors and foresters are instructed in the preparation of ground for planting, the formation of nurseries, the opening of pits for sowing teak, thinning, and other forest processes. The experiment has been successful, and arrangements will be made for the attendance of forest subordinates in rotation.

The forests in Sind, along the banks of the Indus, were originally set apart by the Amirs of the country as their hunting grounds, and thus on annexation they were entirely at the disposal of Government. They have long been demarcated as Government reserves, and now cover an area of 352,460 acres, in 86 forests, 25 on the eastern, and 61 on the western bank.

These forests, or *beylas*, depend upon the overflow of the Indus, without which they would speedily disappear. But this inundation fosters the growth of tall dense reed grasses, which require much labour and expense to repress. The loss of forest land by erosion has also been considerable. Some of the forests are but skeletons of what they once were, and the subject is becoming very important. The best remedy, if such were practicable, would be to give up the idea of maintaining permanent forests immediately on the river banks, and to look to their extension in some safer position. The loss by erosion, in 1872-1873, was very severe, being no less than 10,500 acres. The receipts for 1872-73 were 25,499*l.*, and the expenditure 16,227*l.*, giving a surplus of 9,272*l.*, which is an increase over the preceding year.

Forest conservancy in the Madras Presidency was presided over by Dr. Cleghorn from 1856 to 1867, when he was succeeded by Major Beddome. The Government of Madras recorded their satisfaction at the results of Dr. Cleghorn's labours, and their conviction that these results had been attained without any infringement of the privileges of the people.

In 1871-72 the Forest Department was reorganised somewhat on the plan adopted in Bombay; the district forest officers being placed under the Collectors, while the office of conservator of forests was abolished. Major Beddome was appointed Inspector of forests with no direct authority over the officers of the Forest Department, who are even prohibited from corresponding with him, but with the duty of visiting the different districts, and offering advice to the collectors. The new system came into operation on the 1st of October, 1872. Forest conservancy was then placed under the Collectors, with trained Deputy Conservators under them, assisted by advice from the Inspector of forests.

When the Forest Department was formed in 1856, the Government forests had for some time been nominally under the charge of collectors of districts, and as soon as the operations were extended to a district, portions of the forest or jungle, more or less extensive, were retained on a separate footing, under what was styled "Village Jungle Conservancy," with the management of which the forest officers were allowed to have nothing to do. Yet there was no demarcation, and no distinct line drawn, so that the forest officers had no means of knowing the exact boundaries of their jurisdiction; and, as Act VII. of 1865 was not accepted in Madras, there is no forest law in the Presidency.

Dr. Cleghorn ascertained where forests existed, and what revenue was to be derived from them, and his researches into the forest capabilities of Madras were most ably seconded by his assistant, Major Beddome, who explored the forests throughout the length and breadth of the Presidency, and is the author of the first Indian forest flora. Felling and slipping operations were conducted in the Anamallay and Mudumallay Mountains; the establishments were organised, and three maps were prepared, one of the Denkanikota range in the Salem district by Captain Walker; another of South Kanara by Mr. Cadell; and a third by Lieutenant Fullerton of the Wynaad forests.

The first attempts at demarcation were made in 1868-69, when a few jungle tracts were marked off as fuel reserves for the railways in Salem, Cuddapah, and North and South Arcot; but in no case were they surveyed or mapped. Mr. Puckle, the collector of Tinneveli, also did something towards forming reserve forests in his district, by fixing certain limits for grazing and cutting firewood, which were notified in the district Gazette. But these reserves were never even roughly demar-

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cated. In 1870-71 some tracts in the Madura district were selected for the supply of wood for agricultural implements and fuel; and in the same years portions of jungle were set apart in the Madura district, Tinneveli, and Trichinapalli districts as reserves for railway fuel, but no demarcation or survey has been undertaken. Indeed, there is no information available regarding the area of reserved forests. In some cases undefined tracts of forest are declared to be reserves, and in others certain descriptions of trees are reserved over specified but undefined tracts. In Ganjam the area of reserved forests is quite unknown. In Kurnul it is supposed to be about 300 square miles. In Madura there are the forests on the Pulney and other hills. In Tinneveli the forests at the sources of rivers have been declared to be reserves, mainly to secure the rainfall. In Coimbatore there are the Anamallay Government and leased forests, and in the Nilgiris, the Mudumallay leased forests, and the Wynaad teak belt, about 300 square miles. In Malabar the Chenat Nair forest covers 18 square miles; and there are the ghaut forests of South Kanara. The completion of the survey of the Nilambur Range in Malabar has enabled the correct acreage of plantations to be entered. Great facility in working will be secured by the accurate knowledge thus obtained of the shapes of the different blocks; and by the help of the maps the Collector is preparing a scheme of roads. A systematic valuation, too, can now be commenced. There is very urgent need for an efficient system of survey and demarcation in the other Madras forest districts.

The finest teak plantation in the Madras Presidency, and, indeed, in all India, is the Conolly Plantation on the River Bepur, in Malabar. It was formed by Mr. Conolly, the collector of Malabar, in 1844; and in 1862 Mr. Ferguson, the present superintendent, took charge. He continued to plant 100 acres a year. The plantations are on undulating ground, along both banks of the river, in a climate where the rainfall is 150 inches. They are in narrow belts, extending for several miles, with a width from half a mile to a mile. About 3,000 acres are planted. The river is navigable to the sea, so that there are great facilities for the removal of timber.

In planting new ground the jungle is felled and prepared for burning at the close of the dry season. Nurseries are formed in April. The seed is steeped in cold water for 48 hours, and sown on raised beds of fine mould covered with straw, to prevent too rapid evaporation, and constantly watered until the seeds germinate in 12 to 20 days. When the rains commence, the plants are put out in lines six and a half feet apart, in pits a foot square and deep, filled with good surface mould. The ground is hoed and weeded from time to time, but after four years the young plantations keep down the grass and jungle by their own shade. Thinnings are made in the fifth year.

The largest teak trees are now seven feet eight inches in girth, with noble straight stems, without a branch for 60 or 70 feet. Up to 1865, the number of seedlings planted was 1,678,679, occupying 1,696 acres, and at the rate of 1,000 trees to an acre; there are now about 3,000,000 trees in the 3,000 acres. The sale of saplings commenced in 1859. In 1872-73 the receipts from thinnings amounted to 739*l.*; making a total of receipts since the sales began of 8,297*l.* The whole cost from the commencement in 1841 has been 17,800*l.*, and deducting receipts from sales of saplings, the net expenditure has been 9,500*l.* When freed from the cost of annual extension and maintenance of nurseries and young plantations, a very few years will see a considerable and increasing surplus in the plantation accounts.

Numerous other plantations have been formed in the various districts, 26 for railway fuel reserves, three or four for teak, and two for sandal wood. At Mudumallay there is a plantation of 20,000 teak trees now six years old, and the two sandal wood plantations contain 38,000 trees. Australian gum trees were introduced into the Nilgiri hills about 20 years ago, and now form magnificent plantations, and ornamental clumps round the stations. The quantity of teak timber felled in 1872-73 was 19,466 cubic feet, worth 1,184*l.*, but there was a reserve in store, and the sales were 42,421 cubic feet, worth 7,878*l.* The sandal wood felled amounted to 632 tons, worth 2,949*l.*; and 563 tons were sold, worth 5,762*l.* Sandal wood is also obtained from Mysore and Curg. In 1872-73 the quantity sold in those two provinces was 889 tons, worth 27,896*l.* The whole sandal wood trade thus amounted to 1,452 tons, worth 33,658*l.* The price varies from 36*l.* to 46*l.* per ton for good sandal wood. The receipts of the Madras Department in 1872-73 were 41,876*l.*, and the expenditure 47,814*l.*; but this deficit is quite exceptional, having been caused by the purchase of a forest. In 1871-72 there was a surplus of 7,195*l.*, the receipts having been almost exactly the same in the two years. The receipts are derived from the sale of timber at depôts, permit fees, grazing fees, sales of forest products, fines, and sales of confiscated timber.

This brief review of forest administration shows that great progress has been made in the demarcation of reserved forests, which is the most important work in the department, in the North-West Provinces, Oudh, the Punjab, the Central Provinces, the Berars, Bombay, and Sind; but that in Madras little progress has been made, and no systematic measures have been adopted for securing this great desideratum in forest management.

It is considered of such paramount importance by Colonel Pearson that, last year, while officiating as Inspector-General of Forests, he obtained sanction for the constitution of a special branch of the Forest Department to survey, demarcate, and prepare working plans for all the reserve and communal forests. The work is to be done on a uniform plan, district by district, the forest survey branch working in concert with the revenue and topographical surveys, and settling the forests as the revenue officers settle the cultivated land, in consultation with all who claim to be interested in the matter. This is the same procedure as is followed in Bavaria, Prussia, Saxony, and other German States.

Many exotic trees have been introduced into India by the Forest Department since its formation. The Australian eucalyptus and acacia are established on the hills in India, and the chinchona trees of South America will also soon clothe their higher slopes. It is also in contemplation to introduce the cultivation of the *Hevea Braziliensis*, yielding the Pará india-rubber of commerce, which has been proved to be superior to the article collected by the hill tribes of Assam from the *Ficus elastica*; and some young plants, from seeds purchased and raised at Kew, have already arrived at Calcutta. An exhaustive report on the caoutchouc of commerce has been prepared by Mr. James Collins, in which all the india-rubber yielding trees are botanically described, and an account is given of their cultivation, relative values, and uses. The information thus carefully and systematically collected and arranged by Mr. Collins has established the importance of introducing the cultivation of Para rubber into India. At the same time a good deal may be done to improve the yield of the Assam caoutchouc, by the establishment of plantations on a large scale, and in accordance with a well-considered plan. This measure is strongly recommended by Dr. Brandis, who has added a valuable memorandum to Mr. Collins's report.

Books are much needed for the use of forest officers, especially handbooks for reference in the field, and accounts of systems of forest management in other countries. Major Beddome, in his "*Flora Sylvatica*," of the Madras Presidency, has just completed a most valuable work.

Dr. Brandis has completed a "*Forest Flora*" of North-West and Central India, commenced by Dr. Stewart, and which has been designed with great care to contain all the information a forest officer is likely to need respecting every important forest plant, and yet to be of such moderate dimensions as to be carried about with ease.

An interesting series of reports has also been published on forest management in Germany, Austria, and Great Britain, by Captain Campbell Walker; and in France by Colonel Pearson; with a memorandum by Dr. Brandis on the professional studies of forest officers on leave. Full particulars are given respecting the management of forests in France, Hanover, Prussia, Saxony, Bavaria, Austria, of the Crown forests in England, and of woodlands on private estates in Scotland; which will be most useful in India, as well as an invaluable guide to officers on leave.

For the management of a vast system of forest conservancy in India, the provision of thoroughly efficient officers, with a scientific knowledge of forestry in all its branches, is essential. It is also necessary that such officers should be men of strong constitutions, active habits, and aptitude for work. In 1866, Dr. Brandis, the Inspector-General of Forests to the Government of India, represented the necessity for adopting some plan to ensure a supply of such men, and his proposals have been adopted with the most satisfactory results. The system for preparing candidates for forest service was commenced in 1867. In that year candidates were allowed to go up for examination before the Civil Service Commissioners, and the seven most promising were selected. It was arranged that these young men, between the ages of 17 and 23, should undergo a regular course of training for two years and a half in the management of forests and the science of forestry, in surveying, road making, and the natural sciences, either in Germany or France. A knowledge of either German or French was, of course, made compulsory at the preliminary examination. M. Burckhardt, Director of the State Forests in Hanover, and M. Nanquette, head of the Forest School at Nancy, kindly undertook to superintend the training of the young men, and have continued to watch over their progress and direct their studies

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with the greatest zeal and interest. Between 1867 and 1873, 42 candidates have been selected, of whom 22 have been sent to France and 20 to Germany. The number of young officers already in India, who have gone through this professional training, is now 30, and, although sufficient time has not yet elapsed to judge the merits of the present system by the work accomplished through the agency of the officers trained under it, yet the Government of India has already expressed great satisfaction at the attainments and general tone of those who are now in India. The gradual formation of a thoroughly well-informed and efficient staff will, no doubt, be the means of eventually completing the work of forest conservancy, and of introducing correct principles of forest management into all parts of India.

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THE mineral wealth of India is practically confined to its coal seams, salt mines and iron ores; and the latter have not yet been worked profitably on a large scale. Although coal was known to exist as long ago as 1774, and was actually worked in 1775, it is to the more recent labours of Dr. Oldham and his staff of zealous geologists, that the exploration of the coal fields of India, as well as the geological survey of vast areas in all parts of the country, are due. Mr. Blanford thoroughly examined the Rániganj fields, and those of Chanda and the Godávári. Mr. Medlicott has explored those of the Narbada valley, and other areas have been investigated by Mr. Hughes, Mr. Willson, and Mr. King, all members of the Geological Survey.

The coal fields of India lie in a region bounded by the Ganges on the north, and extending beyond the Godávári on the south; while, from east to west, they stretch from the neighbourhood of Calcutta to some distance down the Narbada. Outside this limit, the only coal fields are in Upper Assam and the Khasia Hills. Mr. Hughes has calculated the area, in India, over which coal rocks may be presumed to extend at 35,000 square miles. Nearly all the coals come from one geological formation, called "Damuda," from the name of the river (Dánodar), in the valley of which the principal coal seams occur. It is the same as that of the Australian beds, and differs very little from the carboniferous group of beds in Europe. But the coal is very different, both in quality and appearance. Its most characteristic distinction is its excessive lamination, and it contains from 10 to 30 per cent. of ash, while the proportion of fixed carbon rarely exceeds 60 per cent., and averages 52 per cent. In average English coal, the ash is 2·7 per cent., and the fixed carbon 68 per cent. average. Indian coal is only capable of doing from one-half to three-quarters of the work performed by the same amount of English coal.

Mr. Blanford divides the coal fields of India into four groups; 1st, those of the Rajmahal Hills and Damuda Valley; 2nd, those in Rewah, Sirgújah, Chota Nágpur, Tálchir, &c.; 3rd, the coal of the Narbada Valley and Satpúra Hills; and 4th, the new fields in the valleys of the Wardha and Godávári.

On the Rajmahal Hills there are small coal basins in every large valley traversing the range, with seams from 3 to 12 feet thick. But Rániganj is far the most important of the Indian coal fields, and nearly the whole coal mined in India is obtained from it. The latest returns are for 1868, in which year the number of tons extracted throughout India was 497,000, of which 493,000 came from Raniganj, and 4,000 from all other sources. The field commences about 120 miles north-west of Calcutta, and is 18 miles long from north to south, by 40 wide, with an area of from 500 to 600 square miles. The seams are numerous, and those that are mined vary in thickness from $4\frac{1}{2}$ to 35 feet. Dr. Oldham has roughly estimated the coal available at 14,000,000,000 tons; but many seams vary in thickness, and there are not data for accurate determinations. There are now 44 coal mines at work. The East India Railway has been worked with Raniganj coal ever since it was opened, and the yield of the mines has doubled in the last 12 years. The coal field is now traversed by the chord line of the East India Railway, with a branch line to some of the collieries.

There are four other coal fields in the Damuda Valley. At Jherria, 10 miles west of the Rániganj coal-bearing tract, there are numerous seams of great thickness, which have not yet been worked. The Bokaro field is a long strip of coal-bearing rocks, commencing within a mile of the Jherria field, and extending for 40 miles; but the coal has not been worked, and, so far as is known, it is inferior to that of Rániganj. Rámgarh is a small field, of 30 square miles, to the south of the Bokaro field, and of the same character. Karanpura consists of two basins of coal-bearing rocks, lying west of Rámgarh, and due south of Hazáribagh. They contain a considerable quantity of coal of fair quality. These four, with Raniganj, are all in the valley of the Damuda, and form a belt of coal-bearing rocks extending 150 miles, and occupying 1,500 square miles of country. Over at least half this area workable coal seams of considerable thickness occur, within a distance not exceeding 1,000 feet from the surface; but there is a gradual diminution in thickness of the coal-bearing formations to the westward. Where the Damuda formations attain their greatest thickness, they consist of two groups, the upper one 5,000, and the lower 2,000 feet thick, each containing several seams of coal; but to the westward the

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upper group thins out and disappears, while the lower one gradually diminishes in thickness.

The Kurhurbari coal field, in the valley in the Barakar, a tributary of the Damuda, is to the north-west of the Raniganj collieries, and covers an area of 18 square miles. Mr. Hughes calculates that there is a sufficient supply at Kurhurbari to supply 250,000 tons a year for 800 years. The collieries belong to the East India Railway, and a branch line 25 miles long has been made to them from the Chord line. There are two very small fields containing no workable coal near Deogarh, in the Santhal Parganahs, and a third at Itkuri, to the west of Kurhurbari.

The second group consists of a number of basins scattered thinly over an immense tract of the wildest country in India, and none have been thoroughly explored. The Palamau fields in Chota Nágpur belong to the Government, but there is not much coal. In the South Rewah field the coal exists over an area 40 miles long by 20 broad; in the Upper Son Valley the seams are very numerous but thin, and of poor quality; in Biláspur and the country west of Chota Nágpur there are seams of coal in several places, some of them of great thickness, and at Tálchir, on the Brámani river there is a coal field, but containing no coal of any value.

The third group is included in the Narbada Valley and the Sátapura hills, which form its southern boundary. Here the Mopani collieries belong to the Narbada Coal and Iron Company. The average thickness of the coal seam is 25 feet, and, though there are numerous faults and dykes, it is believed that a large quantity exists, and that the quality is little inferior to that of Rániganj. This company was formed in March 1860. The site of their grant is twelve miles east of the main line of the Great Indian Peninsular Railway, and 80 miles south of Jabalpur. But there was no demand for the coal until March 1870, when the railway was opened to Jabalpur. In 1872 a branch line was opened to the company's colliery, from the Great Indian Peninsular Railway, and the demand for coal is now greater than the supply. The manager estimates the known coal on the company's ground at 214,500 tons. The receipts for 1873 from the sale of coal were 10,635*l.*, being 10,463 tons of round and 705 of screened and small coal. At Umret, near Chindwara, there are several seams of fair coal over a considerable tract; and also in the Tawa Valley, between Baitul and Hoshangabad. The Mopani coal fields were examined by Mr. Medlicott during the season of 1870-71; and in the following year, 1871-72, he was engaged on similar work in the Sátapura hills, where he has since been succeeded by Mr. Ball.

The fourth group of coal fields lies on the edge of the great sandstone tract which occupies the valley of the Godávári, and its tributaries, the Wurda and Pranhita, from the neighbourhood of Nágpur to that of Ellor. Workable coal is known to exist in several localities, which have been examined by Mr. Blanford and by Mr. Hughes. The existence of coal in the Chanda district, in the Central Provinces, was first pointed out by James Prinsep in 1830, but the geologists of the survey were the first to trace out the limits of the field, and to make a detailed examination of it, which is still in progress. The existence of a very thick seam of coal and carboniferous shale has been ascertained, 50 to 70 feet thick, over a large area of the Central Provinces and Berár, and again a few miles further south in the Nizam's territory. At Pisgaon, in Berár, coal-boring operations have been commenced, and a shaft sunk 52 feet; but more powerful pumping machinery has become necessary. The quality of the coal hitherto mined is inferior to that of Rániganj, but good enough for railway purposes. There are several borings in the Chanda district, but the principal shaft is sunk at a place called Warora. It was impeded by water, and new and more powerful pumps were ordered from Bombay, to be ready by August 1872. New and more powerful machinery was set up in February 1873. Since then there has been steady progress. At 176 feet below the pit-head coal was reached, the seam being 15½ feet thick, and another 11 feet thick, lying a short distance below the main seam. If the double seam is continuous over the whole coal field at Warora, there will be 100,000 tons of coal a year, for a hundred years. In 1870-71 Mr. Whyte, who is engaged on similar investigations in the Nizam's territory, proved the existence of coal at a place called Sastu, more than 50 feet in thickness.

Mr. Blanford during 1870-71 carried on the general mapping of the extent of the sandstone area in the eastern part of the Nizam's territory, and southwards into the Madras Presidency, towards Ellore. These sandstones appear to belong to the

true coal-bearing rocks, but they are for the most part devoid of coal. At Kamáram, in the extreme east of the Nizam's dominions, and 100 miles north-west of Ellorc, there are two seams, 9 and 6 feet thick respectively, of good quality, but only occupying an area a quarter of a mile square. In 1871-72 Mr. King, of the Geological Survey, discovered coal at a place called Singharani, 80 miles south-east of Kamáram, where about two feet of the seam are visible. The Singharani bed is interesting as the most southern coal yet discovered in India. Numerous trial borings were made by the Nizam's officers in 1873, and a considerable amount of coal was proved. Mr. Blanford in 1871 mapped the coal-bearing rocks of the Godavari, and a series of borings were taken, in accordance with his suggestions, near Dumagudem, the headquarters of the navigation works at the first barrier of the river: but the coal was found to be of inferior quality.

Outside these four groups of coal fields there are two to the eastward of Calcutta. One, where some coal has been found of excellent quality but of limited extent, is on the Khasi hills, 4,000 feet above the level of the plain; the other is one of the most promising fields that has hitherto been discovered. It occurs in the Dibrugarh and Sibsagar districts, in the extreme east end of the Assam valley, and there are several seams of excellent coal; but the country is densely covered with forest and very thinly peopled, which makes it unfavourable to commercial enterprise. A mineral survey has been ordered to be made of the foot of the hills in the Darjiling Terai and Bhutan Duars. The chief hope of results lies in the fact that rocks of Damuda age, containing the well-known fossil plants of the Indian coal measures, occur along the inner boundary of the tertiary sandstones flanking the mountain range. But the occasional carboniferous deposits in these younger formations themselves have not hitherto offered any encouragement to extended research.

In the year 1872-73 the coal trade of India was depressed. The out-turn of coal was 322,443 tons, the lowest since 1858, and the import of coal at Calcutta (48,714 tons) also fell off. Since the opening of the Suez Canal there has been a falling off of 200,000 tons in the produce of the Indian coal mines, and, until 1872-73, an increase of imports from England. There is not even a market for large quantities of coal already raised. Yet the high prices in England may eventually be expected to increase the demand for Indian coal, and next year a favourable reaction may be expected. The results of its use on Indian railways prove that the best native coal is a little more than 10 per cent. inferior to English coal, and much cheaper. The development of the coal-producing industry of India will be caused by the local demands of the public works, of railways, river steamers, and manufactures, and hereafter Indian coal will probably be employed in manufacturing iron.

Iron-producing minerals are widely scattered over India, and consist, 1st, of magnetic and specular iron ores and red hematite, in beds and veins; 2nd, of clay iron ores from the coal-bearing strata; and 3rd, of surface deposits derived from the waste of metamorphic and sedimentary strata, and from laterite. The latter formation contains from 20 to 30 per cent. of iron.

Some of the most remarkable deposits of magnetic iron ores are in the Salem district of the Madras Presidency. The ores occur in immense beds, 50 to 100 feet thick, the outcrop of which may be traced for miles. On one hill, six miles from Salem, there are five bands of magnetic iron from 20 to 50 feet thick. At Lohára, in the Chanda district of the Central Provinces, there are two localities, five miles apart, where hematite abounds. At the eastern one there is a mass of dense red hematite, forming an isolated hill 120 feet above the surrounding level of the country, which would probably yield 300,000 to 500,000 tons of iron without going below the surface. The other mass is smaller in extent. In Bandalkhand and in the Narbada valley there are large quantities of hematite ores, the supply in many cases being practically inexhaustible. The clay iron ores in the Rániganj and other Damuda coal fields yield 39 per cent. of iron. The Kamaun iron ores form an argillaceous band, containing large quantities of red hematite, the ore bed being 10 to 20 feet thick, and extending for a long distance. The surface deposits supply the greater proportion of ores used by native smelters, but much labour is necessary in the collection.

Iron has been manufactured in India from time immemorial, and weapons of that metal are even found in the ancient cromlechs and kistvaens, but there never were any large works. The production of iron is the work of poor people of very low caste scattered over the country. They have small clay furnaces, with charcoal for fuel, and the blast caused by foot or hand bellows. The smelting goes on for eight or ten hours, at the end of which time from 10 to 20 lbs. weight of iron is found at

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the bottom of the furnace, and is purified by re-heating and hammering, the resulting iron being generally of excellent quality; but the native manufacture is decreasing, owing to the difficulty of obtaining charcoal. Iron smelting, and shaping the material into agricultural and other implements, is, however, carried on, in a rude, primitive way, in many parts of India, especially in the Central Provinces and Dharwar.

All attempts to manufacture iron, made by the English, have hitherto utterly failed. In 1825 Mr. Heath, of the Madras Civil Service, obtained a Government advance, and formed a company to establish iron works at Porto Novo, near Cuddalore; at Palainputi, near Salem; and at Bepur, where the iron was obtained from laterite. The Porto Novo works were commenced in 1833, and those at Bepur some years later; but, in spite of help from Government, there was nothing but failure, attributed to the distance of the works from the source of supply, to scarcity of charcoal, and to other causes. Company succeeded company, and at last there was an utter collapse. In 1857 Mr. Sowerby, an engineer, reported on the iron ores in Kamaun, but the attempt to work them ended in financial failure. The Kamaun Iron Company stopped its operations in 1863. This year Mr. Hughes has made a favourable report on the iron of Kamaun. He considers the iron ores in the Ramgarh Circle to be good and plentiful; and the ores in the Keladhangi and Déh Choari Circles to be not so good, though the supply is very great. Mr. Hughes thinks that the high price of coal in England may furnish a better chance for iron manufacture in India. A similar attempt by a Calcutta merchant, who started works near Suri, in Bírbbum, was also abandoned.

The enterprise of the Government in the Narbada valley, however, promised well, and might have been most successful. Works were erected at Burwai, on the Narbada, under the auspices of Colonel Keatinge. Mr. Mitander, a very able Swedish metallurgist, was induced to take charge of the works, and, after many experiments, all difficulties were overcome, and the works were ready for the production of iron. Suddenly, in 1864, the Government, after spending 75,000*l.* on these preliminary expenses, dismissed Mr. Mitander, closed the works, and offered them for sale, without success. They have now, with the ground on which they stand, been made over to Holkar. Iron ore and limestone abounded in the neighbourhood; large forests, furnishing supplies of charcoal, extended for many miles to the east and north-east; and Mr. Mitander was an excellent manager as well as a scientific metallurgist. No record has even been preserved of the experiments and plans of Mr. Mitander for burning and storing charcoal, and for other processes, which would have been useful hereafter.

The Government are now once more anxious to foster the iron manufacturing industry of India. In 1872 Mr. Bauerman was sent out to report on the subject; and the increasing price of iron in England is most favourable to the prospect of the manufacture proving profitable in India. The use of Indian coal for smelting iron has never yet been tried. Mr. Bauerman, during 1872-73, visited the iron ore districts of Rániganj, Kamaun, Chanda, &c.; and his conclusion is that, under existing circumstances, the Rániganj coal field is the most promising place for a trial of the practicability of iron manufacture in India, on European methods. In this opinion he has the concurrence of the Geological Survey, and has simply re-stated the case as it has all along been expressed by its members. Mr. Hughes has since considered and reported upon the adaptability of Rániganj as the site of iron works. Coal is there in abundance. The iron ores are of two kinds, those represented by laterite and those associated with the coal measures. Mr. Hughes considers that the main dependence of any iron works must be on the ores of the coal measures. The iron stones cover an area of several square miles, in thin beds. There is an unlimited quantity of *kunkur* (nodules of impure limestone), which must be relied upon as a flux. The cost of a ton of coal is placed at *Rs.* 3, iron ore at *R.* 1, and *kunkur* at *Rs.* 1. 8.; and the cost of manufacturing a ton of pig iron is estimated at *Rs.* 24.

The supply of salt from the Salt Range running through the Jhílám and Sháhpur districts, and on to Kalábágh, is practically inexhaustible. The principal beds occur in the southern slopes of the range, and are from 150 to 200 feet in thickness. The mines are of two kinds; one where the salt rock is approached by galleries and excavations, and the other where, as at Kalábágh, the salt is at the surface, and is quarried. It is excavated at four places, namely, at Kheora, now called the Mayo Mine, and the Sardi Mines, in the Jhílám districts; at the Warcha Mine in Sháhpur; and at the Kalábágh quarry. Salt exists in large quantities at eight other places,

but these mines are closed to prevent smuggling. In the Kohat district, salt is obtained from five quarries in the chain of hills running from the Indus towards Bohadur Khel, and is of a black or dark green colour, being found near the surface. With reference to the supply from the Salt Range, Dr. Oldham says, that nowhere else in the world are salt deposits of such vast extent and purity known to exist.

There are copper mines in Kamaun, Garhwal, Nepal, and Sikkim, which are worked on a very small scale by natives, and the produce is very considerable. There is a small mine at Jaipur, in Rájputána, and copper ore is found in the hilly portions of the Gurgáon and Hissar districts, and in Kulu and Spiti. There is also copper ore in Singbhum, to the westward of Midnapur, extending over 80 miles; and old workings abound, but much fine ore remains. Lead occurs, in the form of sulphuret or galena, in Kulu, Garhwal, and Sirmur, in the north-western Himalayas. There is also a lead mine near Sabáthu, in the Simla district worked by the "Patiála and Sabáthu Mining Company," which yields about 40 tons of ore a month, containing 16 to 72 per cent. of lead. In 1869 Mr. Blanford examined a promising lead vein at Chicholi, near Raipur. There are very rich tin deposits in Tenaserim and Martaban, and a project has been submitted to the Government for working them; but the country is very wild, covered with dense forest, and thinly inhabited, and there are no roads or means of carriage. Gold occurs in many parts of India, but always in very small quantities in stream gravels. It is occasionally extracted in the north-west Himalayas, Chota Nágpur, Assam, Singbhum, the Godávári valley, and some other places. In the Punjab not more than 3 or 4 annas' worth of gold can be obtained by a hard day's labour at washing. Silver occurs, associated with lead, in Kulu. Antimony, in the form of what the natives call *surma*, is produced in great abundance in the Himalayan range, and, reduced to a fine powder, is sold by druggists as a cosmetic for the eyes. The ore occurs in Kulu and Lahul. An ore of cobalt, in small quantities, is obtained near Jaipur, in Rájputána, and is used for colouring enamel.

Petroleum is procured in considerable quantities from Upper Burma, and some is known to exist in Pegu and Assam. Mr. Theobald, of the Geological Survey, reports its discovery in Pegu, in several localities, but nothing but experimental shafts can satisfactorily settle economic value. A little oozes from the ground at several places in the Punjab, and gasworks were erected at Ráwalpindi, with the intention of utilizing this mineral oil for lighting the station. But the supply was found to be insufficient.

Dr. Oldham and the Staff of the Geological Survey have done all that was possible in the time that has elapsed since their labours commenced 23 years ago, to acquire and disseminate an accurate knowledge of the mineral resources of India; while their investigations, embracing the whole range of geological science, of which inquiries into the economic value of minerals form but a part, have achieved most satisfactory results. In spite of all difficulties of climate, inaccessibility of districts, and slowness of means of travel, they have examined an area about four times as large as Great Britain. The detailed and matured results of the survey are published in the "Memoirs," with maps and illustrations, while the "Palæontologia Indica" is a superb series, containing figures and description of organic remains, collected during the progress of the Survey. The "Records," published every quarter, contain a series of shorter papers, giving an account of current geological proceedings. Much interesting work was finished or commenced during the season of 1872-73, which is reported in the "Records." Mr. Theobald completed the first geological examination of Pegu, which had been begun by Mr. Blanford in 1860. No one who has not made the attempt can form a conception of the difficulty of observing rocks in a wild tropical region, such as formed the field of this Pegu work. Rank vegetation produces deep soil, and a geologist may march for days through a hill country without once getting a fair section of rock in place. Mr. Theobald has discovered series of triassic, cretaceous, and nummulitic strata on the Arakan side of the Yomah hills, beneath the tertiary deposits of the Pegu Yomahs. Mr. Theobald now proceeds to the North-West Provinces, where one of the most interesting problems of Indian geology awaits solution. This is the obtaining of materials for establishing the palæontological sequence in the immense series of deposits based upon the marine nummulitics, and ending above in the deposits containing the gigantic mammalian fauna of the Sawáláks.*

Dr. Stoliczka, the palæontologist of the Geological Survey, accompanied Mr.

* See *Memoir on the Indian Surveys*, p. 148.

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Forsyth on his mission to Kashgar, and has communicated a paper on the structure of the hill ranges between the Indus Valley in Ladak, and the borders of Turkistan at Shah-i-dula. He found that the whole system of ranges between the Indus and Turkistan was bounded on the north and south by syenitic rocks, including between them Silurian, carboniferous, and triassic formations. His observations also furnish evidence that once there were far more extensive sheets of water, of which the Pangong and other lakes are the remains, enclosed between the lofty ridges; and he furnishes proofs that the climate of those cold and arid regions was then both milder and moister, and therefore more favourable to animal and vegetable life than it is now. The melancholy intelligence of Dr. Stoliczka's death, on his return journey from Kashgar after having penetrated to the Pamir Steppe, has recently reached this country.

The commencement of the systematic publication of the maps of the Geological Survey was made in 1873 by the issue of the twelve sheets of the district of Dumoh, on the scale of one inch to the mile. The final and general form of publication will be the sheets of the Indian Atlas, coloured geologically; and quarter-sheet, No. 77 s.w., was published during the year. Several of the adjoining sheets are ready for the engraver.

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TRADE AND MANUFACTURES.

THE trade of India is only represented in a small degree by the returns from the great sea-ports, for the bulk of production is consumed in India itself, and the value of external commerce is only a fraction of that of the internal and interportal trade combined. There are no very reliable statistics of the internal trade, but that from port to port is steadily increasing; and although external trade is said to have shown continued depression during the year 1872-73, yet there is an increase as regard several of the most important staples. The whole sea-borne trade of India, exclusive of treasure, during 1872-73 is reported to be worth 107,485,697*l.*; of which the foreign trade represents 86,488,056*l.*, and the interportal 20,997,641*l.* In the former there has been a decrease of 7,781,538*l.*, and in the latter an increase of 1,095,412*l.* The imports from foreign countries amounted to 31,260,561*l.* in value, and the exports to 55,227,495*l.*, both exclusive of treasure. The importation of bullion and specie was very much less than in 1871-72, amounting only to 4,556,585*l.*, against 11,573,812*l.*, a decrease of 7,017,227*l.*; while the quantity exported, 1,298,080*l.*, remained nearly the same. The precious metals to the amount of 358,505*l.* remained in India. This great falling off in the importation of bullion and specie seems to indicate that the balance of trade in 1872-73 was settled, to a larger extent than in 1871-72 and the five preceding years, otherwise than by payments of the precious metals. The falling off in exports is due mainly to the decrease in the quantity of raw cotton shipped, owing to American competition and low prices, and, to some extent, to a very satisfactory increasing demand for cotton from the manufactories in India. The diminution in the value of exported cotton nearly corresponds with the falling off in the value of imported treasure; the one amounting to 7,250,322*l.*, and the other to 7,017,227*l.* There is also a decrease of 1,938,948*l.* sterling in the value of opium exported.

Thus, after deducting the treasure which remained in India, there is an excess of 23,966,934*l.*, representing the value of goods sent out of India over and above the value of the imports. This fact suggests interesting questions relating to the way in which Indian trade is balanced; and Sir Richard Temple, in a minute dated September 14, 1872, has placed these questions in a very clear light. The balance of trade is not a mere question of import and export, and of the excess of one over the other. It results from the relative totals of all the amounts expended by each upon the other, whether in payment of produce and manufactures, or for the purchase of shares and public securities, or for the settlement of profits, commissions, or tribute of any kind. Payments made by one country to another, for any purpose whatsoever, have the same effects as payments for direct importations. Thus the general indebtedness of two countries to each other may be balanced, though the one imports far more commodities from the other than it supplies in return. Accounts are never squared or balanced in any one year. Transactions in one year run on to the next, and are not always adjusted in the year to which they belong. For a full comprehension of the way in which Indian trade is balanced, it is, therefore, necessary to take a number of years together.

Sir Richard Temple gives the following figures. The value of merchandise is calculated from the valuations made by the owners at the time, and must be taken with reserve, although the extent of the error from this cause cannot be computed. Between 1835 and 1871 the value of the merchandise exported from India was 1,012,000,000*l.*, and of the imports 583,000,000*l.*, leaving a balance of 429,000,000*l.* unaccounted for. The amount of treasure imported in the same period was 312,000,000*l.*, from which the quantity exported, amounting to 37,000,000*l.*, must be deducted. This leaves a net receipt of treasure, amounting to 275,000,000*l.*, to be deducted from the balance against India, which reduces it to 154,000,000*l.* All payments in England must also be deducted from the balance. These consist of civil and military services and salaries paid in England, pensions, interest of debt and of railway capital, and remittances by troops: all included in what are called Secretary of State's bills. For the amount to be drawn from India to meet these charges, the Secretary of State sells bills in London. The purchasers pay their

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money in England, and receive money in return in India. Such remittances operate just as if treasure had been despatched to India; and, consequently, the amount of Secretary of State's bills, amounting between 1835 and 1871 to 113,000,000*l.*, must be deducted from the balance, which reduces it to 41,000,000*l.* India also owes, and has to pay England, large amounts on private account, made by encashing private bills. These amounts cannot be given with any accuracy, but they are made up of Indian securities held in England and in deposit by banks, dividends on joint-stock enterprises, rents from houses, profits from plantations and trade, and private remittances. The total is now placed at 3,500,000*l.* in a year, but it was much less in former years. As a set-off, there is the private capital remitted to India—about 1,000,000*l.* Freight also is an item almost entirely against India, as the shipping is chiefly British. The freightage is about 1,000,000*l.* These items of private accounts and freight, if their amounts could be correctly ascertained, and if the other figures were accurate, would complete the investigation, and show an exact balance of Indian trade.

The phenomena of the trade between India and China are to be explained on the same principles. In 1872-73 the exports from India to China were worth 12,074,347*l.*, of which the opium was worth 10,529,673*l.*, the raw cotton 1,185,684*l.*, and the rice 112,157*l.* But the imports were only worth 1,355,171*l.*, consisting chiefly of raw silk (519,948*l.*), and tea (201,781*l.*). Thus there is an excess of 10,719,176*l.* against India, being more than the whole value of the opium, for which India apparently receives no return whatever direct from China. Here the balance of trade is made partly in treasure, and partly by the transfer of claims on England, which China has for excess produce exported thither. From 1852 to 1871 the exports from China to England were worth, including treasure, 198,000,000*l.* The imports into China from England, also including treasure, were 86,000,000*l.* in the same period. There is, therefore, a balance of 112,000,000*l.* due to China. By this debt due from England to China, the latter country defrays her obligations to India. Between 1852 and 1871 India had a balance against China of 112 millions, which sum must represent the amount which China has settled with India by transferring her claims for excess produce exported to England. For the last few years the debt due by England to China has been decreasing, till in 1870 there was no debt at all. The use of British manufactures by the Chinese has been decreasing fast. In these years China had little or no claims on England to transfer in payment of her debt to India, and could only have paid it by transferring her claims on countries other than England. This circumstance, Sir Richard Temple suggests, may account for the phenomenon in Indian exchange, of there being in England an exchange not favourable to India, though the exports from India to the United Kingdom largely exceed the imports. India failed to obtain the benefit due from the state of her trade with England because of the cessation of the requirements of remittance from England to China. These remittances are largely made up of Secretary of State's bills on India. When, therefore, the need of this remittance fell off, there was less competition for the bills, and consequently less favourable terms for India. This shows the importance of the foreign trade of China to the exchanges of British India.

The shipping which carried the foreign trade of India in 1872-73 consisted of 6,095 vessels entered, with an aggregate of 2,371,529 tons; and 6,371 cleared, representing 2,388,451 tons. The interportal trade was borne by 15,071 vessels. The average tonnage of vessels in the Indian trade continues to increase. The number of vessels which entered the port of Calcutta, in 1872-73, was 1,118, with a tonnage of 992,211 tons, of which 342 were steamers, and there were 161 native craft. The number of British vessels that entered the harbour of Bombay in 1872-73 was 629 (584,815 tons), of foreign vessels, 95 (70,519 tons), and of native craft 5,729. The tonnage of vessels frequenting all the ports of the Madras Presidency was 1,227,880; the most important ports, after Madras, being Cochin, Calicut, and Tutikorin; and then Cocanada, Mangalore, and Tellicherry.

The value of Bombay interportal trade, including exports and imports, exceeds that of any other port of India. It was worth (exclusive of treasure) 6,475,369*l.* for 1872-73; that of Bengal 5,772,185*l.*; of Madras, 3,884,984*l.*; of Burma, 2,234,540*l.*; and of Sind, 2,640,561*l.* But in the foreign trade Bengal takes the lead, its whole trade, exclusive of treasure, being worth above 40 millions, or half the value of the total imports of India, and two-fifths the value of the total exports. The whole foreign trade of Bombay is worth over 30,000,000*l.*; of Madras, over 9,000,000*l.*; of Burma, 5,500,000*l.*; and of Sind, nearly a million.

The exports and imports, exclusive of treasure, were as follows :—

	1872-73.	
	Exports. £	Imports. £
Bengal	24,618,538	15,396,189
Bombay	19,929,315	10,563,295
Madras	6,244,668	3,296,401
Burma	3,776,980	1,680,425
Sind	657,994	324,250

The great article of export from India, next to cotton, is rice. For the foreign trade alone the quantity exported during the year 1872-73 was 22,973,797 cwts., worth 5,701,439*l.*, being an increase of six million cwts. over the previous year. Calcutta exported 5,779,594 cwts., but more than half is shipped from Burma. Most of the grain exported from Madras, 77 per cent., or 1,858,177 cwts. out of a total of 2,411,501 cwts., went to Ceylon. The rice trade is flourishing and improving everywhere. The largest quantity, 12,675,005 cwts., goes to Europe. The next largest customers are Ceylon and Mauritius, receiving 2,978,551 cwts. and 2,435,035 cwts. respectively. The Straits carry off 1,752,288 cwts.; 904,048 go to the Persian Gulf; and the remaining 2,228,870 to various other foreign countries.

Cotton vies with rice as an article of export. In 1872-73, a remarkably bad year, the exports amounted to 494,214,447 lbs., worth 14,022,108*l.*, being less by 315,031,640 lbs. than the exports of the previous year. From Bengal the quantity of cotton exported was 79,752,618 lbs., against 164,376,961 lbs. in 1871-72. From Madras the quantity exported was 65,783,567 lbs., against 75,329,127 lbs. in 1871-72; and from Bombay it was 320,204,354 lbs., being the lowest since 1866, and showing a decrease of 32 per cent. since the previous year.

A great quantity of cotton is worked up in India, and the duty on imported piece-goods fosters and encourages the home manufacture. The most important industry in the Bombay Presidency is now the manufacture of cotton, cloth, and yarn. This manufacture has always existed in nearly every village. The cotton is cleaned and spun into thread by all classes of the people, and there are weavers and dyers in every town. Printed goods have also long been manufactured, especially in the large towns of Gujrat, stronger and more durable than European goods. But it is only within the last ten years that steam spinning and weaving mills have been introduced. The first factory was started at Kurla, in 1863. There are 13 steam mills in the town and island of Bombay, besides the Kurla mill, employing 60,000 spindles and 848 looms. There are also one at Broach, one at Surat, and two at Ahmadabad. The 18 mills now at work employ altogether 4,500 looms, 405,000 spindles, and 10,000 hands, and turn out daily 100,000 lbs. of yarn. The weekly consumption of cotton is 1,500 bales, 6½ per cent. of the average cotton crop, and this is likely to increase largely. Many cotton printers are settled in Bombay, and much of the cloth manufactured in the mills is dyed in their vicinity, and exported to the Deccan and the Kakan for the use of the Mahomedan community. In Bengal there are two well established cotton mills at Boureah and Ghosrey, suburbs of Calcutta, for the manufacture of mule twist. The pressing and cleaning of cotton for exportation also gives rise to a thriving branch of the cotton industry. In Bombay there are 28 pressing and ginning companies, besides steam presses in other parts of the Presidency, in Berar, Madras, and at Mirzapur. There are also many cotton manufactories in the Punjab, and especially in the Central Provinces, where there is a large demand for cotton for home consumption, which checks the export materially. In Mysore cotton cloths are woven in nearly every district, and in Madras there is actually a considerable export and interportal trade in piece-goods and twists. Yet the amount of imported cotton goods is enormous. In 1872-73, there were 14,545,772*l.* worth of cotton piece-goods imported into India, besides cotton-thread, twist, and yarn.

In 1863, when the American war gave an extraordinary impetus to the cotton trade, and there was a ready sale for every bale that could be shipped, there was much adulteration. On the voyages from Kunta to Bombay, the crews of the pattamars used to work their way into the bales, pull out large handfuls of cotton, and fill up the spaces with dirt. These and similar practices gave rise to the Cotton Frauds Act (IX. of 1863), which provided that there should be inspectors, whose duty it would be to inspect the bales before they were pressed, and see that there was no adulteration; the expenses of the establishment to be defrayed by a tax of 3 annas on each bale. The Act has now been in force for 10 years, and during 1872-73 44 cases were brought to trial under its provisions, out of which 24 con-

victions were obtained. There is, however, a good deal of difference of opinion as to the policy of continuing or repealing the Cotton Frauds Act. Those who are in favour of its continuance contend that, although convictions are few, the deterrent effects of the Act are very great. On the other hand, it is urged by the Bombay Chamber of Commerce, and those who advocate its repeal, that it was passed at a time when there were extraordinary temptations to adulterate owing to the high prices, that the causes which gave rise to it have ceased to exist, that it is utterly useless for putting down fraud, and that the money spent on the establishment is wasted. The subject is now under the consideration of the Bombay Government, and, meanwhile, the tax imposed under the provisions of the Act was, in August, 1872, reduced from 3 to 2 annas on each bale.

The local cotton mills have almost annihilated the English trade in low-class cotton goods, grey shirtings and T cloths, and yarns. The productions of the mills find a ready sale at paying prices, and India gains by saving the expense of sending its raw material to Europe, and having it returned in a manufactured form. Bombay made cloth has the advantage of freedom from duty, and this has been assigned as the cause of the success of Indian cotton manufactures. It may be that the duty largely aided the mills in their infancy, and that it may have some share in the fact that the importation of English piece goods is decreasing, while the country manufactures are largely increasing and competing with the English goods. But even this is now doubtful, for the returns from Aden and Sind show that Bombay made cloth can, on equal terms, compete successfully with the produce of English mills.

There may be another cause, namely, the inferiority of the piece-goods imported from Manchester, and their rapid deterioration. Complaints of this deterioration have been made several times, and the Manchester Chamber of Commerce represented that it was the result of damage by water. In December, 1872, the Shanghai Chamber of Commerce reported that the damage was principally in grey shirtings and T cloths, the outer packages of which showed no signs whatever of contact with water or undue dampness of any kind. The losses from this cause have been very great, and the damage was prevalent on the rise of the price of cotton during the American war. The cloth was not only discoloured, but often rotten. When prices fell the deteriorated cloths became less common. But during the last two years they have presented themselves in a still more aggravated form. In 1872 the evil was very general, and 75 per cent. of the entire stock of these cloths was unsaleable at Shanghai as sound goods. The Chamber is fully convinced that the cause is inherent in the cloth itself, from the use of size of a deleterious character to increase the weight. The evil becomes prominent when the value of cloth is unduly low compared with the cost of cotton. The Bombay Chamber of Commerce fully concurs in this view; and the Bengal Chamber has also protested against the various improper methods, and the use of deleterious compounds for increasing the weight of cloth. Finally, in April, 1873, a Committee appointed by the Manchester Chamber of Commerce at last condemned the practices of introducing moisture into the cloth, and of excessive sizing for the object of producing weight.

The present very prosperous state of the native cotton manufacturing industry is due to various causes, but not the least important among them are the inferior character of the Manchester goods, and the excellence and durability of the cloths manufactured in India.

The most valuable special article of export from Calcutta, next to cotton, opium, and rice, is jute. The quantity of jute exported in 1828 was 364 cwt., worth 62*l.*, and the extraordinary increase that has since taken place is due solely to the energy of the ryots of Bengal. They found it profitable, engaged in it with alacrity, and created the trade. The large import of cheap Russian flax into this country at first kept down the demand for jute, but this source of supply was destroyed when the Russian war broke out in 1854, and the demand for jute became brisk. The ryots seized the opportunity without any prompting or assistance. From 1858 to 1863, the average exportation of jute from Calcutta was 967,724 cwts. From 1863 to 1868 it had risen to 2,628,110 cwts. The quantity of raw jute exported in 1872-73 was 7,080,912 cwts., worth 4,142,547*l.*, an increase of nearly a million cwts. as compared with the previous year. Thus the ryots have created and extended an industry in 45 years to a value of more than 4½ millions, without any official encouragement or aid whatever. In 1872 there were 3,955,455 cwts. of jute imported into the United Kingdom from India; and 69,000 cwts. from other countries. Of this quantity 3,200,455 cwts. are used in Great Britain—almost entirely in Dundee. The remaining 755,000 are re-exported. France takes 148,876 cwts. direct from

Calcutta, and 550,500 cwts. from England. Trieste takes 9,000 cwts. direct from India. Holland receives 5,357 cwts. from India, and 58,610 cwts. from England. In 1872, Germany took 77,831, Belgium 31,192, Spain 20,768, and other countries 16,176 cwts. by re-exportation from England. Large power mills have also been established for spinning and weaving the fibre under European management in India. At the Barnagpúr mills, near Calcutta, there were 17 European overseers, 4,700 natives, and the mills work up 16,000 tons of jute in a year. There are also jute mills at Fort Gloster, down the Hugli, at Budge-budge, at Rishra, at Chapdani, and two at Serampúr. Women and boys are employed in the spinning, winding, and sewing, and men in weaving; the rates of wages being for men 11 annas a day, for women 5 annas 5 pie, and for boys 3 annas 5 pie. The work is practically confined to making gunny bags and cloth, and the total value of the gunny bags, cloths, twine, and rope exported in 1872-73 was 835,911*l.* The success of these jute mills has been very great, and there are also many jute screw houses and warehouses.

It is remarkable how various industries, carried on at vast distances, act upon each other. The growth of jute in Bengal led to its manufacture in Dundee, and this caused the revival of the whale fishery in Baffin's Bay. In 1872 the quantity of jute imported direct into Dundee was 1,828,614 cwts., and the bulk of the whale oil is required by the jute manufacturers of Dundee and its neighbourhood. Thus the port of Dundee has now become the centre of the whale fishing trade, and cargoes of oil from the Arctic Regions may be seen discharging alongside cargoes of jute from Calcutta, both being essential to the prosperity of this industry. The Dundee Chamber of Commerce has represented that an Arctic Expedition is desirable, in order that new haunts of oil-bearing animals may be explored; and if an Arctic Expedition will benefit the jute manufacturers of Scotland, it is equally important to thousands of industrious Bengal ryots, to whom jute cultivation gives employment and the means of subsistence.

There has been a great increase in the production of tea, of which 17,187,328 lbs. was exported from India in 1871-72, and 17,789,911 lbs. in 1872-73, worth 1,577,691*l.* In 1872-73 the export of indigo amounted to something more than 115,312 cwts., worth 3,426,824*l.*; and of sugar to 630,938, worth 492,743*l.* The increase in the produce of sugar has been very marked, it has indeed nearly doubled. India-rubber, from the *Ficus elastica* of Assam, is also a product belonging to the region whose commercial centre is Calcutta. In 1872-73 there was a large increase in the quantity exported, namely, 21,571 cwts., worth 143,760*l.*, against 15,628 cwts. in 1871-72. Some India-rubber also comes down the Irawadi from the same region, and specimens have recently been submitted to the Bengal Chamber of Commerce from the Shan States, which were not marketable in the state they were sent, but which, if properly prepared, would be worth 59 rupees per maund at Calcutta.

The special product of the Madras Presidency, besides cotton, is coffee, the great mass of which is brought down the gháts from the hill districts of Mysore, Curg, Wynaad, and the Nilgiris, to be shipped from the Malabar ports. Some is also shipped in South Kanara and at Tutikorin, as well as from a new port in Travancor. The whole quantity exported, in 1872-73, was 41,462,705, worth 1,128,549*l.*, besides that exported from the Travancor estates, the amount of which is annually increasing. This is a considerable decrease compared with 1871-72, but it is merely due to the unusually large exportations in the latter year. In like manner the importation of coffee into Bombay was unusually high in 1871-72, and consequently there was a decrease of nearly six lakhs in the importations of the present year. The Travancor coffee district is on the Asambhu hills in the extreme south of India, near Cape Comorin. Colachul is the port which was first occupied as a station for the preparation of coffee in 1870. It is 25 miles from the foot of the Asambhu hills, and the coffee is brought from the foot of the ghaut in carts. The estates cover 9,382 acres, of which 5,105 are planted. In 1872 about 500 tons of coffee were exported from Colachul, which has been doubled in 1873. The first ship called there in March, 1871, and since that date other ships have loaded at the port; but a survey is urgently needed.

The trade of the coast of Malabar has a special interest of its own; historical, because this was the part of India which Vasco da Gama first brought into direct commercial relations with Europe; economical, because it is in some degree special and isolated. In 1872-73 the total value of the imports into Malabar was 1,442,981*l.*; the largest item was rice, of which, owing to bad harvests, 1,102,016 cwts. were imported. Of cotton goods came 11,753,593 yards, of gunny bags 310,671. The

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value of the Malabar exports was 2,090,668*l.* The most valuable produce is that from the cocoa-nut trees. In 1872-73 the value of the export of cocoa-nut oil was 356,187*l.*, and of the coir yarn and rope 176,482*l.* Next comes the pepper, of which 77,617 cwts. were exported, worth 116,438*l.*; and 24,235 cwts. of ginger, worth 27,889*l.*

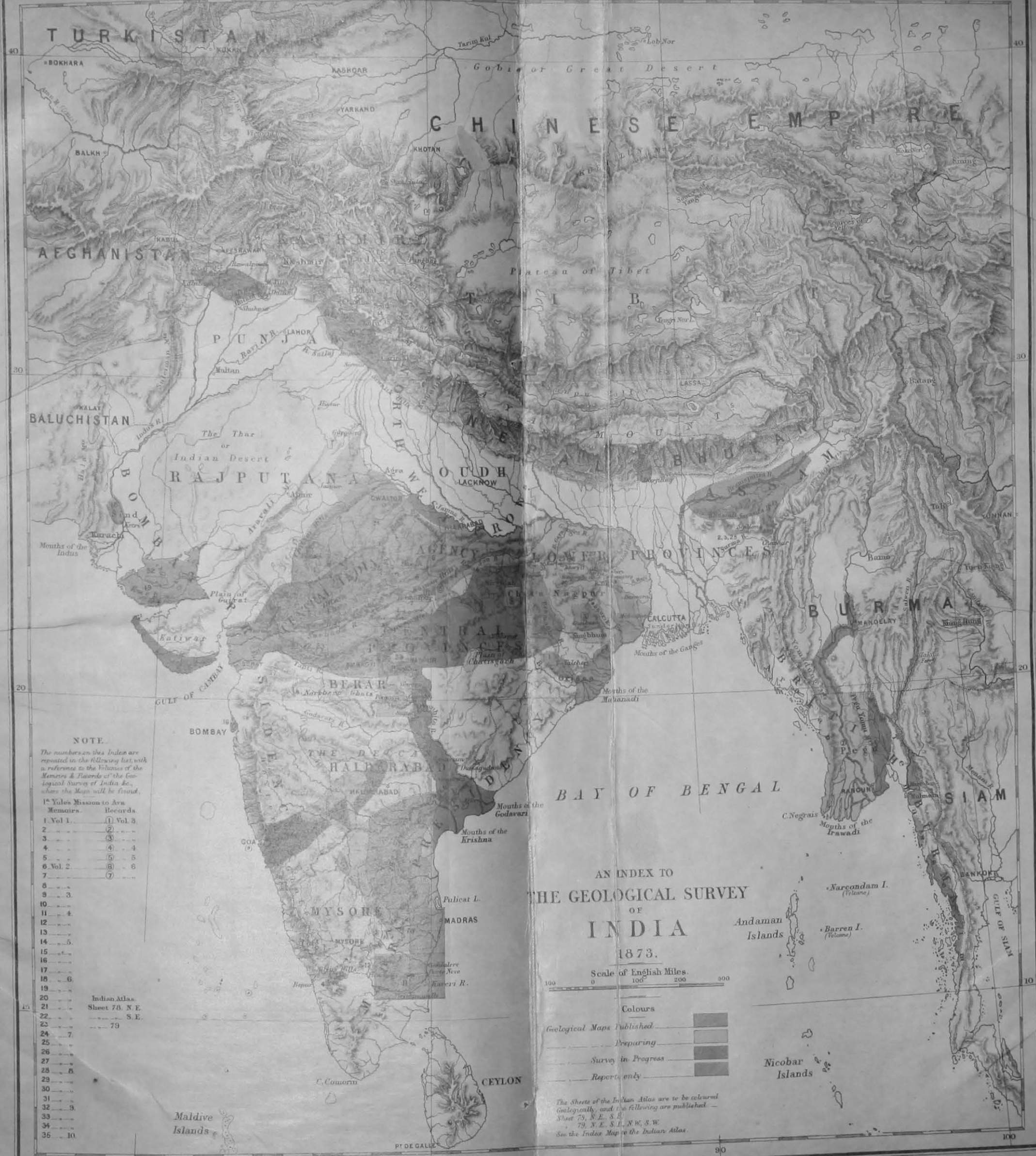
There is an increasing trade from India in hides and skins. In 1872-73 the export rose to 22,989,615, worth 2,921,416*l.*, an increase of nearly three million hides compared with the previous year. Wool is chiefly exported from Bombay and Karáchi. There was a falling off of three million lbs., the quantity in 1872-73 being 20,394,718 lbs., worth 838,042*l.* Saltpetre is fast recovering its former rank as an important article of export. The trade was much greater last year than in any previous year since the close of the American war. The exportation has been free since 1867. In 1872-73 there were 518,982 cwts. of saltpetre exported, worth 536,314*l.* Of teak timber 50,443 tons were exported, worth 356,386*l.*, a great improvement on the previous year. In British Burma, besides rice and timber, the great export is *cutch*, manufactured in large quantities for export to Europe, from the *Acacia catechu*, chiefly in the Prom district.

Chinchona bark, yielding quinine and other febrifuge alkaloids, will soon become as important an article of export as it is one of the most valuable products of India for home use. The exports of bark from the Nilgiri Hills, on the part of the Government, during 1872-73, the first regular year of export, amounted to over 20,000 lbs., which realised 4,000*l.* in the London market. About the same quantity will be exported in 1873-74, but after that year the trade will rapidly increase. At the same time the East India and Ceylon Chinchona barks, from private plantations, appear regularly in the monthly particulars of bark sales in the London market, selling at from 10*d.* to 4*s.* per pound; very good average prices as compared with those obtained by the South American barks.

The chief present interest in the sea-borne traffic of India lies in the development of the transport of merchandise by the Suez Canal. At present, out of the total value of the trade of India with Europe and America, about 40 millions, or 60 per cent., passes annually through the Suez Canal. The number of Suez Canal steamers that arrived at Calcutta in 1872-73 was 91, against 89 in 1871-72, and at Bombay 122 as against 88 in the previous year. A trade has thus sprung up with the countries bordering on the Mediterranean. The export trade is worth 1,539,240*l.*, but India receives only 186,573*l.* worth of imports in return. The Russians, during two previous years, had attempted to force a trade between Odessa and India by the canal, which has now been abandoned. Two steamers, subsidised by the Russian Government, sailed from Odessa in March, 1871, with cargoes of coal, one for Bombay, the other for China. They returned, the former with rice, cotton, and coffee, the latter with tea, in May and June. In 1872 similar voyages were undertaken, but they were not successful, and in 1873 they were given up. There has also been a great decline in the exports to Genoa. On the other hand, Austria, Syria, and Sicily appear for the first time, and the decrease of trade with Genoa is compensated by an increase with other ports of Italy, and with Trieste. The trade of the free port of Aden is also thriving. It amounts to 1,407,102*l.* of imports, and 834,087*l.* of exports, chiefly coffee, raw and manufactured cotton, grain, and ivory. The coffee trade was worth 138,496*l.* Much of it comes to Aden from Mocha and Hodaida in native boats, because there is no tonnage at those ports.

The trade of the East Coast of Africa is, to a great extent, in the hands of natives of India; and there is a considerable traffic with the ports of Kách and Bombay, although the facilities for direct communication with Europe are tending to lessen it in future years. There are about 4,000 Muslims and Hindus of British India established at Zanzibar and other East African ports. The Muslims are of the Khoja, Bohra, and Memon sects. The two former are Shia'ahs, the latter Súnnahs. The Khojas settled in Zanzibar in about the middle of the 17th century, and are chiefly from Kách and Jamnagar. They number 535 families, governed by a council of five elders, and they annually remit about 6,000*l.* for religious purposes to Agha Khan, the head of their sect in India.* There are 2,000 Khojahs in Zanzibar, 137 in Bagamoyo, and a few in Pemba, Quiloa, and Dar Salam. The Bohras came from

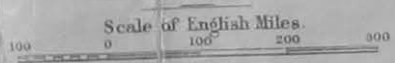
* The Khojahs are converts to Islam from the Hindus of Gujrát, Katiwár, and Kách, taking their name from one of their early teachers. They number 6,000 in Bombay; 5,000 in Gujrat; 20,000 in Katiwár, and 3,000 in Kách. The present head of the sect is Agha Khan Muhammad Husain Husaini, a son-in-law of the late Fat-h 'Aly Sháh of Persia, and a descendant of Imám Hásan es-Sabbáh, the founder of the sect of the Assassins in 1090 A.D. and known to the Crusaders as the "Old Man of the Mountain."



NOTE
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 79, N. E. S. E. N. W. S. W.
 See the Index Map in the Indian Atlas.

Surat, and settled on the north-west coast of Madagascar, for trading purposes, at about the same time that the Khojahs established themselves at Zanzibar. The Bohras next formed trading stations at Pemba and Lamu. During the last fifty years they have ceased to come from Súrat and Rájkot to the African coast, but there has been a great immigration from Kách. The Bohra community is guided by a Mulla, and has no council such as regulates the affairs of the Khojahs. There are 250 families of Bohras in Zanzibar, 142 at Mombas, 51 at Pemba, 42 at Lamu, and 21 at Malinda. Of the Hindus there are 474 Banians belonging to the Bhattia and Wania sects of the Maharajahs, from Kách. They are prevented by their customs from bringing their wives and children to so distant a port as Zanzibar. These natives of India hold the local trade in their hands, and also do a very considerable outside trade both to Madagascar and Mozambique, and to England direct. Formerly Bombay was the *entrepôt* of East African products. These are now shipped direct to Europe, unless used as remittances to Bombay, and in this form they will decrease, and be replaced by the usual operations of banks. So that the Kách and Bombay trade has greatly fallen off, and will continue to do so. The chief trade between India and the East African ports is in cotton cloths. In 1871 the whole value of the trade between Kách and Zanzibar was \$281,660, and between ports of British India and Zanzibar \$396,889. Of this \$264,400 worth of cotton cloth came from Kách, and \$344,550 from British Indian ports: the whole value of cotton cloths imported into Zanzibar in that year amounting to \$1,345,850. The Indian merchants also carry on considerable trade with the city of Mozambique; ten Indian houses doing business there to the extent of 60,000*l.* a year. In 1871-72 the whole import trade of Zanzibar was valued at about 420,000*l.*; and the export trade at nearly 500,000*l.*, carried by 58 merchant ships. Of the export trade 105,000*l.* belonged to Zanzibar island, consisting chiefly of cloves and cocoa nuts.

In addition to the sea-borne commerce of India, there is the land traffic through the passes of the Himalayas which lead from Sind and the Punjab to the lofty plateaux of Afghanistan, Turkistan, and Tibet. In 1862 Mr. Davies estimated the trade beyond the mountain frontier at 1,000,000*l.*, and it has considerably increased during the 12 years that have since elapsed.

The trade of the Lohani merchants (called Povindahs or runners), who are the channels of communication between India and Central Asia, is a very old one. Only militant merchants of this description could ever have made a profit out of a commerce which had to traverse difficult mountain ranges, through tribes of savage robbers, and the countries between them seamed with the customs lines of greedy, short-sighted chiefs. Starting from Bokhara with his merchandise, the Lohani would be called upon first at Karshi for the dues claimed by the Tora or Prince governing there, then for customs dues on the Oxus, octroi at Balkh, customs at Khulm, at Duab, at Kamard, at Bamian, at Kabul, and so on to the point where he reached the British frontier. They are the victims of most unequal and heavy exactions at the hands of the officials of the Amir of Afghanistan. From among the imports to Hindostan, they have to pay for camel loads of assafœtida and of walnuts, worth respectively 130 and 16 rupees, equally 18 rupees. Camel loads of pistachios and pomegranates, worth 120 and 30 rupees, pay 32 and 18 rupees. Among exports from India, English cotton goods, worth 3,000 rupees the camel load, pay 74 rupees; indigo, valued at 400, pays 72 rupees; tea, worth 800 rupees the load, pays 98 rupees duty. Besides these demands of the governments, there are the exactions of the officials and petty chiefs at every stage on the road, and the black mail of the various tribes through which he passes; the Turkmen on the Oxus, the Uzbek robbers of Muzar Shurif, the Tartars of the Dasht Safid, the Hazaras of Syghani and Bisût, the Wurdaks between Kabul and Ghazni, the Hotuks between Ghazni and Kutawaz, the Sulaiman Khyal of Kutawaz, and the Waziris between them and the Indus valley. But the Povindahs banded together in large caravans to resist exactions that would render their trade impossible. They defied the robber tribes here, compounded with them there, avoided or slipped past in the night some customs post of weaker chiefs, whose pursuing emissaries they could defy, and bribed officials at others to shut their eyes to the value of the richer bales. And so, sorely harassed at every step, losing men, horses, camels, bales of merchandise here and there on their way, bribing, cajoling, bullying, defying, fighting, twice every year did the caravans of these hardy traders, seeking their precarious gains, battle their desperate way through the deserts of Bokhara, the defiles of the Paropamisus, the Ghilji plateau, and the passes of the Sulaiman range, across the Indus to the Punjab. The Kafilas have to pass the Sulaiman mountains in one great company for mutual protection. They

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throw out advance and rear guards, and occupy difficult portions of the road in force, while the camels pass. At night the Waziris often make attacks, and plunder in spite of sentries and pickets. Throughout the day these robbers hang on the skirts of the Kafilas, along the hill tops and in the ravines, waiting for opportunities to make a dash on a camel or two. Much of this is now changed for the better, with the natural result of a vast development of the trade. There now exists one government from the Oxus to the Trans-Indus plains, for the first time since 1780, when the empire of Ahmad Shah began to fall to pieces under his son Timûr. At the same time the plains of India have all come under one Government, and once across the Indus the merchant finds himself in a state of security the most absolute. If the rest of the route was made safe, and the duties in Afghanistan were fixed at a moderate *ad valorem* rate, the Povindah merchants might make four trips in the year instead of one, because they could proceed independently instead of being obliged to proceed in strong caravans, and the value of the trade would assume much larger proportions. The Povindahs number some 12,000 fighting men, with 60,000 camels, and their trade by the Gomul Pass is worth 60,000*l.*, in spite of the serious disadvantages with which they have to contend. Every year they lose a hundred or more men, and at least two per cent. of the camels, besides some hundred loads, at the hands of Waziri and Sulaiman Khyal tribes. The Kafilas move towards the plains in October, leaving their families at the foot of the hills. The largest proceed to Multan, and thence find their way to the chief marts of India. They bring down the wool of Kirman to Amritsar and Ludiana, which places do not attempt to rival Kashmir in the production of the higher descriptions of shawls, but prefer to produce the coarser and cheaper article most in demand. In 1851-52 the import of Kirman and Turkistan pashmina wool into Amritsar amounted to 1,250 maunds of the last and 100 of the first. Ten years later there were 1,000 of the first and 500 of the second. Now Kirman wool is one of the most important Povindah imports by the Gomul and Gwalezri routes. The Povindahs also import raw silks, gold and silver wire, dried fruits and almonds of Kabul, horses and ponies. They return with English cotton cloth of every kind, crockery and metal goods, broad-cloth, brocades, indigo, spices, tea, carpets, lungis, chintzes, gold coins, drugs, pearls, gold lace, and the gold thread of Delhi. Before the interference of the Russians, English cloth and tea was exported from Bokhara to Samarkand, Khokand, and Tashkend, but now the Russians have prohibited the trade in order to establish a monopoly.

The commercial traffic between British India and Eastern Turkistan, across the Himalayas, only dates from 1867, when Dr. Cayley was first sent as resident to Ladak. In 1870 the Maharaja of Kashmir was induced to abolish transit dues on goods passing from India to Central Asia, the negotiations being conducted on the part of the English Government by Captain Grey. The equivalent given was the remission of all Indian sea-board duties on trade between the Maharaja's territories and Her Majesty's dominions. One item of trade for which there is a great demand in Europe is borax. It is procurable at Rudok, in Changthân, at ten annas per maund, of such quality that only about a quarter is lost in refining, whereas that obtained at Puga, the Maharaja's monopoly, loses one-half. The former, however, has now to be brought on sheep to Rampur, on the Sulej, at the rate of two miles a day, so that the price in the plains becomes six to seven rupees a maund raw, and 15 rupees per maund refined; and it is exported at 25 rupees a maund at the sea-board. Notwithstanding this profit the export is small, owing to the difficulties under which the supply now labours. The consequence of the abolition of transit duties was that by 1871 the traffic had increased seven-fold; in that year it amounted to 124,177*l.* The Yarkandi merchants used to meet the Indians from the Punjab at Leh, but now the Amritsar traders find that the Yarkandis are coming down in yearly increasing numbers to the Punjab to attend the Palampur fair in Kangra, so they do not trouble themselves to undertake the weary journey up to frozen Ladak. It is to be regretted that nearly 50 per cent. of the total imports from Turkistan consists of bhang. But next in importance comes gold dust. £8,590 worth was bought in 1871, and the supply is likely to increase, as a new goldfield has been discovered near Khotan. Next comes pashmina, or shawl wool, most of which goes to Kashmir, hardy baggage ponies, silver ingots, carpets, felt sheets, and raw silk. The latter article is capable of great development. The Yarkandis take back cotton piece-goods, for which there is an immense demand, Kashmir shawls, sugar, Kangra tea, gold brocades of Benares (kincobs), and spices. Mr. Shaw has recently called the attention of the manufacturers of Manchester and Bradford to the importance of

developing this trade. Kashgar is only 390 miles from Jhilm, in the Punjab; and it is demonstrable that English merchants could convey their goods to Turkistan at a cheaper rate than the Russians, and that they could, therefore, undersell them. The cost of transport of 1 cwt. of cotton piece-goods from Moscow to Eastern Turkistan is 4*l.* 7*s.* 8*d.*; the same from England is 3*l.* 17*s.* 5*d.* All that is necessary is to send suitable goods to the markets, and to study carefully the tastes of the buyers. The goods brought in exchange are admirably suited for a long and difficult mountain route, being of small bulk and great value, raw silk and gold dust. A great development of this interesting trade may be expected in the near future. In 1872-73 the total trade with Turkistan was worth 158,480*l.* The traffic has increased, especially the tea exports. There has also been a development of the through traffic from the Punjab by mules. A troop of 170 went from Jalandhar to Ladak, which at once obtained return freights to carry borax to Kulu, so that the venture was very successful to the owners of the mules, and will doubtless be followed by others. The Treaty of Commerce between the British Government and the Amir Muhammad Yakub Khan, ruler of Kashgar and Yarkand, was signed on February 2, 1874. It provides for the passage of merchants from one state to the other, and that there shall be no duty on goods exceeding 2½ per cent. *ad valorem*.

In forwarding the treaty of commerce which he concluded with the Amir of Kashgar last February, Mr. Forsyth reported that the bazars in the towns of Kashgar and Yarkand were well filled and the trade brisk, but one great drawback to trade at present is the want of a proper currency, and another is the difficulty of the road over the Himalayas. It is probable that mules will supply the carriage, aided by Yarkandi ponies. Mr. Forsyth has made as complete a collection as possible of samples and specimens of goods in use in Eastern Turkistan which are capable of being manufactured profitably in India or England, and he has given information respecting the packing of goods and the means of transport. It seems to be clear now that English goods can be conveyed at a cheaper rate through India and over the Karakorum pass than through Russia to Kashgar.

A fair was established at Palampur in Kangra in 1867, with a view to develop the local trade, which promised to be capable of great expansion, as well as to open out commercial relations with Central Asia. Palampur is quite a recently created village, conveniently situated for the Punjab merchants, and 317 miles from Leh in Ladak. The first fair was experimental, but the returns showed that about two lakhs of rupees worth of goods changed hands in the few days the fair lasted, and there was a large demand for woollen fabrics. There were 30,000 persons at the first fair, among them several merchants from Central Asia, exchanging ponies, woollen blankets, Pashm shawl wool, borax, jade cups, gold, and musk for piece goods, brass vessels, English cloth, kincobs, boots, shoes, and ornaments. In 1870 the number of persons attending the Palampur fair increased to 30,000, but, unluckily, an early fall of snow stopped most of the traders who had not got beyond Leh. English piece goods, metal, and vessels were in very great demand. The fifth Palampur fair was held in November, 1871, when the Earl and Countess of Mayo were present. Traders came from Kangra, Jalandhar, and Amritsar, but no Yarkandi merchants were present. The value of goods exchanged amounted to 32,450*l.* Business fell off at the fair of 1873, and the attendance was smaller than usual, chiefly consisting of cloth merchants from Amritsar and Jalandhar, and traders in copper and brass vessels from Ambalah. Only two Yarkandi merchants appeared, who brought a few ponies, a good supply of carpets, numdas, and jade ornaments. The value of goods sold only amounted to 4,000*l.*, of which 2,000*l.* was for English piece-goods.

In the Eastern Himalayas there are trade routes from India to Tibet by Nepal, by Sikkim, and by the country of the Tawang Bhutias. The prohibition of trade between India and Tibet is solely due to orders from Peking. The local officers in Tibet would, it is said, gladly facilitate a direct trade; and even now there is considerable traffic through Sikkim, carried on by Tibetan, Lepcha, and Bhutea merchants. The Sikkim Rajah is willing to facilitate this trade, and Mr. Edgar, the Commissioner at Darjiling, will this year visit Sikkim, learn the actual state and prospects of trade with Tibet, and report upon the best line of road. On the north and east of Sikkim there are a succession of routes, leading into Tibet by seven passes through the southerly bend of the great range which embraces the Chumbi valley. The most southerly is by Jelepla, 45 or 50 miles from Tumlung, the Sikkim Raja's capital, which is 13,000 feet above the sea. The two next, to the north, are the passes of Guatiula and Yakla, the latter 14,000 feet high. These are rarely interrupted by snow for many days, and form the easiest way to the Phari valley. Next, to the north, is the Chola

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Pass, 15,000 feet high, which is the direct route from Tumlung, the capital of Sikkim, to Chumbi. Then comes the Tankrala Pass, 16,083 feet high, the most snowy pass in Sikkim, difficult of access, and unsuited for traffic. The Donkiala pass is at the head of the Lachung, the eastern branch of the Tista river, and is at the north-east corner of Sikkim, under the great peak of Donkia, and above the Tibetan lake of Cholamu. It is 18,466 feet above the sea. Lastly, the Kongralama Pass, 15,745 feet high, is at the head of the Lachin, the western branch of the Tista. The Donkiala and Kongralama passes are used by the Tibetans, who bring cattle to graze in Sikkim, and by the inhabitants of the Lachin-Lachung valley, who, twice a year, carry wood into Tibet, and bring back loads of salt in return. The construction of a good road is quite practicable, but it would be expensive. The Tista valley may be ascended to a height of 4,000 feet above the sea in a distance of fifty miles by an ascent of 1 in 50 to 1 in 100. But then there is a further ascent of 900 feet to the pass, and a slight descent on the other side to the Chumbi valley.

In 1871 a native pundit, trained as an explorer by Major Montgomerie, made his way from Darjiling, through Sikkim, into Great Tibet, by the Wallangchoon pass mentioned by Dr Hooker, and called the Tipta-la by the pundit; and thence to Nepal. He describes the Tipta-la road as difficult, and the ground north of the pass as very elevated and barren. The first place he reached beyond the pass was a large standing Bhutia encampment called Tashirak, on the Arun river, about 1,500 feet above the sea. Marching northwards he crossed the Nila-la pass, and obtained a passport to Shigatze. He was now fairly in Tibet, reaching the village of Lamadoug on the 4th of September. This, and other places in this part of the pundit's route, are on the Arun, a tributary of the Kosi, one of the chief rivers of Nepal. He next came to the Chonto Dong lake, a fine sheet of water about 20 miles long by 16; at an elevation of 14,700 feet above the sea. The water is excellent, although the lake has no outlet. It forms a portion of the boundary between Sikkim and Tibet. Thence crossing the Gyaling range of mountains, by a pass covered with snow, he reached Shigatze on the 17th of September. From Shigatze he made his way south-westwards towards the Dingri-maidán, and reached the great Shukia monastery, situated on a tributary of the Sang-po, about 13,900 feet above the sea. Crossing the pass of Dong-la he again came into the region divided by the Arun river, on the banks of the Dingri-chu, the great western branch of the Arun. Following its course, he arrived at Dingri-maidán, a town situated on a large open plain. From this place there is a good road along the Dingri-chu valley to Jong-ka-jong, and thence, by Kirong, to Katmandu. Officials are the only persons allowed to travel by it, all others taking the route by Nilam. This leads over a snowy pass called Thung-lung la, 18,460 feet above the sea, to the town of Nilam, a place with 250 houses, ruled by two jongpons appointed by the Tibetan Government. North of the passes the country is tolerably level, but to the south the ground is very rugged and broken. That below the Thung-lung-la pass is, however, much more difficult than the Wallangchoon route. From Nilam the road follows the course of the Bhotia-kosi into Nepal, which it crosses 15 times by means of three iron suspension and eleven wooden bridges. In one place there is a chasm which is so perpendicular that the path is supported by bars of iron and slabs of stone stretching from peg to peg and covered with earth, for a third of a mile. The pundit's route, 844 miles long, took the explorer completely round Mount Everest; and his survey gives a general idea of the direction of the mountain drainage between the Himalayan water-parting north-west of Kirong, and the point where Turner crossed it near Chumalari, up to the Sang-po. So little is known of the trade routes from India to Tibet, that the account of the pundit's journey, as given by Major Montgomerie, is possessed of special interest.

There is another route to Tibet through Bhutan to Dewangiri, a post on the frontier of Kamrúp, which now belongs to the British, and is a centre of trade. A more promising road, still further east, leads from the Assam district of Durrung, through Tawang, the Bhutea Rajas of which are very friendly to the English, and independent of the truculent rulers of Bhutan proper. There is a great fair twice a year in connection with this route, at Udelgiri.

The Tibetans are eminently a commercial people, and it is stated that every person in authority, including even the Chief Lamas of the monasteries, keeps an agent and carries on trade on his own account. Besides this, a large number of Mussulman traders from Kashmir are located in the capital. The inhospitable nature of the country, which produces few articles that are required by the rest of the world, makes bullion an important article of export, and there is no doubt that with a more careful *exploitation* of the mines of silver and gold which abound in Tibet, commer-

cial transactions would assume larger proportions. Silver especially seems to be frequent even near Lhasa, but the authorities prohibit the working of the mines, it is said from a superstition that it would bring impoverishment into the country, and cause the men to degenerate. There is no prohibition against working the gold mines; and those of Thok Jalung in 32° 30' N. latitude, north of Kailas, and under the still loftier peaks of Aling Gangri, are said to be especially productive.

The commerce of Tibet with China is carried on almost entirely along the great road between Tatsianlu and Lhasa. The Chinese import into Tibet tea, cotton fabrics, thread, porcelains, and Yunan ponies, and receive from Tibet silver, salt, blankets, and other woollen goods, furs, drugs, and musk. Brick tea is the especial article of import from this side. It is made mostly in the neighbourhood of Ya-tsow in Szechuan from a hedgerow tree fifteen feet high, with a large and coarse leaf. The packet of four bricks (weighing 5 lbs. each) is bought at Tatsien-lu for about six and fourpence; it sells at Lhasa for £1 4s. to £1 8s., and at a much greater sum in the districts which lie off the grand road. It is clear, therefore, that our Darjiling planters could supply Lhasa with tea which would undersell the Chinese tea at a very considerable profit, and could make a still larger profit by supplying the country which lies between Lhasa and the frontier of Sikkim. The better teas are seldom imported, and they cost about two rupees a pound at Lhasa. M. Desgodins, one of the missionaries settled there, calculates the annual supply of tea at about six millions of pounds, producing not less than an income of £300,000. Chinese cottons are largely imported into Eastern Tibet, but at Lhasa their place is supplied by Indian goods. Silks of good striking colours sell at about their weight in silver, and are generally brought from the north of China through the Koko-Nor country.

China imports from Tibet a large quantity of silver, including great numbers of English rupees melted down into ignots, and in their original shapes. Some of this finds its way through Ladak, but a large quantity passes into Tibet from Assam, by the Tawang route, as the Tibetans who come down to our frontier fairs for trade generally take money in exchange for their goods. The inhabitants of the mountainous country of Szechuen clothe themselves to a great extent in Tibetan blankets. Tibetan musk is much esteemed in China, and there is a great demand for it, but it reaches the sea-coast in a very adulterated state; the best musk is said to be that produced in the Mishmi country, and this trade, at least, ought to come into our own hands. Salt is abundant in all parts of Tibet, and is produced by solar evaporation in shallow pits. Tibet supplies part of Szechuen, the whole of Yunan, and all the wild tribes along the Lu-tse-kiang and in the north of Burma.

Of the trade with the north we know very little. The Pandit states that from Jelung in Tartary are brought gold lace, silks, precious gems, carpets of a superior manufacture, horse saddles, horses, and a very large kind of *dumba* sheep.

Between Tibet and India there is a considerable trade through Kashmir and Ladakh; some also passes through Nepal and Bhutan, especially Tawang, to the east, where Tibetan territory actually marches with our frontiers. English woollen cloths are much sought after in Tibet, but they have apparently to contend with importations from Russia. M. Desgodins saw numerous packets on their way to the salt works wrapped in wax-cloths bearing the name of a Halifax maker, and he says they appear made expressly for Tibet, where they sell well, though the quality is but mediocre. The people are used to European sizes, and the cost is 20 to 40 francs a square piece of the whole breadth. Scarlet is the favourite colour; green and violet are not so much in demand; a golden yellow would fetch a good price. The scarlet cloth is used for shawls, dresses, borders of carpets, and linings for boots and saddles. Flowered calicos, both Indian and European, are also much used for lining walls. The missionaries frequently found tin-plates evidently of English manufacture. Mr. Edgar reports that the demand for indigo is very great, and the profit on it is greater than that on any other import, varying from 50 to 100 per cent. on the cost of importing the article. This is accounted for by an alleged difficulty in getting it in small quantities from the producers, which creates a practical monopoly in favour of traders with what is for Tibet a large capital, while the use of the dye is universal in the country. Corals also form a large item of the Indian imports; the preference is for round grains pierced, or oval grains with the ends truncated, and pierced through the length; a piece as large as a pea fetches its weight in gold, and the price augments with the size; the darkest colours are the most esteemed. Turquoises and other precious stones, and pearls, are much imported. Rice is mainly imported for the use of the Chinese residents.

The chief exports from Tibet by the Nepal and Ladakh routes are blankets, musk,

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yaks' tails, borax, ponies, gold and silver. The Kashmir merchants almost always pay in bullion for the articles imported by them, and much of the silver is that which has entered Tibet by the Tawang route. Tea is brought into Darjiling from Tibet for the use of the natives—a fact which does not tell for the enterprise of our planters. Tibetan salt also is sold in the market at Rs. 2 a maund less than the price of sea-borne salt; but the demand will probably cease with the opening of the railway. Coarse blankets command a good sale in Darjiling, and musk, chowries, and silk piece-goods also enter our frontier. If a good frontier road were opened through Sikkim, Mr. Edgar believes that large quantities of cows and sheep, *ghí* and wool, the real wealth of Tibet, would find their way into India*.

The most easterly great prospective trade route is that from Sudiya, through the country of the Mishmis, and the unknown region beyond, to Patang, and the Chinese province of Sze-chuen. An annual fair is held at Sudiya, near the north-eastern frontier of Assam, which is frequented by the Mishmis, bringing caoutchouc, wax, skins, and other forest products from beyond the frontier, and by people of the Abor, Miri, Khampti, and Singpu tribes. The fair was held on the 10th of February, 1872. The Chulikota Mishmis, who had not been allowed to come for some years as a punishment for former raids, were permitted to attend; and about a thousand came, bartering their forest produce for cloth, brass vessels, and opium. The Miris and Khamptis brought 2,570*l.* worth of ivory. The fair is tending more and more to cement friendly feelings with the hill people, which is extremely important, as the forerunner of future direct commercial intercourse between Assam and the western provinces of China. The total value of the forest products brought to the Sudiya fair is about 3,000*l.*

As the largest portion of the products of India is consumed in the country, the internal trade is even more important than that with foreign countries, and the condition of the people may, to some extent, be shown by the character of the traffic between province and province. The materials, however, for such an examination, are very incomplete. In the Punjab the value of the external trade, in 1872-73, was 5,024,883*l.* There was a considerable increase in the value of the silk and shawl manufactures, the whole value of the Punjab manufactures being estimated at 5,315,400*l.* From the handlooms come valuable white and coloured cotton cloths, and thick floor cloths with coloured stripes. The woollen manufactures are from the exquisitely soft fleeces of Rampur and Kirman, from country sheep wool, and goat and camel hair. The silk manufactures of the Punjab also form an important branch of industry. The chief seats, Amritsar, Lahor, Multan, Bhawalpur, and Jalandhar; and the raw silk is obtained from the Afghan and Yarkandi merchants, from Bengal and China. The boat traffic on the Indus is registered at Sakhar. The up trade amounted to 95,286 maunds, worth 47,588*l.*, and the down trade to 587,646 maunds, worth 448,476*l.*

From Delhi come the silk embroideries, and Benares is famous for its gold brocades. In the Bombay Presidency there are extensive silk manufactures, all by handloom weaving, and all consumed at home, the raw silk coming chiefly from China and the Persian Gulf. At Ahmadabad there are manufactures of brocades rivalling those of Benares. The exhibitions at Lahor, Rurki, and Calcutta, in 1864, at Nágpur in 1866, and at Madras, and other places in India, have been very useful in stimulating manufactures, and making designers mutually acquainted with the products of the different parts of a vast empire. The commencement of European influence of the best kind on Indian manufactures is beginning to be clearly perceptible. An advance is being made in every department, but schools of design are much needed, and one at Lahor has been determined on. The labours of Dr. Hunter at Madras in this direction have been most useful.

If the once famous manufactures of Bengal, the silk stuffs and Dacca muslins, have nearly disappeared, it has only been to change their seats, but not to be destroyed. These industries not only still exist, but they are growing in importance, and in some respects are likely to hold their own against the imports from Europe. The very fine and richly decorated tissues, for instance, will probably always be better and more cheaply manufactured by hand.

The trade of the Ganges is registered at Sahebgunj, because all the great tributaries enter the main river above that point, and it is above the point where any Ganges mouths leave the parent stream. During 1872-73 the number of boats that passed Sahebgunj was 43,000, with an average freight of 300 maunds each; and 11 steamers belonging to a European Company passed up and down, which seem to get very little of the ordinary traffic of the country. The total weight of the cargoes

*From the *Calcutta Review*, July, 1871.



Between the Below Chok path is to be by iron bar where possible or yaks.

While Bhutan is con- Tibet is remarkable game, and beasts of the sort is seen.



A MAP OF
TRADE ROUTES TO TIBET
 FROM
THE LOWER PROVINCES OF BENGAL
 AND ASSAM

Scale of Eng. Stat. Miles
 0 10 20 30 40 50

Explorers & their Routes.

- 1774. M^r George Bogle, Kuch Bahar, Buxa, Tashihjong, Phari, & Takulambo near Shigatse.
- 1783. Capt^m Turner, Kuch Bahar, Buxa, Tashihjong, Paraka, Wardipur, Phari, & Takulambo.
- 1815. Rishenkant Bose, Byni, Chirung, & Panaka.
- 1838. Capt^m Pemberton, Gowhaty, Baru, Dewangiri, Tassong, Tonga, Panaka, returning by Buxa, Kuch, Jahar, and Rangamully.
- 1848. M^r J. D. Hooper, Aranya Chat, Purnea, Bihangung, Talaha, Siliguri, Darjiling, Thana to Eastern Nepal as far as the Tambar Valley, Wallanchow & Yachma Passes, also to Sikkim as far as Cho La, Tankra La, Chelama Lake, Zoru R. Gubre M^t &c.
- 1854. Capt^m Godwin Austen, (Surveyor with The Hon. Ashley Eden's Mission) Darjiling, Daling, Pare, Panaka.
- 1866. Capt^m Montgomerie's Pundit, Dehra, Katmandu, Krong, Tulum, Shigatse, Ganga, Lassa.
- 1870. M^r W. T. Blanford with Capt^m Ewen, through Sikkim to Jelep La, Yak La, Cho La, Denka La, & Lengra Lama.
- 1871. Major Montgomerie's Asiatic, Darjiling to Nepal & Tibet, Tambar R., Wallanchow, Tashiruk, Chomedong Lake, Shigatse, Shakia Jong, Dirugi, Nilam, Katmandu, the Tambar again at Toplung, Dhankata.

Remarks on the Construction of the Map

This map includes the Surveys of Turner, Pemberton, Hooper, Godwin Austen, (with Eden's Mission) Blanford, Montgomerie's Pundit, & the Asiatic Surveyor, combined with the Indian Atlas, Bryan Hodgson's Itineraries, the maps of Assam, & the Lama Surveys incorporated by D'Anville in the Atlas de la Chine. D'Anville supplies the outline of Palgu Lake & the site of Aridjong, together with those parts of the Sangpo which were not seen by the Pundit, viz. between Sarkajong & Janglache, also between Shigatse & Chusuljong besides the long course of the river, otherwise unknown, below Chusuljong down to British territory where it is called the Dihong. The Suhans here beyond the British boundary is also from D'Anville. In using the Lama Survey on the North and East of Bhutan, it has been necessary to compress it, & between the southernmost Chinese route from Lassa to Batang, which as a high road may be assumed to be accurate in latitude; and 2^d the features, determined by Surveys in Bhutan & Assam. The Lama survey of this part does not contain any of the names in the itineraries across this region obtained from natives by Pemberton and others. It is however known that Towang in 92° 20' East Long. and 27° 35' North Lat. & Ruim' in 97° 5' East & 28° 5' North, are seats of Chinese-Tibetan governors, & in both of these localities the Chinese frontier may be said to coincide with the British; while between them the limits of Chinese authority cannot even be surmised. As the British frontier now runs at the foot of the mountains, and the mountaineers frequent British territory, it is reasonable to expect that the chiefs will soon be induced to admit Europeans among these unexplored highlands.

Note on the Route between Katmandu and Nilam in Nepal.

At Nilam, the Butia Kosi River is crossed 15 times on bridges, and the route follows the river through a vast chasm, where the road is 6th of a mile, at a height of 1500 feet above the torrent, driven into the precipices, and supporting slabs of stone, no more than 18 inches wide, and often only 9 inches. Men with loads reverse it, and also a few sheep and goats, but neither ponies nor parts of the same track are nearly as bad, but not so long. Trig. Survey Report, 1871, 2.

Bhutan & Tibet contrasted.

rich with verdure, forests, and orchards, and cultivated in every accessible spot, for its fertility. On the other hand, the variety and quantity of wild fowl, prey, flocks, doves, and herds in Tibet is astonishing. In Bhutan nothing Turner's Embassy, pages 216, 217.

was 209,200 tons down, and 182,766 up stream; chiefly oil seeds, pulses, sugar, wheat, tobacco, cotton, and saltpetre going down, and rice, salt, and gunnies going up.

IX.
TRADE AND
MANUFACTURE

In Oudh there is great excess of exports of agricultural produce over imports, and the province is dependent on outside trade for all manufactured goods, except coarse cotton cloths. The Central Provinces have large cotton manufactories, and the railways carry the great bulk of the traffic. A good deal of China silk is also used up in making the ornamental borders of the better sort of Nágpur cottons; and a considerable quantity of coarse brown silk, commonly called tussar, is raised in the Chattisghar country. The importation of cotton and grain from Málwa is increasing, the arrival of cocoa-nuts from the North-West Provinces has nearly doubled, and the imports from the east coast consist of salt and tobacco. Cotton is, of course, the great article of export. But there are no statistics of the weaving trade. The external trade of the Central Provinces, taking exports and imports together, is estimated at 12,750,000*l.* In Mysore there is no regular system of registering the trade; but the value of the exports for 1872-73 is given at 1,128,312*l.* They consist of betel nut, coffee, cotton, cardamoms, rice, silk, and sugar. The imports were 2,146,423*l.*, consisting mainly of iron, gold, pepper, salt, and pulses. Silk and cotton manufacture is carried on to a considerable extent, as well as the working of cutlery, copper vessels, and gold and silver lace. There is a large sugar manufactory at Palahalli, in the Ashtagram division. In the Madras Presidency complete information respecting internal trade and manufactures is wanting.

The numerous fairs held all over India, generally on occasion of pilgrimages to shrines, are most useful as stimulants to trade, and as extending the knowledge and increasing the wants of the people. At the great Delhi fairs 50,000 persons assemble, some of them coming from distances of 500 miles; and at the last great solar eclipse at Thanesar, in Ambála, in 1861, 200,000 persons assembled, from distances extending to 1,000 miles; and there are 127 other fairs in the Punjab, at which the assemblies number 10,000 and upwards. A set of rules has been promulgated for police management, water supply, conservancy, and medical aid, during the more important fairs. In the Bombay Presidency the *jatras*, or fairs, are held in all parts of the country, and in Sind, where they are held in honour of Moslem saints, the fairs are very numerous. This custom of assembling at shrines, and of taking the opportunity of the occasion to display merchandise, prevails in all parts of India, and is of immense advantage to the commerce of the country.

The exhibitions have served similar useful ends, but on a much more extensive scale, by disseminating knowledge of the products of India throughout all parts of the country, and by giving merchants and manufacturers broader and more enlightened views of their own interests, and of the interests of their customers. Mr. Baden Powell's handbooks of the manufactures and arts, and of the economic products of the Punjab, are most valuable results of the Lahor Exhibition. Dr. Forbes Watson has done much to furnish the means of obtaining an accurate knowledge of Indian wants to manufacturers in England. He has collected specimens of textile manufactures of India in 18 volumes, of which 20 sets have been prepared. They may be looked upon as 20 industrial museums to promote trade operations between the East and West in this department of commerce. They exhibit tissues which suit the Indian markets, and illustrate the principles which must be observed in all attempts to introduce into them designs which will satisfy the tastes of the people. These volumes have been presented on condition of their being kept in suitable buildings, and made readily accessible to 12 of the principal centres of manufacture in Great Britain, and to seven of the cities of India.

Dr. Forbes Watson has also submitted an elaborate and carefully thought-out scheme for an industrial survey of India, with a statement of the measures required to make its results available to commerce. There is still a want of a really exhaustive and systematic knowledge of the various products of India. There are abundant materials for a general superficial acquaintance with the subject; but more precise and comprehensive information is required, in order to render such knowledge really useful and practical. There are 2,000 articles named in trade returns, and 7,000 more are mentioned in various works, while the list is doubtless very incomplete, and there is some confusion about almost every article. A complete collection and identification of raw produce and of manufactured goods are required; trade museums might be formed, and an industrial survey organised. Limited markets are a bar to improvements, and production on a small scale is wasteful and costly.

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The proposed survey, among other useful results, might promote an extension of the demand for products of all kinds, by affording to every part of India easily accessible means of information with regard to the productions of the whole country. Dr. Forbes Watson's proposals are now under the consideration of the Government of India.

X.

CONDITION OF THE PEOPLE.

THE order for taking a census of the people of British India, and the measures that have been taken for introducing a system of birth and death registration, show the pressing need—that is felt for accurate statistics in all administrative work. Without correct information regarding the numbers of the people, there is no basis on which to found conclusions on the growth and rate of increase, on the sufficiency of food supplies, on the incidence of taxation, or on the spread of education. Such information is also necessary in order to show the health and general condition of the people, and the extent to which the rate of increase is modified by variations of seasons, conditions of water supply, and other causes.

Before the census of 1871, the want of statistical information in the provinces under the administration of the Lieutenant-Governor of Bengal had reached an extreme point. One or two examples will show the sort of dependence that can be placed in figures that are given in previous Administration Reports. In 1870 the population of Naddea was given at 568,712, “according to the latest returns.” The population, according to the census, is 1,812,795. The same Report of 1870 gave the population of Cuttack at 215,835. It is really 1,449,784.

The Bengal census was taken under the superintendence of Mr. Beverley, between December, 1871, and March, 1872. It was found impossible to make a synchronous census, or to adhere closely to all the details of the system adopted in England. All attempts to lay down any detailed scheme of operations to be adopted everywhere alike were abandoned, and plans were devised which seemed best adapted to attain the object in different localities. The English method was adhered to as closely as possible, and departed from as little as was practicable; and in some of the more important districts, including Rájsháhi, Dacca, and Calcutta, the enumerations were taken simultaneously.

The plan generally adopted was as follows:—The old divisions of the country were into villages, pergunnahs, chucklas, circas, and soubahs or vice-royalties. But the judicial divisions were different, so that the limits of a collector's jurisdiction as regards revenue matters are often not conterminous with his magisterial jurisdiction. There was too much uncertainty about such boundaries, and they were unsuited for census purposes. The country is also divided into police jurisdictions, called *thannahs* (by Regulation XXII. of 1813), each with an area of about 20 square miles, and as the agency of the police was resorted to, it was found most convenient to take the census according to these *thannahs*. The first step was to cause a list of villages and hamlets in each *thannah* to be prepared. Two enumerators were then appointed for each village, who were generally the head men. Their first duty was to submit a list of houses, with the names of occupants, and the correctness of a certain number of these lists was tested by the police. The census forms were then distributed, to be filled in and returned. The municipalities were called upon to make their own census arrangements, and the hill chiefs made lists of their followers. The boat population, which was an important item, consisting of 300,000 persons in 60,000 boats, was reached by taking a census at every landing during several days, the boats being marked as they were counted to prevent their being taken twice over.

The census appears to have been regarded in some districts with much suspicion by the people, who naturally believed that it was the forerunner of a new tax; and all sorts of rumours were spread abroad. One man hid his babies, on the ground that they were too young to be taxed. In Murshidabad it was believed that the authorities intended to blow the surplus population away from guns; in other places it was reported that it was to be drafted to the hills, where coolies were wanted. But generally the people patiently resigned themselves to their fate, and were counted without making any actual resistance; and they are doubtless waiting, in great suspense, for the expected consequences of the measure. The form distributed to the enumerators had columns for the number of houses, the names of adult males in each, the number of adult females, boys, girls, and the totals, with caste, nationality, and occupation. The census was not scientifically accurate from not being simultaneous, but it was taken with great care, and the population is, if anything, understated. Its total cost was 21,600*l.*, or about a farthing a head.

This was the first regular enumeration of these Provinces, and the result is most

surprising. Indeed, Sir G. Campbell observes that it may almost be said to revolutionise our ideas both in regard to the amount of the population and relatively in regard to its distribution in different districts, races, and religions; while by showing that the numbers vastly exceed any former computation, it wholly altered calculations with respect to the incidence of taxation, the consumption of salt, and many other matters. The total number of persons counted in the provinces under the Government of Bengal was found to be 66,856,859, of whom about 2,000,000 belong to the tributary States. The population of Calcutta was 447,600. The population of the Lower Provinces, given in the Administration Report of 1870-71, was 42,500,000; so the reality was more than half again, and all calculations based upon those figures are wrong to that extent. Half the area of the Bengal Government consists of the hilly and thinly populated tracts of Chota Nágpur and Assam, with only 87 and 63 souls to the square mile. But the other half is one of the most densely peopled countries in the world. In Bardwán there are 573, in Patna 553, in Rajsháhi 500 souls to the square mile, as compared with 262 in the United Kingdom, and 422 taking England alone. For the whole of Bengal, in the restricted sense of that word, the number is 430, for Behar 465. But if the unculturable or uncultivated lands at the foot of the hills, or waste and marshy, are left out, the food-producing area cannot average less than 650 souls to the square mile, or one for each half acre, crops being excluded which are not food producing. This enormous population, moreover, inhabits a country which exports grain, so that the supply of food is abundant in ordinary years. But the consequences of a failure of crops are terrible to think of, and the bare possibility points to the urgent importance of a perfect system of communications between all the grain-producing provinces both by sea and land.

The census shows that the number of men and women is nearly equal, there being 99.6 females to every hundred males; and a tendency to excess of males over females nowhere appears. In some districts the males, in others the females preponderate.

About two-thirds of the population are agriculturists. But the most interesting results are those which show the proportion of Hindus and Muhammadans. In Central and Eastern portions half the population is Muhammadan, while in some of the districts the latter largely preponderate. Yet it is very remarkable that this preponderance does not prevail around the old seats of Muhammadan power. In Dacca there are comparatively few, round the site of ancient Gour hardly any, at Patna only twelve per cent. of the inhabitants, and at Murshidabad the vast majority of the people is Hindu. The conclusion is that the Bengal Muhammadans are not descendants of the old conquerors, but of converts, who were low-caste Hindus, and embraced Islam to escape from their ignoble position under the Hindu system. These provinces contain 21,000,000 Muhammadans, more than in any other country in the world, and they are probably on the increase. It is asserted (but the assertion must be taken with reserve) that it is a mistake to suppose that the Hindu religion is not proselytising. Any number of outsiders, so long as they do not interfere with established castes, can form a new caste and call themselves Hindus, and the Brahmins are always ready to receive all who submit to and pay them.

The census of the North-West Provinces was taken between the 20th of May, 1872, and the 15th of November, 1873; the actual enumeration having been made on the 18th of January, 1872. The operations were conducted under the superintendence of Mr. W. Chicheley Plowden. The preliminary work was carried on in the end of 1871, and consisted of an enumeration of houses and their inmates by a staff of 84,277 enumerators under 10,140 supervisors, there being one enumerator to every 75 houses. The machinery of supervisors and enumerators was under the Tahsildars of the districts. The two previous enumerations of the population of the North-West Provinces were in 1853 and 1865; and, in addition to improved machinery, the most important feature of the census of 1872 is the careful attempt, made by Mr. Plowden, to classify the population by age.

The result was that the population of the North-West Provinces, embracing an area of 81,403 square miles, proved to be 30,769,056, of whom 16,413,642 were males and 14,367,562 females. The number of houses was 6,359,092. The number of inhabitants to the square mile was 378. The densest district, exceeding even any in Bengal, is Benares, where there were 797 souls to the square mile, in Agra 575, in Allahabad 501. The most thinly populated were the hill districts of Kumaon with 72, and Gurhwal with 56 to the square mile.

The vast majority of the inhabitants are Hindus, there being 26,569,074 against

4,189,349 Muhammadans. The native Christians number 7,648. More than half the Muhammadans are collected in one district, that of Rohilkhand. They are divided into Sheikhs, or supposed descendants of Arab invaders of India, a title generally assumed by all Muhammadans who do not come under the other three classes, namely, Saiads, Moghuls, and Pathans. Of the Hindu castes, the Brahmans number 3,234,342, congregating chiefly in Benares, Allahabad, and Agra. The Thakurs or Rajpúts number 239,688, the Baniyas 1,025,342, and the 304 other inferior castes 19,910,230. The agricultural population includes 56 per cent. of the whole. The inhabited villages number 90,684; and of the towns there are 204 with a population over 5,000, and 13 where the number of inhabitants exceeds 50,000. Benares is the most populous city in these provinces, numbering 174,188 souls, then follows Agra with 149,008 and Allahabad with 142,770.

Mr. Plowden made a careful attempt to classify the ages of the people, which is most valuable in connection with all inquiries relating to the average duration of life, and to the well-being of the people. His classification is on the same plan as that adopted in England, the ages of the population being divided into nine terms or periods. Perhaps the most suggestive discovery is the extraordinary disparity between the number of girls and boys. Between birth and the age of five there were 161 boys to 170 girls; yet between the ages of five and ten there are 132 boys to 118 girls and between ten and fifteen 102 boys to 79 girls. This points not only to a uniform concealment of girls between the ages of five and fifteen, but also to the suspicion that much female infanticide still prevails.* This is confirmed by the serious disparity between the sexes of all ages. There were 11,424 males to every 10,000 females.

There has been no recent census in the Punjab; the last enumeration having been in 1868, when the population was given at 17,596,752. It is now roughly guessed at 19,000,000, or 173 to the square mile. In Oudh the population was given at 11,220,232, or 469 to the square mile, at the last numbering of the people in 1869.

The census of the Central Provinces, under the superintendence of Mr. Neill, was the second that has been taken, the first having been made in 1866. The general arrangements were similar to those of the North-West Provinces. Each *Tahsil* was divided into circles, each including a certain number of villages, and over each circle there was a superintendent to overlook the work of the enumerators, who were generally the *Patwaris* or head men of villages. The census papers were filled up, scrutinised, and tested, preparatory to the regular enumeration which took place on the night of the 25th of January, 1872. The returns, of which there were 196,120 in various languages—Hindi, Maráthi, Urdu, and Telugu—were then sent in to the Census Office, with the columns filled in, stating names, age, religion, caste, occupation, sex of the inmates of each house. The population proved to be 9,251,229, over an area of 113,797 square miles, or 81·3 to each square mile, a sparsely peopled region with abundant room for future increase. The most thickly peopled portion is the Nágpur plain, and next comes a portion of the Narbada valley. There are three towns with a population over 15,000 and 39 with more than 5,000; but the bulk of the population is scattered in small villages. The above figures include the feudatory chiefships. If these are excluded the population is 8,200,000 over 84,963 square miles, or 96 to the square mile. The agriculturists form 64 per cent. of the population. The Hindus are 71 per cent., and the Muhammadans 2·8 per cent. of the population. About 2,000,000 are hill tribesmen, and the number of Christians is reported to be 10,477. The proportion of the sexes is given at 96·6 females to every 100 males.

The census of the Madras Presidency was taken in 1871, but the full report has not yet been received. The first enumeration of this presidency was made in 1822, and there have been others in 1836, 1852, 1857, 1862, and 1867, but the figures are absurd in the earlier returns, and obviously unreliable in the others. For the census of 1871 there was first a preliminary house to house visitation, which was commenced in January. The accountants of the villages prepared and transmitted to the Tahsildars of Talugs registers of houses, and placed a number on each house. There was then a preliminary enumeration in July, when the inmates of every house were registered; and afterwards 10 per cent. of the entries were tested by the supervisors. The final enumeration took place on the 15th of November, 1871, everywhere except in Tanjor, where it was deferred owing to the presence of numerous strangers at a festival. There were 71,641 enumerators, generally village officers, who sent the

* See page 129.

returns to the supervisors to be tested, whence they were transmitted to the Census Office for final scrutiny and tabulation. The results show the previous enumerations to be worthless. The population of the Madras Presidency proved to be 31,597,872; the number of houses was 6,229,954. The most densely peopled district was the fertile rice-producing region of Tanjor, where there were 540 to the square mile; then followed Malabar with 376, South Arcot with 360, and Trichinapoli with 341. Besides a few Uriyas in the northern extreme of Ganjam, the population is divided into four races, speaking branches of the Dravidian group of languages. In Kurnul, Kadapa, part of Balari and Nellore, are the Telugu speaking people, numbering 11,610,000. The Tamils spread from a few miles north of Madras to Cape Comorin, along the east coast, and count 14,715,000 souls. The Kanarese, in part of Balari, Mysore, Coimbatore, Salem, and North Kanara, number 1,699,000; and the Malayalam speaking people of Malabar, Cochin, and Travancore, number 2,324,000. The distribution of caste and religion in the Madras Presidency is particularly interesting, because it indicates the extent and relative completeness of the successive waves of invasion. For instance, the 1,095,445 Brahmans in the Presidency are chiefly found in the northern districts. The Chetties, or merchants, number 714,712; the Vellala, or agricultural caste counts 7,826,126, who acknowledge Siva, but worship their own village gods. There are 1,730,681 of the shepherd class, 785,085 of the artisan, 1,071,781 of the weaver, 250,343 of the potter, and 3,944,463 of the Vannia or labouring caste. Of the outcasts, the Shanars or toddy-drawers, in the far south, who are either demon-worshippers or Christians, count 1,664,862, and the Pariahs 4,761,303 souls. There are nearly 29 million Hindus, or 92 per cent. of the whole population; about two million Muhammadans, and 490,299 native Christians, of whom 102,249 are natives of Tinnivelly. The Moplahs, those industrious but fanatical Muhammadans of Malabar, number 612,789 souls. The proportion of the sexes is satisfactory, being 99 females to every 100 males; while in the city of Madras the females largely predominate, there being 104 women to every 100 men.

The census of the city of Madras, the full report on which has been received, was managed and superintended by the lamented Mr. Gover, the accomplished author of "Tamil Folk Lore." He sickened, and died from overwork before his report was completed.* There were 64 enumerators and 17 testers, and the first work was the numbering of the houses, after which the final enumeration commenced on the 13th of November, 1871, and went on for seven days. Madras consists of 36 large villages, covering an area of 27 square miles. The population proved to be 397,522, which is very much less than was supposed. The occupations were classified according to Dr. Farr's scheme, and included as many as 657, the number of castes being 195.

The report of the census of the city of Bombay has arrived in England, but not that of the whole Presidency. The general superintendence of the census of the presidency was entrusted to the Sanitary Commissioner, the district operations being under the collectors. The final enumeration was made throughout the Presidency on the 21st of February, 1872. The whole area, excluding native states, is 124,943 square miles, and the population proved to be 16,352,623, or 131 to the square mile. The number of houses was 2,164,338, or 4.9 souls to each house. About 76 per cent. of the population (12,440,000) are Hindus; 17 per cent. (2,817,000) Muhammadans; 1 per cent. (192,245) Buddhists; 0.6 per cent. (106,133) Christians; 0.4 per cent. (67,115) Parsis, two-thirds living in the city of Bombay; and 3.7 per cent. aborigines. In Sind alone is the majority of the population Muhammadan. In that province the followers of the prophet number 4 to 1 of the population. The enumeration of the city of Bombay was made on the same day as the rest of the Presidency. The population was 644,405, of whom 22,860 men and 93 women were in the harbour. Thus the three Presidency towns have populations amounting to 644,405 in Bombay, 447,600 in Calcutta, and 397,522 in Madras; and Bombay being the most populous, not only in British India, but, next to London, in the whole empire. The people are, however, fearfully over-crowded. There are 29,691 houses, or an average of 20.9 persons in each house. In one part of Bombay there are 40 people to each house. The area of the island is 22 square miles and 105 acres; and 898.5 acres have been reclaimed from the foreshore of late years. Thus the number of inhabitants to the square mile is 33,372. The Hindus number 408,680, divided into 56 castes. The Muhammadans form 21.3 per cent. of the population; and there are 43,945 Parsis and 23,534 Indo-Portuguese.

* There is a well merited tribute to the memory of this accomplished young scholar in the new volume of Mr. Talboys Wheeler's History of India, note p. 21.

The census in Mysore was taken in November, 1871. The population was 5,055,412, or 187 to the square mile, of whom 4,807,667 were Hindus, 208,991 Muhamadans, and 25,676 Christians. The population of the little mountain province of Curg is 168,312, of whom, only 26,389 are of the dominant Curg race.

There is now a steady and persevering determination throughout India to obtain more accurate vital statistics. A system of mortuary registration was generally introduced in about 1864 to 1866, and a registration of births in about 1870. The figures obtained are, as a rule, worthless, but they are in one respect satisfactory. Both the death and birth registers show an increase every year, which is not due to any change in the actual rates, but to improved registration; and there is a determination to push this improvement forward year by year, until a real approach to the actual facts is attained. The returns of deaths are now quite worthless. In Bengal the mortality was said to be only 4 in 1,000, and in the district of Mymensing only 1 in 1,000! During 1872-73, Sir George Campbell made a tentative reform in the system under which mortuary statistics are acquired. He saw that the acquisition of accurate statistics over the enormous area of the Lower Provinces, with their vast populations and uneducated agencies, was at present impossible. But he resolved to perfect the system on a smaller scale, over certain experimental selected areas, chosen with reference to geographical situation, so as to be accessible and easily supervised. It was arranged that the census should be taken in these areas with special care. The town areas thus chosen were usually the head-quarter stations of districts, and the country areas were limited to a moderate number of compactly situated villages. A wide discretion was given to the local officers in selecting agencies, and a sanitary clerk was allowed to the civil surgeons of selected stations to aid in the compilation of vital statistics. The experiment was commenced on the 1st of January, 1873, and reports, showing undoubted improvement, have been received for the first two quarters of 1873 from the Sanitary Commissioner. There are 101 selected areas, with a population of 1,922,608, and in most of them there has been a step in advance towards ascertaining actual facts with reference to death-rates, though there are many failures. The returns of births are also imperfect, but there is great improvement.

In the end of 1872 the Secretary of State called for a special report on the vital statistics of Calcutta, owing to the Army Sanitary Commission having submitted a memorandum inviting special attention to points regarding mortality returns, which seemed to cast doubt on their value. The figures show a decrease, in five years, of mortality from 20,000 a year to 10,000. If this be a fact, it is certainly unprecedented in the history of sanitation. The returns show that 10,000 lives a year are saved by proper water supply and effective drainage. Yet, if the facts are considered, this result is not surprising. Fifteen years ago there was no drainage at Calcutta. The filth of the city rotted in the midst of the population in pestilential ditches, or floated backwards and forwards with every tide in the river. The inhabitants drank the loathsome water of the river, which was not only the receptacle of filth but the great graveyard of the city, or else they resorted to the still filthier contents of shallow tanks. Now Calcutta is drained, and possesses a water supply far better than that of London, and as good as that of Glasgow. Surely a large reduction in the death-rate is a natural consequence of this change. Registration was first introduced into Calcutta in 1864, and neglect was rendered penal. Birth registration is now fairly correct, and the mortuary returns received from each police inspector of the 21 sections into which the city is divided are checked by other returns from the sextons of cemeteries, and the clerks of the burning ghauts.

In the North-West Provinces there is an endeavour to obtain more accurate mortuary returns, through a new system of entrusting the duty of reporting death to the chaukidars or village police, and the registration of deaths to the clerks at the police stations. There is increasing accuracy, but the death-rate of 1872 is returned at 23 in 1,000, which is obviously absurd, for the death-rate in England is 22.5 in 1,000. There is no information with reference to the death-rate of particular ages, classes, or occupations; but Sir William Muir's measures for the suppression of infanticide will secure improvement in the registration of births. In the Punjab the returns of births are quite useless, though there is some improvement in the mortuary registration; in 1871 it was given at 21 in 1,000, and now at 24 in 1,000. In particular cities a much higher rate is given, owing to the prevalence of cholera and other diseases. In Delhi it was 54, and in Peshawar 65 per 1,000. In Oudh there is no attempt at any registration of births; while the return

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of deaths is quite worthless, being derived from reports of village watchmen, and given as 17 per 1,000. In the Central Provinces the vital statistics are collected through the agency of the police, the village watchmen reporting births and deaths; but the resulting figures are worthless.

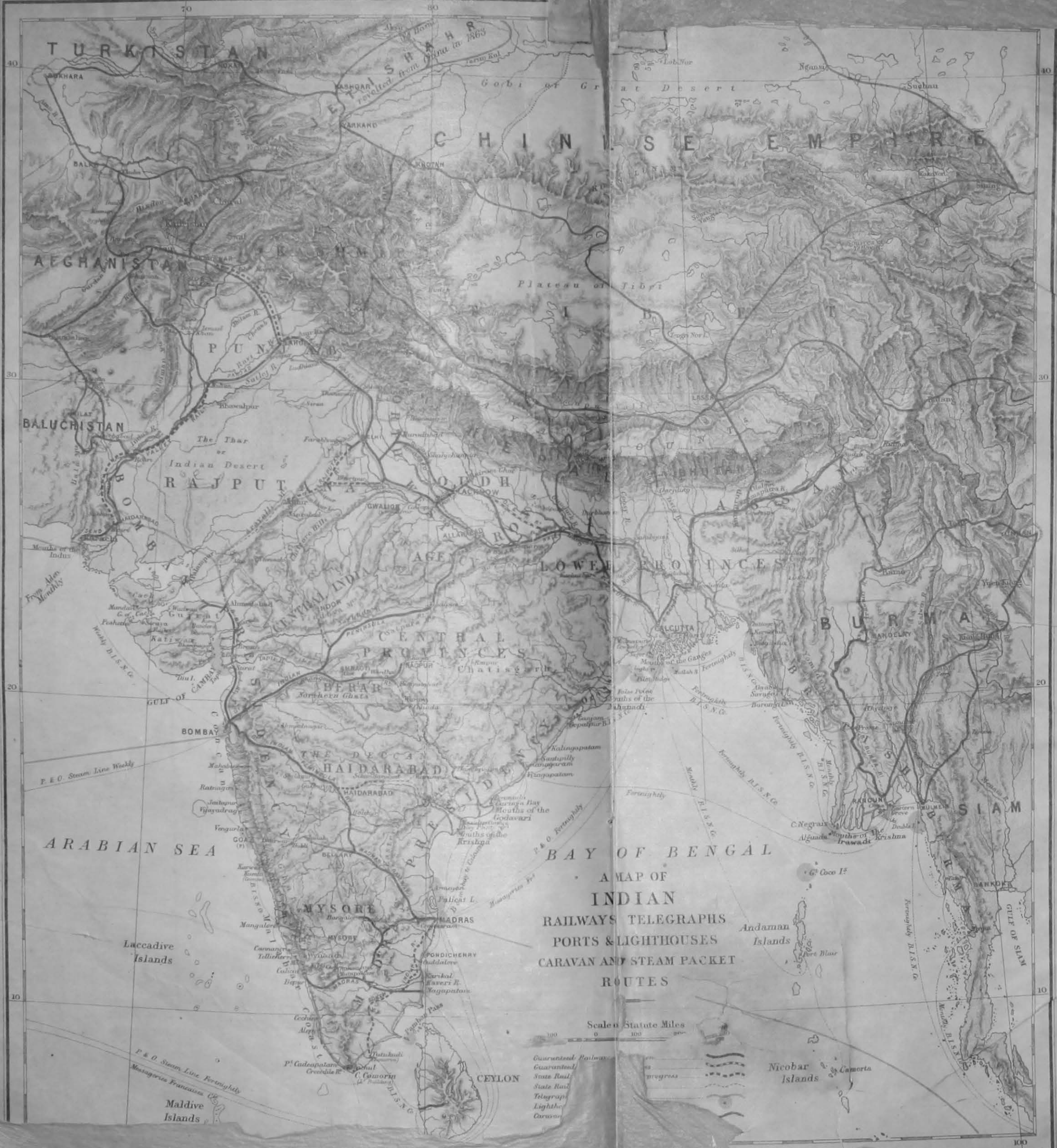
In the Madras Presidency the registration of births was commenced in 1870, and there has been a gradual advance in the number registered year by year. In 1872 there was an increase of 15 per cent. over that of the previous year. There is a nearer approach to accuracy in the municipal towns than in the rural districts. The mortuary registration was commenced in 1866, and the increase in the number of deaths recorded is due to more efficient registration, but it is still very imperfect. In the Bombay Presidency the registration of deaths was commenced in 1865, and there has been a regular increase, which shows greater attention. But the figures hitherto collected are practically useless. Birth registration has only just been commenced. A vast number of birth and deaths are still concealed, or never reported, in all parts of India.

The absence of correct statistics makes it difficult to arrive at conclusions respecting the actual condition of the people, and the extent to which they can enjoy life. For instance, the enormous error in the estimate of the population of Bengal entirely vitiated previous calculations with reference to the consumption of salt in each family; and the comparison between rates of wages and prices of grain is another test which is not always applicable. In Bengal, for example, the agricultural ryots, or small farmers, are a numerous class in most districts, and they benefit by a rise in prices.

The Calcutta Missionary Conference dwelt on the miserable abject condition of the Bengal ryots, and there is evidence that they suffer many things, and are often in want of absolute necessaries. As a rule they are comparatively better off in eastern Bengal, and worse off in the west; the rates of wages being higher in the east, and food cheaper, while rents are less screwed up to rack-rent pitch, and light in comparison to the productiveness of the soil, and the remunerative character of their special crop—jute. In the west, and in the Behar and Orissa, many labourers supplement home means by going to other parts of the country for temporary service and labour. In Bardwan the people are poorer than elsewhere, and the people of Assam, judged by an Indian standard, are very well off.

In the North-West Provinces the wages of agricultural labour have hardly varied at all since the early part of this century; and, after the payment of the rent, the margin left for the cultivator's subsistence is less than the value of the labour he has expended on his land. The wages of a labourer in the ploughing season furnish him with 50 ounces of *behjur*, a compound of barley and peas, of which about 46 ounces are nutritious. In the digging and weeding season he only gets 34 ounces, but sometimes his wife earns enough for 25 ounces more. He only tastes salt two or three times a week. Many live on a coarse grain called *kesari*, which is most unwholesome, and produces loin palsy. The small tenant farmers only get about the same amount of *behjur*, although they can have salt daily. This extreme poverty among the agricultural population is one of the reasons which makes any improvement in farming and cultivation so difficult. In the Punjab wages range from 7a. 3p. to 4a. 11p. for skilled, and 3a. 3p. to 2a. 5p. for unskilled labour, and there has been a steady rise in the price of grain. In January, 1873, rice sold at 5s. 9c., salt 12s. 5c., wheat 20s. 10c., barley 27s. 8c., and jawari 30s. 12c. for the rupee.* In Oudh wages were 4a. 5p. a day for skilled, and 1a. 11p. for unskilled labour; and prices were, for rice, from 3r. 7a. 11p. to 2r. 10a. 5p., wheat 2r. 2a. 9p., and salt 7r. 9a. 11p. per maund of 82½ lbs. In the Central Provinces skilled labour fetches 6a. to 12a., and unskilled 1a. 6p. to 4a.; and the prices, in 1873, were 3r. 10a. to 1r. for rice, 2r. 8a. to 1r. for wheat, 1r. 11a. to 1r. 3a. for jawari, and 6r. 2a. to 4r. 8a. for salt per maund. In Mysore and Curg the wages range higher, in consequence of the great demand for labour, caused by the proximity of the coffee plantations of Curg and Wynaad. Many thousands of coolies annually come up to Wynaad, both from Mysore and Malabar; and in 1860 wages in Wynaad were 3 annas a day. In 1865 the coolies at work on the Wynaad plantations received 4 annas a day; and now the pay of an unskilled labourer in Mysore is stated to range in some places

* This statement of prices gives the number of seers (of 80 tolas) and chittacks obtainable for a Government rupee. A seer is equal to 1 lb. 13 ozs., and there are 16 chittacks in a seer. A maund is 40 seers, or 82½ lbs.



TURKISTAN

CHINESE EMPIRE

AFGHANISTAN

PUNJAB

BALUCHISTAN

RAJPUT

ODISH

AGENCY

LOWER PROVINCES

CENTRAL PROVINCES

BERAR

THE DECCAN

HAIDARABAD

MYSORE

MADRAS

PONDICHERY

MADRAS

MADRAS

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CEYLON

ARABIAN SEA

BAY OF BENGAL

A MAP OF
INDIAN
RAILWAYS TELEGRAPHS
PORTS & LIGHTHOUSES
CARAVAN AND STEAM PACKET
ROUTES

Scale Statute Miles

Guaranteed Railway
Guaranteed State Rail
State Rail
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Nicobar Islands

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as high as 8 annas, or sixpence a day. The Mysore people, who are Canarese, live on a small dark-coloured grain called *ragi*, and the natives of Malabar on rice; and the rise in the price of grain has nearly, if not quite, kept pace with the increase in wages. The Mysore people store their *ragi* in underground pits, for use in time of scarcity, where it will keep for 40 or 50 years.

On the coffee plantations the labourers are supplied with suitable huts of split bamboo plastered with mud, and as soon as the coffee crop is picked they return to their homes in Mysore and Malabar, to look after their own crops and spend their money, returning to the plantations for the weeding during the monsoon. In the hill district of Curg the wages of skilled labour are 10*d.*, and of unskilled, 3½*d.* a day.

In the Bombay Presidency wages are much higher, from a variety of causes; a skilled labourer receives from 2*s.* to 8*d.*, and an unskilled labourer from about 6*d.* to 3*d.* a day; and the price of rice ranged, in 1873, from 12 to 10 shillings a maund of 40 sirs. Bajri was from 6 shillings to 2*s.* 3*d.* the maund, and wheat from 8 shillings to 4*s.* 9*d.* The best account of the Bombay peasantry is still, probably, that by Mr. Coats, written 50 years ago. The clothes of a man then cost about 12 shillings, and the furniture of his house about 2*l.*: and his food consists, not of rice, but of dry grains, such as *bajri* and *jawari*, with pulses and salt. The people of Mysore and most of those in the Madras Presidency, also live on dry grains and pulses. Dr. Forbes Watson has shown the proportion in which certain Indian pulses must be eaten with dry grains, in order that the mixture may contain the same proportion of carboniferous and nitrogenous matter as is found in wheat, namely, six to one. The natives habitually combine these two classes of food in their dishes in such proportion as to give the same amount of nourishment as wheat, and thus show how wonderfully correct their immemorial experience has made them. Their weary round of labour is brightened by several festivals, and by annual pilgrimages to the temples.

As to the morals of the people, whatever may be said of the larger towns, the residents of villages are no better and no worse than the same classes elsewhere; temperate, as a rule; chaste, honest, peaceful, singularly docile, easily governed, and patient. Of course there is great variety of temperament and character, as there is of physical appearance in the different latitudes over which British India extends.

The climate and sanitary condition of India give rise to pestilences which periodically carry desolation over the country, while disease in its worst forms is never absent. Hospitals, richly endowed and admirably regulated, supported as well by Government as by private munificence, exist in all the large towns; and great efforts are constantly made to bring the benefits of medical skill and knowledge within reach of the poorer classes. In Calcutta there are three first-class hospitals, besides a large municipal pauper hospital, and a good hospital at Haurah, on the other side of the Hugli. The amount paid by the Government for medical charities in Calcutta is 30,000*l.* a year. There are 176 charitable dispensaries throughout the Bengal provinces, exclusive of the Calcutta hospitals and of the temporary dispensaries for the relief of unusual sickness. During 1872-73 the number of patients treated was 457,295; by far the greatest number for fever. In the North-West Provinces there are 131 Government hospitals and dispensaries, which relieved 761,273 patients during the year under review, of which 2,641 indoor and 106,605 outdoor patients were for fever. The dispensaries are managed on the principle of grants in aid. When the people of any place erect a suitable building at their own cost, and guarantee a fixed subscription, the medical staff is granted and paid by the Government. The dispensaries are also made use of for training medical pupils, who are passed on to the medical college at Agra. At Bareilly and Naini Tal, women are regularly trained in medical and surgical science; and one or two have set up successfully as private practitioners.

In the Punjab there are 116 hospitals and dispensaries, being one to every 160,000 persons. The grant in aid system of the North-West Provinces was introduced in 1866, and since then the number of dispensaries has been increased by 41. The Mayo Hospital, connected with the Lahor Medical School, was completed in March 1872, with accommodation for 114 patients. During the year a dispensary was established at Leh, in Ladak, by Dr. Aitchison, where 419 cases were treated. Among these were 14 operations for cataract, and an amputation of a llama's right leg under chloroform. The latter operation was witnessed with intense delight by all the natives of Yarkand in the town. Dr. Aitchison writes: "I cannot express the

“pleasure I had in conducting the duties of the Leh Dispensary, nor the regret with which I parted from the many grateful faces whom I left behind.” In the native state of Bhawalpūr there are also four dispensaries with hospital assistants, and 16 rural dispensaries under Hakims. A system prevails in several districts of the Punjab of furnishing medical aid to the people through the instrumentality of native *Hakims*, whose sons are now frequently educated at the Lahor Medical School, and then sent back to their own districts for employment by the local authorities. The Hakimi system in the Punjab is the utilisation of native doctors in times of epidemics, by giving them elementary instruction, medicines, and pay. In Oudh there are 28 Government dispensaries and one private, including the King’s Hospital at Lucknow, and the Balrāmpur Hospital, opened in 1871. The number of persons treated was 144,712. Native doctors are also employed to visit the fever-stricken poor in the villages, and a good deal of quinine has thus been distributed. The number of such institutions in the Central Provinces during the year under review was 92, of which 77 are partly supported by Government aid, by the appointment of a native medical officer, and the supply of medicines; all other charges being met by local subscriptions. There were 302,831 patients treated in 1872–73. In the Madras Presidency the dispensaries are numerous and work well; and the demand for additional establishments of the same kind are received from many quarters. They are held in high estimation by the people, who are generally willing to support them by direct taxation. In the city of Bombay 1,110 patients were treated at the European General Hospital during the year under review, 6,290 at the Jamsetji Jijibhoy Hospital, and 1,500 in and 11,564 out-patients at the Sassoon Hospital at Poona. The whole number of patients relieved in the Bombay Presidency was 592,033, of which 176,322 were in and out-patients of 33 hospitals, and 383,648 of the 108 dispensaries. There were 93,347 cases of malarious fever, or 24 per cent. of the whole.

Much of the disease in India is due to bad water and bad drainage; and, as regards rural towns and villages, improvements must mainly be the work of the people themselves. Works of this kind have been undertaken with excellent results, as regards the large towns. The new water supply has had a very marked influence in improving the health of the city of Calcutta, and a similar result may confidently be expected from the works at Madras. The great drainage scheme at Cawnpūr is also progressing. The Act VI. (Bengal) of 1871, for the benefit of the Juggernath pilgrims has worked very successfully, under the immediate supervision of the health officer. Lodging-houses at Puri are registered and inspected, and none are licensed but for a limited number of pilgrims. There have been 342 registered, for 6,085 lodgers; the receipts from fees and fines being 497*l.*, and expenses 368*l.* A very important sanitary question has long been under consideration with reference to the effect of irrigation canals on the health of the districts through which they pass. As long as in 1847 it was found that an extensive epidemic influence had pervaded a large portion of the North-West Provinces of late years, and that disease was more prevalent and severe in canal-irrigated districts. A committee reported on the subject, suggesting that irrigation might be stopped at a distance of 200 yards from the village sites, and a double row of trees planted round the unirrigated space; and that shallow pools about villages should be drained, when the soil is stiff and clayey. Salubrity depends, in a great measure, on the nature of the soil and the efficiency of surface drainage. It was found that the percolation of water caused an efflorescence of soda, called *reh*, to rise up on the surface of the land, causing not only destruction of the fertility of the soil, but sterility of women and cattle. In certain localities all the inhabitants of villages were found to have enlarged spleens, from the continuance of fever. At present there are several water-logged tracts in Sahāranpur and Muzaffarnagar, where the people are fever-stricken. Canal irrigation is to be restricted where the spring level is near the surface, and the cuts are to be deepened, which are now unequal to carry off natural drainage. Meanwhile special medical aid is given, and native doctors have been sent round to dispense quinine from village to village. But as yet there is no conclusive proof of the necessary connection between fever and extensive irrigation from canals. This can only be established by a comparison of the mortuary returns of a large number of canal-irrigated centres with others not so situated. Single comparisons are only misleading. For instance, in the lower Hugli district and part of Midnapur there is no healthy flow of water and no escape. The water stagnates, and a mass of decaying vegetation stagnates in it. Yet there is less fever in these swamps than on the higher ground, and the human race has multiplied in

them to a greater extent than anywhere else in India, perhaps in the world. In the Madras Presidency an opinion prevails that no connection has been proved between canal irrigation and the increase of fever; for the disease affects districts quite irrespective of wet or dry cultivation.

Fever is by far the most prolific cause of death in India, carrying off, except in exceptional years when cholera is raging, very many more than all other diseases and accidents put together. The returns, exclusive of Bengal, the North West Provinces, Madras, and Burma, give upwards of 802,830 deaths from fever in 1872-73, so that the total number in all India cannot be far short of a million and a-half. At least half these lives might be saved if we could put quinine or chinchonidine, or some cheap form of the chinchona alkaloids, retail into every native druggist's shop at 1 rupee per ounce. It is the only real remedy, and the people believe in it, and are ready and anxious to take it. The vast importance of the introduction of chinchona cultivation into India cannot, therefore, be over-estimated; and there is now every prospect of being able to manufacture the febrifuge alkaloids at the plantations at a cheap rate, and of thus conferring a priceless boon on the people. Never was it more needed than now, when fevers are breaking out, in some localities, with unprecedented virulence.

The Bardwán fever is a case in point. Fever of a very severe and fatal type began to rage in Jessor and Naddea, about ten years ago, and in 1864 it spread and crossed the river Hugli. In 1866 it appeared in the east and south parts of Bardwán. In 1868 it spread along the banks of the Damudar, and in 1869 the town of Bardwán was attacked. In 1870 the mortality was not so severe; but in 1871 the fever broke out with renewed virulence, and was more widespread and fatal than ever. It began in July, and continued through the cold season of 1871-2. At the close of 1871 there were five special dispensaries in the town of Bardwán, and twenty in operation in the three rural circles, each with an inspecting medical officer. One assistant-surgeon, five sub-assistant-surgeons, and 24 native doctors were sent to afford medical relief, and a depôt of medical stores was opened at Bardwán. Food and blankets were distributed, as it was thought that the cold of the winter nights had induced relapses. As the weather became warmer the fever subsided somewhat, but in April there was a marked aggravation of the disease, and in August and September it continued to spread; while the heavy rains of October 1872 were followed by a general increase in the severity and virulence of the disease. A grant was made of 10,000*l.* from Imperial funds to aid the operations of medical relief. In 1872-73 four assistant-surgeons, 16 sub-assistant-surgeons, and 73 native doctors were deputed to Bardwán, in addition to those already there; and there were 105 special dispensaries, which were closed and opened according to the requirements of the different localities. The largest number opened at a time was 56, in December 1872. The number of cases treated was 1,275,035. There were also 33 depôts for food and clothing, at which 105,748 persons received relief. Since the close of 1872 fever has gradually abated in Bardwán. In the Hugli district a severe type of fever has prevailed annually since 1864, and dispensaries were opened at which 62,289 cases were treated.

In the end of 1871 a new disease arrived in India called "dengue fever." It appeared at Calcutta in the cold weather, and raged through the hot season of 1872. Few escaped attacks, but deaths were rare. Out of 2,292 treated for dengue fever at Calcutta only 7 died. There is violent fever and racking pain during a few days, followed by great debility and neuralgia. The epidemic spread along the lines of railways and trunk roads. It appeared at Lucknow in July 1872, and died out in November. It broke out in the same year at Cannanore, spread along the lines of road and railway in the Madras Presidency, reached the city of Madras on the 8th of February 1872, and continued to rage there until the following November.

Cholera prevailed in every part of Bengal during 1872-73, but nowhere assumed very large dimensions. Burdwan suffered severely, its appearance being coincident with the arrival of pilgrims from Orissa. It was severe also in Patna, Orissa, and Assam; but its most remarkable feature was its wide distribution throughout the provinces. In the Punjab there was an epidemic of cholera from two centres: the large fair held at Pehonáh in the north of the Karnal district, and the returning pilgrims from Hurdwar, who rapidly spread the disease over Karnál and Ambála. There were 26,566 deaths from cholera in Oudh. The south of India was comparatively free from it. In October 1873, Dr. Hall reported an important and very successful discovery in the treatment of cholera, by hypodermic injections of chloral hydrate, a powerful sedative. He holds that in the collapse of cholera, instead of exhaustion

of the nervous system, as was generally supposed, there is intense irritation of certain sets of nerves; and that the principle should be to endeavour to quiet the nervous system by the action of sedatives, instead of giving stimulants. He has treated 19 cases successfully in Oudh, and his system will receive a complete trial.

Small-pox, as a preventible disease, has decreased steadily, but with repeated reactions, since the introduction of vaccination, and vigorous efforts are being made throughout India to promote the spread of the protective check upon the ravages of the disease. Small-pox was not epidemic in Bengal during 1872-73, and Calcutta was very free from it. But it was universal throughout the Punjab, reaching its maximum virulence in May, and its minimum in October. There were 25,728 deaths. In Oudh there were 17,820 deaths from small-pox, and in the Bombay Presidency an alarming outbreak is shown by a return of 29,699 deaths, against 9,403 in the previous year. Small-pox was also unusually prevalent in Madras and Mysore.

Exclusive of native states and British Burma, the number of persons vaccinated in India during the year 1872-73 was 2,544,260. In Bengal there are two systems; one by which a circle is placed under a superintendent, with a subordinate establishment working steadily over the area, and the other being dispensary vaccination. Although vaccination is still far below the requirements, and has barely reached a third of the annual number of persons requiring it in Bengal, yet there is an increase of 88 per cent. over the previous year in the number vaccinated, and a much higher per centage of successful results in primary operations. There was much progress in the North-West Provinces and the Punjab, and vaccination has been introduced into Leh and Bhawalpúr. A most satisfactory increase also took place in the numbers vaccinated in Madras and in Mysore. In the Bombay Presidency important changes have been effected in the vaccination department, which were introduced in August 1871. Each talúk is to be provided with an itinerant vaccinator, paid from local funds, and each collectorate is to have a superintendent of vaccination.

One extraordinary feature of Indian life is the number of human beings destroyed by wild beasts. Rewards are offered by the Government for the killing of these animals; but in some districts the loss of life is very great, and in others, where it is less excessive, the reason given is that goats are very abundant, and that wolves prefer kids when they can get them. Deaths by snake bites are very frequent, no fewer than 14,529 persons having lost their lives in that way in 1869, while in 1871 the total deaths caused by dangerous animals of all classes amounted to 18,078. In 1872-73 there were 1,525 deaths from snake bites in Oudh, and 2,334 from snake bites and wild beasts in the Bombay Presidency. In the Punjab 48 persons were killed by wild beasts during 1872-73; and in Mysore 21. In Curg there were only 7. Dr. Fayrer is of opinion that if systematic returns were kept, the annual number of deaths from snake bites (exclusive of all doubtful cases) would be found to exceed 20,000. The inhabitants of the border lands between jungle and cultivation are killed and eaten by tigers in such numbers as to require the immediate and serious attention of Government, both in India and in England. The following are a few out of many instances: "A single tigress caused the destruction of 13 villages, and 256 square miles of country were thrown out of cultivation." "Wild beasts frequently obstruct Government survey parties. In 1869 one tigress killed 127 people, and stopped a public road for many weeks." "In January 1868, a panther broke into the town of Chicola, and attacked without the slightest provocation the owner of a field. Four persons were dangerously wounded, and one died." "Man-eating tigers are causing great loss of life along the whole range of the Nallai Mallai Forest. There are five of them. One is said to have destroyed 100 people." "In Lower Bengal alone, in a period of six years, 13,401 people were killed by wild beasts. In South Kanara, in July 1867, 40 human beings were killed by wild beasts." The Chief Commissioner of the Central Provinces in his report shows the following terrible return of human beings killed by tigers: In 1866-67, 372; 1867-68, 289; 1868-69, 285; total for three years, 946. It appears that there are difficulties in the way of killing down these tigers. First, the superstition of the natives, who regard the "man-eating tiger" as a kind of incarnate and spiteful divinity, whom it is dangerous to offend; secondly, the failures of Government rewards; thirdly, the desire of a few in India actually to preserve tigers as game, to be shot with the rifle as a matter of sport. Mr. Frank Buckland suggests an organised destruction of the tiger cubs in the breeding season, and the attraction

of full-grown tigers to traps, pit-falls, and other devices, by means of a drug of valerian, of which tigers (which are only gigantic cats) are exceedingly fond.

The dense population of the Provinces under the Bengal Government represents a state of things in which the number of inhabitants might at any time begin to press on the means of subsistence, and emigration, when efficiently watched and regulated, is certainly a good thing. Movements of this kind are sure to take place from one Province to another within British India whenever there is a great demand for labour on the one hand, and a crowded population on the other. The tea planters of Assam and Cachar have attracted great numbers of labourers from the valley of the Ganges. Soon after the extension of tea cultivation, which commenced in 1856, the difficulty of getting labour began to be felt. In 1858 there were 400 labourers imported into Cachar from Benares and Bahar, the native contractors in Calcutta recruiting men who bound themselves to work for five years in the tea district. The evils connected with the recruiting and transit were so glaring that a Commission was appointed to consider them in 1862. The state of things then disclosed was very horrible, and Act III. (Bengal) of 1863 was passed, to regulate emigration to Assam, Silhet, and Cachar. The objects of the enactment were to make sure that the labourers understood the agreements they entered into, and to lessen the fearful mortality in the transit. Between 1863 and 1866 the deaths in the contractor's depôts and on the voyage up were more than 4,970, out of a total of 89,915 labourers recruited. The Act entirely failed in its object; and the coolies continued to be deceived by unprincipled recruiters. The mortality among the immigrants during the first years of the tea industry was appalling. From 1863 to 1866 the number of coolies that reached the tea districts was 84,195. In June 1866 there only remained 49,750; 35,165 remain to be accounted for; 3,289 were released on the completion of their engagements. The remaining 31,876 must have died in three years; want of sufficient food being a main cause of the sickness and mortality. The practice of flogging the labourers also prevailed at that time, in Cachar and Assam. When runaways were caught, they were tied up and flogged in a way which, in some instances, was believed to have caused death. As late as 1868 such cases were judicially tried, for the punishment was quite illegal. Previous to 1865 the only penalty for labourers breaking their contracts was one month's imprisonment under section 492 of the Penal Code. But by Act VI. of 1865, planters were enabled to arrest runaways without a warrant, and imprisonment was renewable for successive breaches of contract. There has been great improvement in the condition of the labourers since 1868, flogging is now unheard of, and many planters, especially in Cachar, treat their people with kindness and consideration. There are now 44,554 immigrants employed under contract in the districts, and 9,725 were recruited in 1872. Large numbers of time-expired labourers show that they are contented with their bargain by remaining, and strict rules are enforced respecting the provision of lines or quarters, of food, and of medical aid. The wages of coolies on the tea estates are five to six rupees a month. The deaths during 1872-73 were 1,504, desertions, 1,213. A bill has been introduced for the amendment of Act II. (Bengal), of 1870, regulating the transport of labourers to Assam, Cachar, and Silhet.

In the south of India a great annual emigration has long gone on from Tinnevely and other Madras districts to Ceylon, for the coffee-picking season; and satisfactory arrangements have been made by the Colonial Government for their protection. But these Tamil emigrants usually return to their homes in India when the season is over, or after a stay of two or three years. The Government of Ceylon has recently passed an Ordinance to provide for the medical wants of these coolies on the coffee estates. It enables districts to make their own arrangements to supply their medical wants, and it empowers planters to appoint a committee to make regulations for the medical service of their district, subject to the approval of the Government. But if any district fails to make the necessary arrangements, power is given to the Government to step in and take the management into its own hands, imposing an assessment not exceeding one rupee per acre in cultivation. There were 254 vessels engaged in the native passenger trade between Tutikorin and Ceylon during the year 1872-73. Between 1843 and 1867 there were 1,446,407 immigrants to Ceylon, and 839,897 returned. In 1872-73 the number is given at 73,456 (a misprint for 13,456?); and during the year 14,000 returned to Tinnevely. There were also 2,120 emigrants to Rangun.

In the same way the labourers of Mysor and Malabar annually go to the coffee estates on the hills of Curg and Wynaad. In British Burma there were 75,690

emigrants and 97,679 immigrants in 1871-72. The immigrants are mostly coolies from India, who come for the high wages at the rice and saw mills, and return with the money they have saved. Many also come from Upper Burma, for employment on the embankment works.

But emigration to distant colonies is not altogether a natural process, is not caused by the spontaneous action of the people, but is brought about to a considerable extent by the persuasion of agents and recruiters. It therefore requires very close supervision on the part of the authorities in India; and accordingly the Indian Emigration Act (VII. of 1871) was passed for the protection of the coolies, and is a consolidation of all previous laws.

It was provided that the Government of any place to which emigration is lawful, might appoint a person to act as Emigration Agent at Calcutta, Madras, and Bombay, subject to the approval of the local Government; and each local Government is to appoint a proper person to act as protector of emigrants, who is not to hold any other office. The duties of the protectors are to inspect vessels, inquire into the treatment of returned emigrants, to report, aid, and advise. The local Governments are also to appoint medical inspectors of emigrants. A suitable depot for persons engaged as labourers is to be established by the agents at each port to be licensed, after inspection by the protector and medical inspector, but no license is to be in force for more than a year. Emigrants in the depôts are to be inspected at least once every week. Recruiters of labourers, who are to wear a badge, must be licensed by the protectors, and none may engage men without licenses. Contracts may be made with natives of India, to Mauritius, Jamaica, British Guiana, Trinidad, St. Lucia, St. Vincent, Grenada, Natal, St. Kitts, Seychelles, so far British Colonies; French Guiana, Réunion, Martinique, Guadeloupe, foreign territory; Dutch Guiana, and St. Croix; and the Governor-General may, from time to time, declare emigration lawful to any other place. This Act, however, was almost entirely a consolidating measure. All the more important parts of the system had been long in force.

Every recruited emigrant must appear with the recruiter before the magistrate of his district, who is to see that he understands his engagement, and is willing to fulfil it. The magistrate is then to register the name, age, and village of the emigrant in a book, with the depôt to which he is proceeding, the rate of wages and period of service agreed upon; and copies are to be forwarded to the emigration agent and to the protector at the port. The emigrant is to be conveyed to the depôt, and the recruiter is bound to provide him suitable lodging and food on the journey, and to report his arrival. No vessel may take emigrants without a license from the local Government, stating her tonnage, and the number of men, women, and children she may carry, and the protector is to cause each vessel to be carefully surveyed. The height between decks is not to be less than 5½ feet; one adult for every 12 superficial feet of deck, and for every cubic space of 72 feet; women and children are to be apart from men, and there must be proper supplies of fuel, provisions, and water, a double blanket for each emigrant outside the tropics, a distinct place fitted up for a hospital, and a surgeon on board. No emigrant may be forced to embark, but he will incur liabilities for breach of contract. Steamers may sail at any time. Sailing ships may also leave for places east of the Cape at all times of the year, but for places west of the Cape only between the 31st of July and the 1st of March. The number of recruiters in Bengal, in 1872-73, was increased from 171 to 258.

A convention with the French Government was made in July, 1861, by which emigrants were to be allowed to be embarked for Réunion, Martinique, Guadeloupe, and French Guiana, at which places the British Government was to appoint agents; and the rules for recruiting are to be the same as those enforced for the British Colonies. The contracts are not to be for more than five years. The work is not to exceed 9½ hours a days for six days out of the seven. Wages and rations are to be fixed. Medical treatment is to be gratuitous; and return passages are to be provided at the expense of the French Government. The proportion of women to men in each ship is to be one quarter. A similar Convention has since been made with the Netherlands Government for emigrants to Surinam. The statistics of emigration only exist from 1842. Between 1842 and 1870 there were 342,375 emigrants from Calcutta, 159,259 from Madras, and 31,761 from Bombay; in all 523,535. Of these 112,178 have returned. The largest number of the Calcutta emigrants were from Bahar (155,399), and the North-West Provinces or Oudh (100,433). Only 77,050 were from Bengal.

In 1870-71 the West India Colonies applied for 9,423 emigrants, and 7,315 were despatched; but there was great difficulty in getting the quota of 40 females to 100

males. In 1871-72, the number of emigrants who left Calcutta was 8,231, and the rule as to the proportion of females was fully complied with. The number returning was 3,383, in 11 ships; and the death-rate, either going or coming, never exceeded two per cent. In 1872-73 the number of emigrants rose to 17,171, of whom 6,087 were to Demerara, 5,262 to Mauritius, 3,850 to Trinidad, 1,562 to Jamaica, and 410 to Surinam. The number that returned was 3,314, in a satisfactory condition, but there is no complete account of their savings. Of 74 Mauritius immigrants, the remittances amounted to Rs. 42,774; and Rs. 216,106 were brought home by 551 labourers from Demerara. Rs. 14,583 belonged to one man. During the year 1872-73, five vessels went from Madras to Mauritius with 1,554 emigrants, the due proportion of females being maintained, and five arrived with 1,069 returning emigrants. Four vessels also left Pondicherry with 1,312, a decrease since last year. There is no emigration from Bombay; but 269 men and 112 women returned to that port from Mauritius during the year.

In 1869 Sir J. P. Grant, the Governor of Jamaica, made important arrangements by which the coolies are efficiently protected and cared for, and a minimum wage of 1s. a day for men, and 9d. a day for women and boys, was enforced. Hospitals have been provided by the Government at the cost of the immigration fund; medical men appointed by the Governor, or being paid out of the same source, instead of by the employer, as formerly. An Ordinance, framed after receiving the Report of the Royal Commission of Inquiry, was passed in British Guiana, in 1873, to consolidate and amend all the labour laws in that country; and it is considered desirable that it should be taken as a guide for the other colonies which receive labourers from India. The minimum daily wage is fixed at 1s., as in Jamaica; there are to be six working days in the week; rations for new arrivals are to be supplied at 4d. a day, and for children gratis; the duties of emigration agents are defined; medical officers are made servants of the Government, and engagements made with coolies in India are to have binding force in the colonies. There are also provisions for the inspection of ships, for the indenture and schooling of minors, for securing house and hospital accommodation, and for return passages free after ten years, and for disabled immigrants at any time. The Dutch Government is pledged to give equivalent terms in Surinam. Natal emigration was suspended in 1872, owing to complaints of the treatment of coolies; but it is now provisionally resumed, as a law establishing a protectorship of immigrants has been passed in that colony.

There is a constant immigration of Chinese into India, but the male sex only come, and do not seek a permanent domicile. The immigration of Arabs into India to recruit the military service of the Nizam of Haidarabad has been interdicted; but there is a large domiciled settlement of Arabs in the Nizam's territory. The immigration from Eastern Africa requires further elucidation. No slave can be imported into British India, but there is a large influx of Africans connected with the mercantile marine. From beyond the north-west frontier of India, and the hills of Afghanistan, there is a steady annual influx and reflux of merchants and camel drivers. From the same direction aliens of the wild tribes beyond the Indus descend in thousands to seek service in the native British army, or private employment, and form an element in the floating population of the towns.

THE work of preserving the peace of the country, suppressing and detecting crime, and executing decrees in British India, is performed by a body of about 190,000 police constables, aided by the village chaukidars and watchmen, who have continued to occupy their immemorial positions, in most parts of the country, as a supplement, and often a very important one, to the regular police force.

In Bengal, besides 22,640 regular district policemen, there are 6,516 municipal, 2,474 Calcutta suburban, 168 river, and 486 railway police. Their drill is said to be unsatisfactory, for the Bengali, though well adapted for the work of detecting crime, is almost useless as a guard. It is suggested that the force should be recruited from among the bolder and sturdier men of Bahar. The work of the Bengal police in 1871-72, as regards criminal prosecutions, is represented by 72,817 arrests, out of which 36,813 convictions were obtained; but of 394 murders only 160 were detected. Mymensing, Bäckarganj, and the Southal Parganahs take the lead in crime. In addition to the regular police force, there are some 200,000 chaukidars or village watchmen in Bengal. The enrolled constabulary have many duties to perform in addition to the detection of crime and preservation of order. They are used as guards and orderlies, on frontier duty in the hills, as revenue preventive officers, serving writs and summonses, and last year in carrying out the census operations. They are liable to be employed on any miscellaneous executive work, so that much, if not most, of police work falls upon the village watchmen, whose proceedings are not included in the police reports. Under the Chaukidari Act they are under the control of a *puncháyat*, selected from the inhabitants of the villages; and some particulars respecting the work they perform, and their organization, would be a very important addition to the reports. As regards professional crime, embracing thugs, dacoits, and men who make a trade of poisoning and robbing, it can scarcely be said to exist in Bengal; yet, compared with the amount of actual crime, the results of convictions are reported to be petty and insignificant. In the administration of criminal justice, the high court disposes of appeals, and has cognizance of all capital sentences, of which 78 were carried into execution in Bengal during the year under review. The courts of session, aided by jurors or assessors, try cases committed by magistrates. The magistrates have power to imprison for two years, and inflict fines up to 100*l.*, and subordinate magistrates can commit for six months, and inflict fines up to 20*l.*, and whippings. 3,550 persons were flogged, or one for every eight persons imprisoned. During 1872-73 juries were employed in 447, and assessors in 1,289 cases coming before the sessions courts. Before the high court 100 cases were tried by juries. Of the criminals, nearly 37 per cent. are Muhamnadans, 8 per cent. Hindu cultivators, and 6 per cent. Brahmans.

In the North-West Provinces the police force is recruited from all castes, the Muhammadans, and Brahmans, and Rájputs being in nearly equal numbers, the Muhammadans slightly preponderating. The total force numbers 82,988 men, or 27 to every 10,000 of the population. Of these 57,408 are rural police, 16,159 provincial, 9,071 municipal and town, and 378 railway. During the year under review food was dearer than usual, and there was a consequent increase of crime; the increase being chiefly in petty thefts: and the same thing is reported from Oudh. In Gorakhpúr, when the price was 19 seers of wheat for a rupee, the prisoners numbered 556, and the number rose to 727 when only 11 seers could be had for a rupee. The result of this comparison is that 16 seers the rupee should be the minimum rate, and fall below which drives the poor into crime. A comparison of the jail population with the prices of food grain shows the connection between crime and distress. Taking three districts of the Benares division: in Ghazipúr, when 16 seers of wheat could be bought for a rupee, the jail population was 408; when only 12 could be bought for a rupee, it was 548. In Basti, when wheat was 19 seers the rupee, there were 270 inmates of the jail; when it was 10 for a rupee the prisoners numbered 282. Increase of market prices is a perfectly just excuse for the increase of so-called crime. The increase in reported cases of burglary is said to be due to increased efficiency of the police. They obtained 20,040 convictions, or 68·9 per cent. of the accused, against 69·5 in the previous year. 4,652 persons were flogged, of whom 780 were boys; and there were 74 capital sentences confirmed. The village police in the North-West Provinces have been re-constituted; hitherto they have generally been paid by grants of inferior land, as jagheers, and sometimes in

grain or money. They now receive regular wages of three rupees a month, in addition to their ancestral perquisites, paid by the cultivators from the threshing-floors. The chaukidars are also housed and uniformly clothed, and a great improvement is reported to have been effected in their efficiency.

Two duties of special interest are intrusted to the police of the North-West Provinces, namely, the supervision of the hereditary thieves, and the suppression of infanticide.

Various tribes in the Punjab, the North-West Provinces, and Oudh carry on theft and robbery systematically. They live quietly for part of the year in their own districts, and spend the rest in wandering about the country to rob and plunder, the gains being divided according to a fixed rule. In the North-West Provinces there are 29 tribes who support themselves in this way. In October, 1871, an Act was passed (XXVII. of 1871) empowering the Government to declare a tribe criminal; a register is then to be made of its members. The criminal tribes may be removed and formed into reformatory settlements, and any member of them found beyond prescribed limits may be arrested. Under the provisions of this Act, two colonies were formed in the North-West Provinces, one of a tribe called *Bowrials*, in Muzaffarnagar, and another of *Bhudduks*, in Ghorukpur. To these have been added, during the year under review, the Bowrials of Bedauli, and the Habúrahs of Etah. Land is given to them at low rates, and every inducement is held out to them to lead an honest life, while every member is placed under rigorous police supervision.

The measures for the suppression of infanticide are enforced under the provisions of Act VIII. of 1870, by means of the police acting under rules published in March, 1871. The crime of infanticide can be put down by accurate registration of all domestic events among proclaimed families, combined with frequent inspections of female infants by the village police. It is held that where the number of girls is less than 35 per cent. that of the whole number of children there must be foul play, and a suspicion of guilt becomes justifiable. The census returns have been utilised for the purpose of detecting the low percentages of girls among the suspected tribes of Rájputs and Jats. The head of a proclaimed family is obliged to report all births and deaths to the police, and, if foul play is suspected, the bodies are forwarded to the civil surgeons for post-mortem examination. The police officers visit proclaimed villages once a month, and compare the actual numbers in each family with their registers, annual reports being furnished to the magistrates. As many as 4,957 villages, with a population of 485,938 souls, in 25 districts, have already been proclaimed as having their percentage of girls below the prescribed limit; and the rules of repression have been applied. The crime of infanticide is unknown in five of the North-West Provinces (Dehra, Kamaun, Garhwal, Goruckpur, and Lullutpur), but in others it is very prevalent among different classes of Rájputs and Jats. Much good has already been done, girls are beginning to survive in numbers which accord with the laws of nature, the people are, it is believed, becoming ashamed of the crime, and seem to be glad of an excuse to drop it. The power of imposing the cost of repression of the guilty tribes has been very sparingly used, but where an extra force of police is required, a cess has been imposed of eight annas a year on every house. Although the tax is small, it is most unwelcome, and acts as a further stimulus to the people to abandon their ancestral crime. In the suspected villages the registered number of births of boys was 8,756, and of girls 8,794; and of death under 1 year, 1,745 boys and 1,937 girls. Out of 1,050 inquests and 634 *post-mortem* examinations, there were 57 suspicious cases, of which 22 were brought to trial; in 16 there were acquittals from want of proof, and in 5 convictions were obtained. The increase of female children, and the proportion they bear to male children, is due to this direct action among families where, but for the Infanticide Act, at the least half these lives would have been lost. Although some very startling figures in the last Oudh Administration Report turn out to be mistakes made in copying the returns, still the proportion of males to females among the Rájputs of Oudh is greater than among the rest of the population, which is tolerably clear evidence of guilt. Instead of its being 100 to 97, as among other castes, it is 100 to 88.*

In the Bombay Presidency there was suspicion of the crime of female infanticide against two castes in Ahmadabad and Kaira. Compulsory registration was, therefore, introduced among them in September, 1871, and their marriage expenses were fixed within certain limits by stringent and penal rules under Act VIII. (Bombay) of 1870. This measure has worked well, and the people seem to have made voluntary

* See page 117.

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arrangements to remove the motives for murdering their daughters. These consist of combinations among the inhabitants of villages of the same standing to intermarry, parties arranging to give and take daughters in exchange as wives for their sons, free of all expenses, except such as are borne equally by the contracting parties. There are also agreements with native chiefs in parts of the Bombay Presidency where infanticide is suspected, providing for registration and inspection. Funds are also established to aid indigent parents to meet the expenses of their daughters' marriages. The population under surveillance in these native States numbers 44,188, of whom 24,409 are in Kattiawar, and 16,195 in Kāch. In the latter State the returns look very bad, the percentage of male to female deaths under one year of age being 26 to 43!

The causes that give rise to the crime of infanticide are very obscure. It has been ascribed to ancestral pride and to poverty; but, on the one hand, it is practised by the poor and base-born castes, and, on the other, by the rich and well-to-do Rājputs and Jats. Moreover, the Jats and Tugās receive, and do not pay, dowries on the marriage of their daughters, yet they also practise infanticide. Possibly the crime is mainly attributable to hereditary custom and habit, in which case its total eradication will not be difficult, now that active measures have been adopted. The measures taken in the Bombay Presidency show that it is there considered to be due to the marriage expenses of daughters.

In the Punjab, under Act V. of 1861, the police force is divided into Trans and Cis-Sātlej divisions, the whole numbering about 20,000 men, of whom 53 per cent. are Muhammadans, 29 Hindus, and 17 Sikhs. Out of 358 murders there were 140 death sentences, an improvement in the number of convictions over the previous year. In Oudh and the Central Provinces the police force has been organised under Act V. of 1861, and its strength, under these two Governments, is 4,898 and 7,379 respectively, exclusive of municipal and railway police.

In the Bombay Presidency the new police system consists in the creation of a distinct and complete executive for police purposes, the Police Commissioner in each division being also the Revenue Commissioner. The pay of a constable is fixed at seven or eight rupees a month, and he cannot receive promotion unless he can read and write. The railway police was organised by the Government in 1866. By Act II. of 1871 the Government is enabled to call upon municipalities to contribute to the cost of the police to the extent of one-half, but this power has as yet only been put in force at Surat and Ahmadabad. Crimes are increasing, and convictions bear a small proportion to them, only 39 per cent. being convicted. There were 68 capital sentences confirmed, against 66 in the previous year. Most of the murders take place in Tanna. In Kanara there was only one.

The village police, under the control of the magistrates, is composed of the old mahars or watchmen in the ancient village system of the Mahrattas. The mahar was the 10th in order of the Bara Balūta, or body of village officials, of whom the patel is first, and has supervision of all revenue and police matters. The mahar is immediately under the patel, or head man of the village, and the ancient mode of remunerating him was by a grant of rent-free land. The reform of the village police is now under consideration, with a view to introducing a better and more adequate system of remuneration, such as has been adopted in the North-West Provinces, but the necessary statistics of the strength of the village police are not yet available. The duties of village policemen are to keep order, to report crime, and to assist the regular police.

Two bodies of police are still maintained in the Bombay Presidency with semi-military organisation, namely, the Khandesh Bhil Corps of 840, and the Gujrāt Bhil Corps of 503 men. The Bhils were the aborigines of Khandesh, a fierce mountain tribe, dwelling among steep rocks and pestilential jungles, whose profession was robbery. They were the object of mingled terror, contempt, and detestation to the people of the plains, and in their sudden forays they spared neither age nor sex. In 1818 Khandesh was ceded to Great Britain, and in 1826 Mountstuart Elphinstone conceived the idea of establishing the Bhils in agricultural colonies, and organising a Bhil regiment. The agricultural colonies were confided to Captain Ovens; to Lieutenant Outram was assigned the dangerous task of disciplining these lawless barbarians, while Mr. Willoughby established peace and order among the wild Bhils of Rajpeepala. Outram commenced by attacking the Bhils in their fastnesses, at the head of a small detachment, and compelled them to sue for mercy. Having convinced them that their rocky defiles were not impregnable, he sent back his troops, and, throwing himself among his recent foes, unarmed and unattended, he claimed

and received a reciprocity of the confidence thus reposed in them. He accepted their hospitality, listened to their wild legends, taught them many simple mechanical devices, dressed their wounds, prescribed for their ailments, accompanied them in the pursuit of tigers, and won their admiration by showing his superiority in those very qualities which they most valued in themselves. In less than a year he had formed a Bhil corps which, when Outram gave over its command in 1835, consisted of 600 well-disciplined men. The two Bhil corps are still continued, to maintain the peace of the country, and give employment to a naturally restless people.

In the Madras Presidency the police force consists of 22,018 men, besides the police watchers; but, as in Bengal, the regular policemen are also employed on the salt preventive and excise establishments, and as gaol guards. In Mysore there are regular police under Act V. 1861, introduced into Bangalore in 1866, and village police restored to efficiency, with concession of magisterial powers in petty cases to the heads of villages. The force numbers 6,440 men. In Burma there are Imperial and municipal policemen. The percentages of the convictions among cases tried is a test of the efficiency of the police. In Oudh it was 61·8 per cent.; Punjab, 51·7; Madras, 41·9; Mysore, 51·7; Bengal, 59·5 per cent.

Since the introduction of railroads, the formation of numerous plantations under European management, and the increase in facilities of communication, a new class has sprung up which has caused some anxiety. European vagrants or "mean whites" have begun to spread over the country, and are increasing in numbers. A Vagrancy Act was passed in 1869 (Act XXI. of 1869), which was intended to grapple with this evil, and it has been acted upon in all three Presidencies. Government workhouses have been established at Calcutta, Madras, and Bombay. In Calcutta the workhouse is in the Presidency Gaol. In 1871-72 the number of vagrants arrested and transported under the provisions of the Act, in Bengal, was 67. It is not given for 1872-73. In Madras the Vagrancy Act is stated to have put down begging in the towns; but it has created a class of voluntary vagrants who go to the Government workhouse on their own representations, where they are clothed and fed. The cost connected with them in 1872-73 was 809*l.*, including passage-money for those who were deported. There were 62 cases in the year. In April, 1871, a shed was erected in the new house of correction at Bombay, to serve as the Government workhouse; and in 1872-73 as many as 248 vagrants were admitted. Some were arrested up country, along the lines of railway, and the rest in the town of Bombay. They were nearly all hale able-bodied men, able to work, and the cost of feeding and clothing them was 604*l.* The daily average of workhouse inmates at Bombay was 32 for the year.

The gaols throughout India are generally in a satisfactory state; discipline is preserved, industry is enforced, and to some extent instruction is given, while much care and thought has been devoted to the sanitary arrangements. Indeed, the Lieutenant-Governor of Bengal considers that almost too much attention has been given to industrial and sanitary considerations, and that the penal effect of imprisonment has been more or less lost sight of. He thinks that the punishment of short-term prisoners is not sufficiently stinging, that the prisons are made too comfortable, while classification scarcely exists; partitions having been almost universally cleared away for the sake of ventilation. The district gaols have been placed immediately under the control of the magistrates; but there is no gaol of this class in Bengal that can be looked on as a model, or that can be recommended for imitation as based on scientific principles. Standard plans have, however been drawn up for gaols of different classes by the new Inspector-General, Mr. Heely. His predecessor, Dr. Mouat, worked a great improvement in the health, habits, and discipline of the Bengal gaols. There are seven central and 54 district gaols, and 87 lockups, and the number of prisoners during the year was 20,489. Gaol labour is divided into *penal*, consisting of treadmill, stone breaking, and lime and flour grinding; *hard*, including excavation work, drawing water, cutting wood, and blanket weaving; and *light*, such as tailoring, dyeing, weeding, garden work, and writing. Penal work is given to three months' prisoners during the whole time; for prisoners for 18 months during half the time; and for long term prisoners only as a punishment. The percentage of gaol mortality was 5·19, there being 1,063 deaths. The total gaol expenditure was 113,307*l.*, besides 53,887*l.* the cost of the manufacture department. The receipts from manufactures were 87,756*l.*, those at Alipur gaol being particularly remunerative. The Alipur gaol jute mills yielded a profit of 18,150*l.*, and the gaol press 9,422*l.*

In the North-West Provinces there are six central gaols for long-term prisoners,

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33 district gaols, and 22 lockups. During the year under review, 44,349 prisoners were confined, and 24 per cent. were employed on manufactures. The cost of the gaols was 69,580*l.*, and the profits from gaol manufactures 8270*l.*, against 7206*l.* in the previous year. The gaol death-rate was 4.43 per cent.

In the Punjab there are 34 gaols, of which six are central and divisional, and the remaining 28 district gaols. The number of prisoners confined was 42,571, but the daily average only came up to 13,536. The profits from gaol industry amounted to 29,975*l.*, but this is made to include value of labour, not only on public works but also in the performance of gaol duties. The expenditure was 74,559*l.* The gaol death-rate was 3.5 per cent. A ticket-of-leave system has been introduced, by which prisoners who have served three-fourths of their time are selected, on account of good conduct, and admitted to special privileges of probation, eventually being allowed to return home under surveillance. There were 30 of these ticket-of-leave men in the first stage of their probation, twelve in the second, and twenty released.

In Oudh there are 13 gaols, with a population of 20,167 prisoners. The death-rate was 3.8 per cent.

In the Central Provinces the gaol accommodation is ample, consisting of two large central gaols for long-term prisoners, and district lock-ups. The number of prisoners in 1872 was 9,737. They are employed on public roads, in grinding corn, and making prison clothes, and on manufactures. The Jabalpur school of industry was established in 1837, to give employment and instruction to Thug and Dacoit prisoners and approvers, whom it was desirable to keep under surveillance. It is now purely an industrial establishment, as the Thug and Dacoit convicts have been removed to the central gaol. Now only the approvers (of whom there are 125 Thug and 177 Dacoit), with their wives and families, continue to work in the school. The total number working in the school is 759, and the profits 1,800*l.* The institution is famed for its tent-making.

In the Bombay Presidency, 20,747 prisoners were confined during the year 1872. This is an increase on the preceding year. The number of executions has steadily increased for the last five years, and there were 62 in 1872. The number of deaths among prisoners was 196. The net profits of gaol factories was 3,195*l.* In the Madras Presidency the total number of gaol prisoners was 23,441, and the daily average 9,376. The total value of gaol labour was 37,924*l.* The cost of the gaols was 53,497*l.* There were 199 deaths, the death-rate being 2.2 per cent. In Mysore there are 8 gaols and 84 lock-ups. The death-rate among 5,927 prisoners was 1.02 per cent. In British Burma there are two central gaols, at Rangoon and Moulmein. It is intended to introduce jute spinning and weaving into the Burma gaols.

The health of most of the gaols in British India was good, and the death-rate low as compared with the rest of the population. The inmates have sufficient food to preserve health, which is not the case with the labouring poor outside the gaols in many provinces of India. The average death-rate in the gaols throughout India was 3.38 per cent. of the inmates. In Bengal the mortality was serious in particular gaols owing to local outbreaks of disease, and the percentage was high, 5.19 per cent. In the North-West Provinces it was 4.43, in Oudh 3.8, in the Punjab 3.5, in Madras 2.2, and in Mysore 1.02.

The penal settlement at Port Blair, in the Andaman Islands, contained 7,239 convicts. They are under three systems, a cumbrous and complicated classification, which will shortly be simplified. The "Straits System" was introduced by Colonel Mann in 1871, and 4,592 convicts are under it. It divides them into six classes. The 1st class consists of ticket-of-leave men who support themselves and are no charge to the State. The 2nd class is formed of writers and others employed by Government. The 3rd class comprises convicts who receive clothing and rations and a gratuity of 2 rupees a month for men with more than 5 years' service, and 1 rupee for over 2 years. The 4th class men work in light irons but have no gratuity. The 5th class consists of the chain gang who work in heavy irons inside the gaol and have no indulgences, and the 6th class consists of invalids and superannuated convicts who have light labour. The "New System" was introduced in October, 1871, and 1,183 convicts are under it. In it there are three classes: convicts after 14 years' servitude, who obtain tickets-of-leave and are allowed to marry; those after 7 years' who receive small gratuities and may send for their families; and all convicts on first arrival, and for the first 7 years, who are worked in gangs and receive no indulgence. The third system is the old one including 1,593 convicts who receive gratuities, clothing, and subsistence. When all are under the new system, Port Blair will be a disagreeable place of residence for people who dislike regular hard work

under circumstances of considerable restraint. The convicts are quartered in open barracks, under petty officers selected from their own body, who form a convict police. During 1870 there were 160 escapes, of which 100 were by sea and 60 by land. Of the 60 land fugitives 44 were recaptured, and the rest probably died. Out of 100 who got away in boats, 34 were from the Nicobar settlement, and 47 were retaken. There are 460 convicts employed on boat work. The most audacious case of escape was one from Camorta, the Nicobar settlement. The chief of the convict petty officers managed to disable the only two boats that could be sent in chase, and then got away with 17 convicts, in the remaining boat, in presence of the police. The party reached Achin in Sumatra; but the Sultan gave up the boat and 14 of the fugitives. The petty officer escaped. There are 910 married convicts, and 88 marriages took place in 1872. There are schools for the children of convicts. There is little crime in the settlement, beyond numerous cases of petty theft, and the sanitary condition of the place is satisfactory. The labour is devoted to clearing jungle, cutting up timber, and making bunds and tanks. There is an area of 900 acres under cultivation, 500 belonging to ticket-of-leave and self-supporting convicts, and 400 to Government, the crops consisting of Indian corn, paddy, and pulses, while the "Royal Dover Garden," commenced in 1868, occupies 357 acres, covered with guinea grass, plantains, fruit and spice trees. The expenditure on the Port Blair settlement for 1872-73 was 97,104*l*. There is another penal establishment at the Nicobar Islands, where there are 239 convicts, near a large swamp, which makes the place very unhealthy.

In the North-West Provinces, litigation reached the highest figure of any year since the mutiny, and there is also a great increase in the value contested. The total value of property in dispute was 2,147,528*l*. In Oudh the number of civil suits has doubled in four years; and the reports observe that under our rule there is a progressive proneness to civil litigation. There was, in 1872-73, an increase of 7,160 over the previous year. The sales of houses and lands bear a large proportion to the total number of processes, and in many cases there is failure to realise the amount decreed against the debtor, because he is absolutely devoid of means, already wrung dry. In the Central Provinces the number of suits decreased from 76,092 to 71,812. In the Bombay Presidency litigation is most active in Thana and Khandesh, the majority of suits being for debts on written contracts. Exclusive of those in the city of Bombay, there were 179,145, valued at 1,443,364*l*.

Registration of deeds and other documents in India is of two kinds, compulsory and voluntary. To the former class belong deeds having reference to land. In Bengal about 250,000 deeds are annually registered, but the great majority are contracts, the registration of which is compulsory; and documents which it is not obligatory to register only numbered 67,130 in 1872-73. This is a mere drop in the ocean, compared to the whole transactions of the people, and the registration agency does not touch the mass of the business of the country. Sir G. Campbell proposes to appoint Muhammadans of position and learning as registrars of marriage contracts and other deeds used by that community, and he has commenced a system of rural registration. The number of wills registered in Bengal has increased from 934 last year to 1,209, a fact pointing to a revolution in the ancient property law of India, which is gradually being superseded by the English doctrine of freedom of testamentary dispositions.

In the North-West Provinces and the Punjab the Tahsildars are registrars, and the registry districts are the same as those for revenue and police purposes. The number of documents registered in the North-West Provinces was 144,772. The number of documents registered in the Punjab was 84,323. A compulsory registration of decrees of civil courts was abolished, for which optional registration of certified copies of decrees and orders was substituted. In the North-West Provinces there was an enormous increase in the registration of deeds for the sale or mortgage of immovable property; from 86,464 to 102,699. This is an alarming sign; but it is uncertain whether the increase is in deeds executed or in deeds brought for registration; and whether, if the former, the increase is due to the poverty and embarrassment of the landed classes, or to the rising price of land, tempting men to sell. In Oudh, the Registration Act only came into force in July, 1871; and in 1872-73 there were 13,267 compulsory and 33,934 voluntary registrations, of which 139 were wills. In the Bombay Presidency there has been an increase in the registrations of documents generally from 81,588 to 90,361; and of wills from 279 to 404. In the Madras Presidency and in Mysore there is a steady growth in the number of documents registered. In Madras the number was 190,247, an increase of 35,966 over

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last year. The Acts referring to registration are XX. of 1866, and VIII. of 1871. As regards the cost of this system of registration, it appears that the management is more economical in the North-West Provinces than elsewhere. There the proportion of expenditure to receipts from fees, &c., is 56·8; in Bengal it is 75·2; in Madras 70·9; in Bombay 93·5; in the Punjab 58.

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THE education of the people of India is based on the system inaugurated by Sir Charles Wood's Despatch of the 19th July, 1854, the objects of which were two-fold, to provide first-class education for the wealthier classes, and instruction for the masses of the people. The main principle of the Despatch is that European knowledge should be diffused through the medium of the languages which are alone understood by the great mass of the people; that education in India should have for its object the diffusion of the improved arts, science, and philosophy of Europe very widely among the people; but that the teaching of English should always be combined with careful attention to the study of the vernacular languages. At the same time the importance of studying English was fully recognised, and there was no wish to diminish the opportunities which were afforded in special institutions for the study of Oriental literature.

With a view to attaining these objects it was first ordered that education departments should be created in every Presidency and Governorship, with inspectors to report upon the colleges and schools supported and managed by Government, to conduct the examinations, and to aid the schoolmasters by their advice. This admirable machinery is now in full working order throughout India.

A complete scheme was then laid down for the higher education of the wealthier classes. It was declared that the time had arrived for the establishment of universities in India, conferring degrees, and based on the model of the University of London. They were not to be places of education, but to test the value of education obtained elsewhere, and to confer degrees in arts, law, medicine, and civil engineering. All colleges and schools capable of supplying a sufficiently high order of instruction for candidates at the university examinations were ordered to be affiliated to universities which were to be established at Calcutta, Bombay, and Madras. At that time there were five Government colleges in Bengal, besides the Sanskrit College and Muhammadan Madrasa at Calcutta; five in the North-West Provinces, including the Rurki Civil Engineering College; the Elphinstone Institution, Poona College, and Grant Medical College in Bombay, and the High School at Madras, besides certain missionary schools. These were named in the Despatch as adapted to become affiliated colleges of the universities. Below them the zillah or middle-class schools were to prepare for the colleges and for the entrance examinations at the universities. The system was to be tied together, and, as it were, rendered homogeneous, by attaching scholarships, leading the best pupils up from the zillah schools to the colleges, and thence to university degrees. With the object of combining with the agency of the Government the aid which could be derived from the exertions and liberality of private persons or societies, a system of grants-in-aid was adopted, in order to bring all private schools within the scheme. It was hoped that far more rapid progress would follow from thus encouraging private efforts, while fostering a spirit of self-reliance, itself of no mean importance to the well-being of a nation. The grant-in-aid system was to be based on entire abstinence from interference with religious instruction conveyed in the assisted schools; and this principle has led to considerable assistance and encouragement being given to missionary schools of all denominations.

This was the scheme for securing the first object laid down in the Despatch. But it was intimated that as regards the upper classes the Government should not go further, and that an artificial stimulus should no longer be necessary to create a demand for such an education as is conveyed in Government colleges. These colleges and the universities were as much as the Government could do, to place the benefits of education practically before the higher classes. Indeed, the Despatch went further, and looked forward to the time when any general system of education, entirely provided by Government, might be discontinued with the gradual advance of the system of grants-in-aid, and when the existing Government schools and colleges, especially those of the higher order, might be closed or transferred to the management of local bodies aided by the State. This would have the effect of placing the highest class of education almost entirely in the hands of the missionaries.

The second object of the Despatch was considered still more important. It was to convey useful knowledge, suited to every station in life, to the great mass of the people who cannot possibly obtain it by their own unaided efforts. The Government

of India was desired to take active measures in future, with this object in view, for the attainment of which a considerable increase of expenditure would be sanctioned. There should be schools using English as a chief medium of instruction in every district in India, as well as others of inferior order conveying instruction through the vernacular, subject to constant inspection, with the inducement to scholarships at higher schools, as a means of encouragement to the pupils. Lastly, efforts should be made to extend the system of indigenous schools, such as Mr. Thomason had established in the North-West Provinces some years before, capable of imparting elementary knowledge to the great mass of the people, with scholarships to places of higher education as rewards. Grants-in-aid were also ordered to be given to girls' schools, and to special institutions, and orders were given for the establishment of training schools for masters and mistresses in each Presidency, recruited from pupil teachers. In admissions to the public service it was ordered that preference should be given to educated men.

This is the main outline of the system of education which now prevails throughout India. It is based on the Despatch of 1854. Steps were taken at once to carry out its orders. Directors of public instruction were appointed with a staff of inspectors and sub-inspectors in all three Presidencies. The three universities were created, with chancellors, vice-chancellors, and senates as governing bodies, conferring degrees in arts, law, medicine, and civil engineering, and with the same scheme of examinations. These consist of an entrance or matriculation examination, a first examination in arts, an examination for the bachelor's degree, and honours for master's degree. At Calcutta the first entrance examination took place in March, 1857, when 162 candidates passed, and the first degrees were conferred in 1858. At the Bombay University the first entrance examination was in October, 1859, and at Madras in the same year. The colleges and high schools enumerated in the Despatch were affiliated to the universities, and some of them were remodelled. The zillah or Anglo-vernacular schools were expanded and improved through grants-in-aid, and normal schools were established. All this had been accomplished by the end of 1859; but the more important work of bringing instruction within the reach of the masses has made slower progress. This could not be effected by grants-in-aid, and required active assistance and support from the Government.

Regular progress has since been made in all parts of India in advancing and promoting the education of the people, mainly on the principles laid down in the Despatch of 1854.

In order to obtain a clear view of the progress of education in India, it is proposed to deal with the various classes of schools referred to in the Despatch of 1854 separately. Their usefulness and influence affect different classes of the community, and, although they form parts of one homogeneous scheme, and are, to some extent, linked together by scholarships, it is thought that the most lucid way of dealing with the subject will be to glance at the condition and progress of each class over all India, rather than to give a general summary of the educational work of each province. On this plan the sketch will begin with primary education, reviewing the work done as regards the establishment of village schools and the instruction of the poorer classes throughout British India; then an account will be given of the middle-class schools, which give a somewhat higher education; then of the high schools which prepare for the entrance examination at the universities; and lastly, of the colleges where training is given for the higher university examinations.

In Bengal there were always *patshalas*, which in 1871-72 numbered 2,719, aided by Government. They are indigenous rural schools where the vernacular is taught, the course including elementary arithmetic, bazaar accounts, reading and writing. There are also *muktabs* where the kurân is taught, and *jôls*, in one or two districts, for instruction in Sanskrit and the Hindu sacred books. The *Guru*, or ordinary village schoolmaster, gets about 5 rupees a month from fees, and the numbers at a *patshula* vary from 10 or 12 boys to 50 or 60. About ten years ago a system began of aiding the *patshalas* by forming them into circles of four each, with a trained teacher over them to visit and direct the teaching of the schoolmasters, but the funds were stopped by the Supreme Government, and local taxation was suggested, a course which was not then adopted. The chief educational feature of the year 1872-73, in Bengal, has been the successful introduction of a new scheme for the establishment or aiding of the *patshalas* or village schools. In the end of March, 1872, there were only 2,719 of these schools. By the end of March, 1873, there were 8,636, teaching 215,411 pupils at a cost of 19,428*l.*; but the additional grant of 1873-74 will bring the cost up to 53,000*l.* By August, 1873, there were 10,787 *patshalas*, with 255,728

pupils, and there has since been a further increase. Thus a simple plan of primary instruction has now been started in every district. In some places prejudices had to be overcome, in others the people took to the schools with avidity from the first; but, especially in Bahar, there has been a disinclination to pay fees to the *Gurus* or village schoolmasters. Sub-inspectors, on low salaries, have been appointed to supervise the new schools; and there are grants-in-aid in the form of allowances to the *Gurus*, ranging from Rs. 2 8 ans. to Rs. 5 a month. In Midnapur there is a system of payments by results, with periodical examination, which may work well in districts where village schools are numerous. In some of the middle-class schools the lowest classes are receiving the same instruction as is given in the *patshalas*, and, adding these, the number of children receiving primary instruction in Bengal is now 353,300.

In the North-West Provinces Mr. Thomason, the Lieutenant-Governor, ably assisted by Mr. Reid, in 1845 developed a scheme for supplying schools for the rural population. A system of circle schools was introduced, called *Halkabandi*, by grouping several villages together, and establishing a school in a central position, no village being more than a mile from it. There are now 3,630 village schools in the North-West Provinces, with 130,981 scholars. The prospects of this class of schools are very encouraging, owing to the greater expenditure upon them, due to the introduction of the local cess in the new settlement, and to the average cess in permanently settled districts, under Act XVIII. of 1871. One-half of the former, and a part of the latter, are set aside for the education of the taxpayers, to be spent in the district. The *Halkabandi* teachers get from 10*l.* to 11*l.* a year, and give instruction in the vernacular (Urdu or Hindi) history, geography, and arithmetic. Some also teach Persian. These village schools are raising in number and importance, and are becoming more uniformly spread over the province, through the action of the new system of local taxation. There are also 4,609 unaided vernacular schools.

The village or primary schools in the Punjab number 1,046 Government, and 188 aided, the former with an average daily attendance of 51,251, and the latter of 20,825. In Oudh the number of village schools is 758, with 5,460 pupils, and there is now a Government or aided school within 4½ miles of every child in Oudh. In the Central Provinces the number of Government primary schools is 842, with 45,595 pupils, besides 559 receiving aid, with 28,612 pupils. In the Berars there are 326 primary schools, with 7,233 pupils.

In the Bombay Presidency the vernacular or village schools are mainly supported from one-third of the 1 anna cess on every rupee of land revenue, levied under Act III. (Bombay) of 1869, aided by a Government grant of 20,000*l.* There are 3,595 of these schools, with 182,147 pupils, besides unaided indigenous schools. They range from mere village schools up to middle-class town schools preparing for second-class certificates for the public service. In the city of Bombay the vernacular schools are aided by a municipal contribution of 1,000*l.*, and a grant from the Government. Some of the vernacular schools have English classes and their pupils number 4,791; the second class, not giving instruction in English, have 140,765 pupils. The best vernacular schools teach up to a standard required from candidates for the public service, and there is an annual examination held by Committees appointed for each district. In 1872-73 the number that passed was 540, an increase of 150 over the previous year. Owing to the irregular attendance of boys belonging to the working classes, night schools have been established in the Bombay Presidency. There are now 93, with 3,000 scholars, some of which have been successful, while others are doubtful. The ratio of daily attendance to the whole number of pupils is in the vernacular schools 76, and in the night schools 66.

In the Madras Presidency there are 6,190 primary schools, with 149,081 pupils. By Act VI. (Madras) of 1863 rate schools were authorized where the inhabitants would rate themselves for the purpose, and the Act gave legal sanction to the collection of a cess. But this measure led to no satisfactory result. The people did not respond. In Act IV. of 1871 it was provided that local funds raised under it should be applicable (amongst other things) to education. Between 1871 and 1873 there were 323 such local fund schools established, and supported by a house-tax in a corresponding number of villages or group of villages. But the tax proved to be very obnoxious to the people, and was, therefore, suspended at the commencement of the year 1873-74, leaving the education wants of the poorer class to be provided for from general local funds. The system of grants-in-aid from results is now to be extended to primary indigenous schools, and there are 76 inspecting schoolmasters engaged on this work.

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In 1868 Mr. Rice, the Director of Public Instruction, drew up the present scheme for primary education in Mysore. It was that in each *hobli*, or subdivision of a taluk or district, a school should be established; the area of each *hobli* being 41 square miles, and the population 6,040. The teachers are trained in the normal schools. There are no fees in the *hobli* schools, as they are maintained by a cess of 1 per cent. on the land revenue, but the people are expected to build or provide premises as an earnest of their desire for the schools. There are now 534 of these schools, besides 94 taluk schools, altogether 628 primary schools with 15,227 scholars. They are very popular, and the interest felt in them by the people is shown by their eagerness to build or rent suitable premises. Night schools, on the principle of those in the Bombay Presidency, have been established in Mysore. In Curg there are 29 Kanarese *nad* schools (*nad* being the equivalent to the Mysore *hobli*), with 1,376 pupils.

The total results of the efforts, commenced in about 1854, to supply elementary instruction to the children of the poorer, and especially to the agricultural classes in British India, is that in 1872-73 there were (exclusive of native States and British Burma) 30,477 primary schools, with 963,000 pupils.

In British Burma the primary schools are divided into two great classes, indigenous and missionary. The first include those kept by monks, which, by the rules of monastic discipline, are open only to boys, and those kept by laymen where boys and girls are taught together. There are about 4,000 monastic schools, educating 44,400 boys, and 350 lay schools, with 3,850 male and 1,250 female pupils. Of the missionary societies, the Baptists have 178 primary schools, 19 of which are for Burmese, with 690 pupils, two are Shan schools, and 157 are Karen, educating 3,660 children. The Catholic Mission has ten Karen schools, and one Burmese girls' school. There are also primary Burmese girls' schools connected with the Society for the Propagation of the Gospel. Thus there are 192 missionary schools, educating 4,777 scholars, and the number of indigenous schools is 26 times as great as that of missionary schools for primary instruction.

The middle-class schools, as a rule, supply education for the town, as the primary schools do for the rural population. Some provide instruction in English, in others all teaching is in the vernacular. Their classes commence with the earliest rudiments, so that they combine primary education with a higher standard in their upper classes. In Bengal there are 1,374 Government and aided schools of the middle class, with 66,545 pupils. Of these 432, with 22,038 pupils, have English classes, while 1,942, with 44,507 pupils, are vernacular. The middle-class schools are those which receive most support from the people themselves; the yearly cost to a boy in a Government middle-class school in Bengal is Rs. 11 12 ans., and in the aided schools, Rs. 16. 3a.

The *Tahsili* schools of the North-West Provinces are equivalent to the middle-class schools of Bengal. In 1845, when Mr. Thomason first began to provide a system of general education for the people, there were 736 indigenous schools in the North-West Provinces, with 6,433 pupils. He determined to establish a school at the head-quarters of every Tahsildar, and his plans were fully carried out. There are now 226 *Tahsili* schools, with 13,515 pupils. They do not teach English, but most of them give instruction in Persian as well as in the vernacular. The municipalities in the North-West Provinces have accepted the principle that the education of the poor in their towns devolves upon them, and they have voted suitable funds. In the Punjab there are 12 Government middle-class schools, and 56 aided by grants of money. Of these, 24, with 2,272 pupils, have English classes, and are called Anglo-vernacular; the others number 97 Government, with 9,834 pupils; and there are also 10 aided schools of the former, and 46 of the latter class. In Oudh there are 217 schools of this class; in the Central Provinces 48 Government middle-class schools, with 1,878 pupils, and 16 aid, with 1,486; and in the Berars 50, with 3,268 pupils.

In the Bombay Presidency there are 176 of these middle-class schools, with 16,612 scholars, intended as preparatory to the high schools. They also train candidates for the lower grades of the civil service. These schools have been much improved by means of municipal contributions which have provided for better qualified teachers. The average ratio of daily attendance compared with the whole number of pupils is .8. The number of certificates given to middle-class school candidates for the public service was 227 in 1872-73, against 138 in the previous year; and to these must be added the matriculations, which of course also qualify for Government employment. In the Madras Presidency there are 503 middle-class schools, with

28,262 pupils, nearly the whole of which are private establishments, with grants in aid. The Government merely has 16 hill schools in Ganjam, and five special Muhammadan schools, besides the Lawrence Asylum at Utakamund, with 324 boys and 68 girls. In Tinneveli, where there are no Government schools, the whole field being given up to two Anglican societies, there are 484 middle-class schools. In Mysore there are 6 Government middle-class schools with 237, and 9 aided with 629 pupils. In Curg there are four middle-class Anglo-vernacular schools.

As the primary village schools supply instruction to the children of the poorer agricultural classes, so the middle-class schools provide for the education of the children of shopkeepers and other dwellers in towns, and for that of the young men who fill the lower grades of the public services. There are, in British India, 2,506 of these schools, with 144,538 scholars.

In British Burma there are 19 Government and aided middle-class schools, educating 1,630 pupils. Of these schools six are Government, and the remainder aided. English is taught in all of them. Three Karen middle-class schools are intended to train masters, but students are not obliged to enter on the understanding that they will become teachers.

Next come the high schools, which educate up to the standard of the entrance or matriculation examinations at the universities, and in which English is not only taught, but is the medium of instruction. There is one of these at the head-quarters of every district in Bengal, and one attached to every college. The total number of high schools in Bengal is 179, with 20,641 scholars; of which 57, with 11,073 scholars, are Government; 78, with 7,789, are aided; and 44, with 11,779, are unaided. The monthly fees at the Government high schools are 1 to 2½ rupees; and classes have been opened at 18 or 20 of them, in surveying, drawing, and physical geography. Those in Calcutta are self-supporting. The zillah or high schools of the North-West Provinces also educate up to the entrance standard of the university. Three, with 776 pupils, are attached to colleges; 9, with 1,900 pupils, are superior; and 13, with 1,137 pupils, inferior. Altogether there are 25 high schools in the North-West Provinces, with 3,813 pupils. Most of them have good school-houses attached, the latter arrangement being necessary in order that the wealthier inhabitants of villages may share in the benefits of high and middle-class education. Allahabad High School is the largest in the North-West Provinces, and Etawah (Hume's High School) has been most successful. The highest Oriental teaching is at the Benares School, where there are 27 Government scholarships. The zillah or high schools receive 130 scholarships a year, worth 3 rupees a month. There are also a great number of aided high schools, most of them belonging to missionary societies. In the Punjab there are six Government high schools, one at Delhi, with 108 pupils, two at Lahore with 110, one at Amritsar with 65, one at Hoshiapur with 24, and one at Gújrat with 20; besides ten aided high schools. There are also two special schools; the Government Ward School at Ambala, for the education of Government wards and the sons of natives of rank, where there are 10 pupils; and the Anglo-Arabic School at Delhi, endowed by a legacy of Nawab Fazl Ali Khan for the furtherance of education in that city, but managed by Government. It gives instruction to 243 students in Arabic, who are all Muhammadans. In Oudh there are 11 high schools, with 3,096 pupils. In the Central Provinces there is one Government high school with 29 pupils, and 4 aided schools with 82; and in Berar there are two high schools, with 122 pupils.

In the Bombay Presidency the high schools are the medium of instruction in English, and of training for the colleges affiliated to the university. The average daily attendance compared with the ratio of number on the books is .85. There are now 41 high schools, with 7,167 pupils, four having been added during the year 1872-73. There are also many important private high schools. There are seven aided by the Government, which are intended for European and Eurasian children; and nine missionary schools, receiving aid according to results. They rouse the Government schools to increased efficiency by competition, and do still more good by receiving waifs and strays from the bazaars, who would otherwise be uncared for, to whom they offer protection and instruction. Three of these missionary schools are at Bombay, and the others in Poona, Ahmadabad, Súrat, Belgaum, Sharanpur, and Karáchi. Then there are 8 private schools belonging to natives, which all receive grants according to results, except the Bombay Proprietary School for the sons of wealthy natives, which is self-supporting. In the Madras Presidency there are 53 high schools, with 11,990 pupils, many of which belong to missionary societies.

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Some of these should properly rank as colleges. At the Combaconum Provincial College, for instance, there are 60 undergraduates; and the Central Institution of the Free Church of Scotland has upwards of 70 students in its college department. In Mysore there are 7 Government high schools, with 1,524 pupils, and 5 aided, with 832. But the Bangalore High School, the Mysore Rajah's School, and two private institutions should rank as colleges, for they have classes for preparing students for the higher university examination. Indeed the Bangalore High School is the central educational establishment in Mysore. A good deal of attention has been given to physical training in the Mysore high schools. At Bangalore there is a complete gymnasium, and cricket matches are fairly established. Cricket also flourishes with great vigour at Hassan. There is one central high school at Mercara, the capital of Curg, fed by the Anglo-vernacular schools in each taluk, with two boarding-houses, and 293 pupils, 152 of whom are Curgs. There are no high schools in British Burma.

The high schools supply the candidates for the entrance examinations at the universities, and also furnish the training for natives who seek employment in the higher grades of the civil service. In December, 1872, there were 2,144 candidates for the entrance examination at the Calcutta University, an increase of 242 over the previous year, of whom 938 passed. Out of these candidates, 1,717 were from the Bengal high schools, and of these 1,558 were Hindus, 74 Muhammadans, 83 Christians, 1 a Buddhist, and 1 Sikh. From the high schools of the North-West Provinces, out of 186 candidates 100 were successful. From the Punjab 22 were successful out of 54 candidates. From Oudh 44 passed out of 105.

The Bombay University has held matriculation examinations since 1859, when there were 127 candidates, out of which 122 passed. In 1862 only 30 passed out of 134. In 1872 there were 909 candidates and 378 passed. From the foundation of the Bombay University to 1872 there have been 6,341 candidates for the entrance examination, and 1,832 have been successful. The matriculation examination of the Madras University is held annually at fifteen places in the Presidency. In 1872-73 there were 1,530 candidates, and 611 passed. Of the successful students 48 were from Mysore.

For the teaching in all these classes of schools there are normal training schools for masters. In Bengal there are 26 of these normal schools with 1,319 pupils, of whom 318 are for *Gurus*, or village schoolmasters, and 127 for *Pundits*, or higher vernacular teachers. In Patna there are also English classes at the normal schools. The course is for three years, and the training includes geography, history, geometry, mathematics, surveying, and the art of teaching surveying, all conveyed through the vernacular. Besides the Government normal schools in Bengal, there are 17 schools for training masters and mistresses, under the management of the missionary societies. These contain 1,986 pupils, chiefly trained for primary instruction among the aboriginal races. In the North-West Provinces there are 12 normal schools for training masters and mistresses, where 421 males and 41 female teachers are being trained. In the Punjab there are three Government and six aided normal schools. In Oudh every class of school has its own curriculum printed and suspended in each schoolroom, with the hours of assembly and holidays, and every schoolmaster has a manual of duties, with a few plain directions in school management. Each district also has a library for the use of village schoolmasters, and the normal schools are satisfactory. In the Central Provinces there are seven normal schools, with 205 pupils, and in Berar with 29. In the Bombay Presidency there are 12 normal schools, with 602 pupils, and in Madras 17, where 1,929 teachers are trained. The teachers for the *Hobli* schools in Mysore are trained in normal schools, one in each division, and there is one such school in Curg.

The colleges affiliated to the universities only admit matriculated students. Of these there are 15 in Bengal, of which 10, with 858 pupils, are Government institutions, and 5, with 305 pupils, are aided. The Presidency College at Calcutta was established in 1855, and has seven scholarships attached to it. The Hugli College, founded in 1836, is supported from funds bequeathed by a wealthy Muhammadan. It consists of an English, an Arabic, and a law department. The Dacca College, opened as a school in 1835, became a college in 1841. The Colleges of Kishnagur and Berhampur were founded in 1845 and 1853 respectively; and the Patna College was commenced in 1864. The four Government colleges at the Presidency, Hugli, Dacca, and Patna, and all the aided colleges, educate up to the examination for Bachelors' degrees. But the first university examination, after matriculation, is that of "First Arts," which takes place after a course of two years at the colleges,

and two years after that comes examination for Bachelors' degrees. In 1873 science classes were introduced into two of the Government colleges in Bengal. Two science professors, Mr. Pedler and Mr. Watt, came out from England, the former to teach chemistry and conduct analyses, the latter to teach agricultural botany and physiology. Mr. Pedler, who is supplied with chemical apparatus, is at the Presidency College, for which Mr. H. F. Blanford has also prepared a text-book on physical geography. Mr. Watt is at the Hugli College. Law is taught in nine colleges, there being 425 students. The Medical College of Bengal was founded by Lord William Bentinck in 1835. The English class consists of scholarship-holders. The next classes are composed of natives, and are conducted in Urdu and Bengali. Besides the principal, there are 13 professors for the first class, besides two demonstrators of anatomy, and 6 teachers for the vernacular classes; there are 295 pupils. At the Presidency Civil Engineering College there are 133, and 94 at the School of Arts. The Calcutta Sanskrit College was founded in 1824, and is supported by Government. It is open to all respectable Hindus, and has a valuable library of Sanskrit manuscripts. There are annual examinations for the Bengal native civil service, and in January, 1873, there were 238 candidates, of whom 58 passed for the higher, and 86 for the lower class of appointments. Besides certificates of character, health, and ability to ride and walk, the requirements are some knowledge of the vernacular, chemistry, botany, law, drawing, engineering, surveying, and gymnastics.

There are four Government colleges in the North-West Provinces, at Allahabad, Agra, Bareilly, and Benares, with 127 students, against 84 in 1871-72; and four private colleges receiving grants in aid, of which St. Peter's at Agra is Catholic; St. John's at Agra, and Joy Narayan's, at Benares, belong to the Church Missionary Society; and the Victoria College at Agra is supported by natives. The Agra College was established in 1823, and has an endowment, as well as allowances from Government. Its scholarships amount to 10*l.* a month. The Benares Sanskrit College was founded in 1791 for the cultivation of the language, literature, and religion of the Hindus. In 1830 an English branch was added. With a view to enabling natives, after passing the university entrance examination, to devote their undivided energies to Oriental literature, Sir William Muir, in June, 1870, proposed the creation of a central college at Allahabad. A sum of 17,500*l.* was subscribed by the wealthy natives of the province, and he applied for a grant of 5,000*l.* for the building. There are, it was represented, two modes of education. In the Calcutta University system, English is the basis of instruction, as the language of the governing class, the key to offices of trust and emolument, and the means of introducing western science and philosophy; but this can never become a national system, and it is, to some extent, at variance with the Despatch of 1854, which urged the importance of careful study of the vernacular languages. The other mode, which, as the Lieutenant-Governor of the North-West Provinces thinks, has been too much lost sight of, is purely vernacular. He was anxious to form a central institution at Allahabad, which he believed to be necessary to combine this system into a homogeneous whole, by furnishing the stimulus of examinations and degrees. The Allahabad College will affiliate the vernacular schools, afford the means of education for undergraduates, and prepare them for the first arts examinations. The establishment for it was sanctioned in July, 1872, the ground has been marked out, and a design for the buildings selected. With Sir William Muir's consent it has received the name of the "Muir University College."

A chain of scholarships binds together the university, the colleges, and the high schools, as was suggested in the Despatch of 1854. Of these the undergraduates receive 80, at 4 to 5 rupees a month; the graduates of the first arts examination 50, at 10 rupees; and the bachelors 8, at 18 rupees. There are also five scholarships of 25 rupees a month for the Masters of Arts. The whole of these scholarships in the North-West Provinces cost 1,780*l.* a year.

Besides the affiliated colleges, there is the Agra Medical College, which receives pupils who have been trained in the numerous dispensaries, and the Rurki Civil Engineering College. The Thomason College at Rurki was founded in 1847 to give instruction in civil engineering to Europeans and natives, with a view to their appointment to situations connected with the public works of the country. It has a library of 12,000 books, a press for printing, lithography, engraving, and binding, an instrument depot, and publishes a valuable series of professional papers on civil engineering. The students are of various classes, officers in the army, non-commissioned officers and privates, English civilians, and native youths. It supplies the

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Public Works Department with well-trained men, creates an engineering profession among the natives, and disseminates an engineering literature adapted to Indian wants and experiences. It is in sight, as Sir William Muir observed in a recent speech, of the noble monuments of engineering skill which conduct the Ganges canal from Hurdwar across intervening valleys and mountain torrents; and the college itself is full of associations of the famous engineering officers who have constructed the great irrigation works of India—Cautley, Baird Smith, Dyas, Turnbull, all now passed away. It has proved a blessing to the country by qualifying Europeans of every rank for the service, and by engrafting engineering science on the native youth of India.

In the Punjab the two colleges affiliated to the university are at Lahore with 52, and at Delhi with 36 students. The Punjab University College at Lahore has for its objects, like that at Allahabad, the encouragement of the study of eastern classical literature, the improvement of the vernacular, the promotion and diffusion of European science. Its scholarships amount in the aggregate to 840*l*. In Oudh there is, at Lucknow, the Canning College, with 67 pupils in its higher department. There are no affiliated colleges in the Central Provinces or the Berars.

There are six colleges affiliated to the Bombay University. Of these the Elphinstone College at Bombay has 184 students, an increase of 60 over the previous year. Of these 45 are Brahmins. New professorships of astronomy, natural history, history and political economy, Persian, and Arabic, and Sanskrit, have lately been founded. The Deccan College, at Poona, now has 99 students, of whom 90 are Brahmins, and it makes even progress, obtaining respectable results at the university. The Grant Medical College at Bombay also secures satisfactory results at the university. The prospects of the medical students are considered to be sufficiently assured to justify the levy of tuition fees of Rs. 25 for entrance, and Rs. 5 a month. These payments have caused no reduction in the numbers. The Poona Civil Engineering College has 69 students. The building for it was commenced in 1865, and completed in 1868, at a cost of 18,000*l*., of which Cowasjee Jehanghir contributed 5,000*l*. It consists of a main hall, with lecture, drawing, and photograph rooms, and a set of workshops. There is another small civil engineering college at Haidarabad, for training Sindh youths for subordinate grades in the Public Works Department. There are 14 pupils, and the course of instruction has since been revised, and the teaching staff strengthened. The Bombay School of Art has been placed under the Education Department, and a museum and class room have been sanctioned on a new site. It is divided into an elementary drawing school and practical departments for learning wood engraving, decorative painting, and architectural sculpture. The average attendance was 79, against 57 in 1871-72. During 1872 a party of the students, under Mr. Griffiths, visited the cave of Ajanta, and took moulds of the sculpture and copies of the paintings.

In the Madras Presidency there are 13 affiliated colleges, with 480 students. Of these the Presidency College has six professors. The Trivandram College, in Travancor, is also affiliated to the university; and in 1871 its students obtained 3 Bachelors' degrees; while 28 passed the matriculation, and 9 the first arts examination. The high school at Ernacollum in Cochin, also has a university class, and 4 of its students matriculated last year. Some of the best high schools have university classes, and there are also the Doveton Protestant College, and the Medical and Civil Engineering Colleges.

The Madras School of Art is the oldest in India, having been established by Dr. A. Hunter in 1850. In 1856 the Madras Government was so well pleased with the practical results of the school, that Dr. Hunter was placed in official charge of it. Between 1850 and 1873 there were upwards of 4,220 pupils at the Madras School of Arts, of whom a larger number have obtained employment under Government or in private workshops. The usual salaries given to them, after they had passed the examinations, were Rs. 25 to 50 a month; but some, who were trained as modellers of figures and potters, got salaries from Rs. 200 to 280 a month. The Rajahs of Travancor, Vizianagram, and Jaipur have established Schools of Art, with teachers trained in Dr. Hunter's School at Madras, and there are others at Bangalore, Mysore, and Nágpur.

These affiliated colleges prepare the undergraduates for the other university examinations. In two years after matriculation comes the 'First Arts' examination. In December, 1872, there were 560 candidates for it at the Calcutta University, of whom 463 were from Bengal colleges. Out of 220 who passed there were 175 Bengal students, 170 Hindoos, and 5 Muhammadans. From the North-West Provinces there were 45 candidates, of whom 17 passed. From the Punjab 10

passed out of 25; and 5 students from Oudh were successful. At the Bombay University since 1861 there have been 832 candidates at the 'First Arts' examination, of whom only 300 were successful. In 1872, out of 99 candidates, 24 passed. At the Madras University there were 97 candidates for this examination, of whom 76 passed. Of these 9 were from Mysore.

Two years after the 'First Arts' examination come that for a Bachelors' degree. For this there were 242 candidates at the Calcutta University in January, 1873, of which 207 were from Bengal; and out of the 126 who succeeded, 110 degrees were secured by the Bengal aspirants. From the North-West Provinces there were only 16 candidates, of whom 7 got their degrees. Out of 14 candidates from the Punjab, 8 passed; and 1 student from Oudh succeeded. The Bombay University, since its foundation, has conferred 152 Bachelors' degrees for Arts; and out of 56 candidates in 1872, 22 succeeded. The Madras Presidency gave 21 degrees of Bachelor of Arts, three of which were secured by students from Mysore. Degrees are also conferred at all three universities for law, medicine, and civil engineering. There were 137 candidates for law degrees at Calcutta in 1873, of whom 75 passed, and 77 became licentiates. In civil engineering 1 student took a Bachelor's degree, and 7 obtained licenses. The Calcutta Medical College sent up 52 candidates for licenses in medicine, of whom 25 succeeded. At the Bombay University one student became a Bachelor of Law in 1872; 19 passed in medicine, and 19 in civil engineering.

The final university examination is for honours in arts. Out of 19 candidates at the Calcutta University in January, 1873, 15 became Masters of Arts with honours, and out of 11 candidates for the ordinary degree, 5 passed. Of these prizes one was secured by a student from the Delhi College, and one fell to a native of Oudh.

At the Bombay University only 34 Masters' degrees have been conferred since its foundation. In 1872, out of 6 candidates, 5 became Masters of Arts. Only one such degree was conferred by the Madras University.

The Indian Universities were incorporated in 1857. It is deserving of note that the three universities were calmly founded in the regular way of routine during the worst time of the mutinies, when our power seemed at its lowest ebb. The Calcutta University exercises functions over Bengal, the North-West Provinces, Oudh, and the Central Provinces. The governing body is the Syndicate, consisting of the Vice-Chancellor and six members of the Senate. It prescribes the text books and subjects, and the examinations, and thus dominates and guides the course of instruction in all the affiliated colleges and schools. The endowments amount to 23,700*l.* capital, including 20,000*l.* given by Premchund Roychund, of Bombay. It is devoted to five studentships of 200*l.* a year each, for which Masters of Arts of the university are eligible to compete and they are to be held for five years. There is also an endowment under the will of the late Prasana Kumar Tagor, for a law professorship, and fifty scholarships are awarded on the results of the 'First Arts' examination, ten of Rs. 25 and twenty of Rs. 40 a month. The graduates number about 1,500, and the undergraduates exceed 2,000.

The Bombay University was founded by Lord Elphinstone in 1857; to consist of a Chancellor, a Vice-Chancellor, and Senate, for faculties of arts, law, medicine, and engineering, and the same system of examination as at Calcutta. The Bombay University sets the standard of higher education, and examines for degrees. It has been enriched and endowed by the wealthy Settias of Bombay. The endowments for prizes amount to 970*l.*; sums of 10,000*l.* have been given by Sir Cowasjee Jehanghir Readymoney, for the university hall; of 40,000*l.* by Premchund Roychund for the library and clock tower; and a sum of 120*l.* from other benefactors for a grant of arms, and for the university silver mace. The hall and library have been erected on the esplanade at Bombay. Many of the graduates have taken distinguished places in the public service and in the liberal professions.

The Madras University, founded in 1857 by Lord Harris, grants the same degrees, and has the same system of examinations as those of Calcutta and Bombay. It has several endowed scholarships, such as 100*l.* given by the Maharaja of Travancore for a Travancore graduate in medicine or civil engineering; a similar one for a Cochin student, to the value of 650*l.*, given by the Raja of Cochin, and prizes for Tanjore students by Sir Madava Rao, K.C.S.I. In 1872 Mr. Campbell Johnston, in accordance with the will of his father, the Rt. Honble. Sir Alexander Johnston, founded two scholarships for Madura students, to be maintained from the income of lands claimed by Sir Alexander at Madura. There are three Doctors of Medicine of Madras, eight Masters of Arts, about 290 Bachelors of Arts, 79 Bachelors of Law, and 8 of Civil Engineering.

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Thus a great and successful system of education has been developed in India, exactly on the principles laid down in Sir Charles Wood's Despatch of 1854. In Bengal a sum of 76,678*l.* was devoted to education in the year 1872-73, and 50,136*l.* was received from fees, making a total educational income of 126,815*l.*, by means to which 14,371 schools were maintained, giving instruction to 414,946 scholars. In the North-West Provinces there were 9,490 schools and 237,676 scholars, at a cost of Government of 99,636*l.* In the Punjab the number of schools was 1,298, of scholars 65,136; the cost from the public funds, 50,931*l.*; from the local cess, not given; from fees, 3,508: and the total cost, 54,439*l.* There were 952 schools in Oudh, with 48,911 scholars, maintained at a total cost of 14,185*l.* In the Central Provinces the 898 schools and 47,757 scholars were maintained at a cost of 32,395*l.*; and in the Berars the 540 schools and 15,878 pupils cost 32,523*l.* In the Bombay Presidency, including Sind, there were 4,088 schools, providing instruction for 218,466 pupils at a cost of 285,650*l.* In the Madras Presidency there were 6,780 schools and 192,054 scholars, at a cost of 95,935*l.* In Mysore the total number of schools was 2,250, with 38,096 scholars, with an income of 13,217*l.*; and in Curg there were 43 schools and 2,020 scholars, at a cost of 3,542*l.* So that the whole number of schools in British India, excluding the native States and Burma, is 40,700, giving instruction to 1,280,940 scholars, at a cost of 758,337*l.*

Female education receives much attention from the departments in all parts of India. In Bengal there were, in 1873, 245 girls' schools, all private but one. The education is of the simplest possible kind, but home teaching is preferred among the natives at Calcutta; and an American lady has organised a system there by which 40 or 50 governesses visit houses, and by this means several hundred girls are taught in the zenanas. But at present there is no real demand for the education of women and girls among the natives. In the North-West Provinces there are 420 girls' schools, with 8,130 pupils: but, as in Bengal, there is no real response to the endeavours of the Education Department to popularise these schools. Progress is very slow, and "the dead slumber of ignorance still shrouds the women of India." In the Punjab there are 91 Government and 254 aided female schools, a considerable falling off from the previous year. In Oudh there are 81 girls' schools, with 2,020 pupils, the average age being 8. In the Central Provinces the number of girls' schools is 118, with 4,185 pupils, and in Berar 25, with 457 pupils. In the Bombay Presidency the girls' schools are, as a rule, established in large towns, and there are now 11,000 girls under instruction. Their success depends very much on the working of the training schools. Several are doing well, and the liberal assistance of Miss Carpenter has enabled the Government to open a new female normal school at Haidarabad. There are now three of these schools, with 50 pupils. In the Madras Presidency the number of girls' schools has increased from 163 last year to 186, with 9,292 pupils. The number of girls under instruction, in all schools connected with the department, is 14,330. Those instructed by the missionary societies were nearly twice as many as those educated in any other way, and the Hindus seem to be seeking instruction for their daughters much more freely than hitherto. In Madras city there are 3,903 female scholars, and missionary Tinnevely comes next with 3,548, then Malabar with 1,493. The girls in Kurnul are the most ignorant, there being only 23 at school. In Mysore there are also signs of a favourable feeling towards the education of girls being on the increase. The Jains and some of the trading castes are most favourable to it. There is much diversity of opinion on the subject among the rural population. There are 8 Government girls' schools in Mysore, with 242, and 31 private with 1,304 scholars. In Curg 160 little girls go to school with their brothers and learn needlework, in addition to the regular course, but there is no separate girls' school. From these figures it would appear that there are about 1,640 girls' schools in British India, and that somewhere about 57,000 girls are receiving some sort of education.

The schools of art and museums are powerful instruments in the spread of education. Museums have long been established at Calcutta and Madras. The Indian Museum at the former city was formed in 1866, and there are also a geological museum and one belonging to the Asiatic Society. The daily attendance averages 657. The Government Central Museum at Madras was visited by 112,360 persons in 1872-73, and there are small local museums at Rajmahendri and Utakamund. The Bangalore Government Museum was founded in 1864.

The Bombay Museum was founded by Lord Elphinstone, under the name of the "Government Central Museum," for the illustration of the economic products and natural history of Western India. The late Dr. Buist, LL.D., F.R.S., was the first

curator, and the Rev. Dr. Fraser, LL.D., succeeded him. The collections organised by these gentlemen were lodged in the town barracks, and on the breaking out of the mutiny in 1857 they were destroyed, the brigadier commanding the Bombay garrison having ordered them to be thrown of the windows. In the same year Lord Elphinstone appointed Dr. Birdwood as curator, who, with the aid of Dr. Bhau Daji, raised a large sum of money by subscriptions from the public for the erection of a building. It was erected in the Agri-Horticultural Society's garden; and thus was established the Victoria and Albert Museum and Gardens, at a total cost of 100,000*l*. The first stone was laid by Sir Bartle Frere in November, 1862; but the works were stopped in 1865 for want of funds, and it was not until 1868 that the Government again undertook to complete them. The new museum was opened in 1871. During the interval of its building, Dr. Birdwood arranged the collection in the Town Hall, and zealously worked at the task of making it a really useful institution, until his retirement in 1868. He drew up valuable reports on the Tasar silk and on the Indian blister fly, and, in connection with the museum, he published a catalogue of the economic vegetable products of Western India. It was also through his connection with the Victoria Gardens that he was enabled to identify the sources of frankincense (*gum olibanum*), and to complete his important monograph on the genus *Boswellia*.

There is also a small museum at Karáchi. The Lahor Central Museum was visited by 49,903 persons during 1872-73. It contains a fine collection of coins, and a most interesting gallery of Græco-Bactrian sculptures. The Lucknow Museum was visited by 132,496 persons, and 58,000 visitors came to the Nagpúr Museum in 1872-73. There are institutions of the same kind at Allahabad and other places, and the numbers of visitors who flock to them show that they take their share in the education of the people.

But one very important criterion for judging of the intellectual movement that is going on in Indian is the number and character of the books and newspapers that are published. In Calcutta there are 23 daily, weekly, and monthly newspapers published, of which 15, or a little over half, are English, and the remainder Native; but there are only five English newspapers published in other towns of Bengal, against 32 Native newspapers. The number of magazines published at Calcutta is 19, of which three are Native, and the rest English, against eight Native, and two English published in other towns in Bengal. The number of books published in Bengal during the year under review was 1,082, but the return gives no particulars as to their character. As a rule the vernacular newspapers in the districts are not important, and have little influence. But the native papers of Calcutta exhibit considerable talent and excessive freedom of opinion. They certainly are an engine of some power.

There were 36 Native newspapers published in the North-West Provinces in 1871-72, with an average circulation of 253 copies each, and nine magazines. Of the two languages, Urdu keeps a decided lead in relation to Hindi, the great majority of the newspapers and magazines being in the former language. As a rule, there is nothing that is offensive to morality or good taste in these publications, and much that is useful. The Government takes a large number of copies, with a view to stimulating the circulation, and it is considered that the intellectual progress resulting from the reading of these papers is not unimportant. Ninety-seven books were published in 1872-73. Educational works formed 58 per cent. of the whole, and works on religion 19 per cent. Religion and poetry are the subjects on which books are most in request. The Government grants rewards for meritorious authorship in the vernacular.

In the Punjab 12 Native and two English newspapers are published; and in 1872-73 the books were 344 in number. In Oudh there are four English and three Native newspapers. No information respecting newspapers is given in the Madras Report; but 387 books were published in that Presidency during the year 1872-73, of which 187 were original. In English there were 76; in Tamil, 130; in Telugu, 85; in Malayalim, 14. 144 were on religion, 36 on poetry, and 37 on language. A set of vernacular maps for elementary schools has also been completed. Of the four languages in the Bombay Presidency, Marathi and Gujrathi show signs of intellectual activity, but in Canarese and Sindi there are few books and no newspapers. A reporter on the Native press is maintained by the Bombay Government, who draws up a weekly report. Of the 52 Native newspapers in the Presidency, 28 are in Marathi, 23 in Gujrathi, and one in Hindustani. They are published in most of the large towns, and their general tone is loyal, the advantages of British rule

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being understood and confessed, although there are acrimonious attacks on particular measures, and on the conduct and actions of individual officers of Government. The topics most discussed were the Municipal Act, compulsory vaccination, the law against infanticide, and Sir Bartle Frere's mission. In 1872 the number of books published in the Bombay Presidency was 380. 332 were original works, and the rest translations or reproductions. The taste of readers seems to run in the same direction as in the North-West Provinces and the Madras Presidency. There were 124 on poetry, 61 on religion, and 16 on law. The general tone of vernacular literature, in respect of morality, is reported to be good and progressive. Among native publications there is a Marathi drama, "The Death of Afzul Khan," in which Siváji is defended against the charge of perfidy, on the ground that the Muhammadans themselves meditated treachery. A learned work on the ancient history of Persia was also published in Gujráthi; and prizes of 40*l.* and 20*l.* were given for Marathi poems on the Ganges. A Dustoor at Poona has been engaged during the year in collating the MSS. of the Pahlavi text of the Yasna; and the Pahlavi text of a very curious work, "The Book of Ardaí Kiraf," was prepared by the Dustoor, and published with a translation by Dr. Haug. The third and fourth fascicles of the catalogue of Brahmanical MSS. in Gujráthi has been published by Dr. Bühler, who is now exploring the large Jaina libraries at Ahmadabad.

The growth of scientific and literary societies among the Native communities is a very remarkable sign of progress and of intellectual activity which deserves careful attention. There have always been societies in India in which Europeans and educated Natives meet on common ground, and such institutions continue to increase and flourish. The Bengal Asiatic Society was founded by Sir William Jones in 1774 as a centre to which individual inquirers might forward their materials, and from which they might derive assistance and advice, and the Madras Literary Society was formed in 1818. The Bombay branch of the Asiatic Society dates from the year 1804, and in 1817 it was grafted on to the Royal Asiatic Society in England as the Bombay branch. Its Journal was established in 1841, and the publication has been regularly kept up ever since at intervals of one or two years. During ten years Mr. William Frere was its president, and Dr. Carter its secretary, men of high literary and scientific attainments; and on the retirement of Dr. Carter, who may be looked upon as the father of Indian geology, Dr. Birdwood succeeded to the secretaryship. During his brief incumbency the number of members was more than doubled, and the annual receipts were increased from 1,000*l.* to 3,400*l.*, in addition to 800*l.* from Sir Cowasjee Jehanghir for the purchase of coins, and 500*l.* for the purchase of standard works of Oriental literature; 1,000*l.* from the late Honourable Jugernath Sunkersett for books on natural history, and 1,000*l.* from Premchund Raychund for library fittings. Altogether 6,200 volumes were added to the library by Dr. Birdwood. He was succeeded by the late Mr. James Taylor, the distinguished secretary to the Bombay Chamber of Commerce, and the Society has continued to flourish and to publish its Journal with regularity. The Bombay Geographical Society, which dates from 1830, was, in 1873, amalgamated with the Bombay Branch of the Asiatic Society. The Medical and Physical Society, though it languished from 1863 to 1869, has now been revived, and published a large volume of transactions in 1871. The Sassoon Mechanics' Institute has 346 members, courses of lectures, and a good library of reference of 13,935 books. In Calcutta, besides the venerable Asiatic Society, there are the Bethune Society, for the promotion of intercourse between European and Native gentlemen, the Dalhousie Institute, for the literary and social improvement of all classes of the community, the Bengal Social Science Association, and others. In other parts of India there are several societies, such as the Rangún Literary Society, with lectures and classes, established in 1857. But in addition to these societies of European origin, there are now throughout India, and especially in Bengal, many associations, some of them literary or scientific, but others political, which were founded by and are composed entirely of Natives. In Bengal, among many others, there are the "People's Association" and the "Radical League." The Lieutenant-Governor says of them that "if not very completely justifying the titles they assume, they are nevertheless an earnest of things to come, and are on the whole much to be encouraged. Some of them are already interesting societies, with much reality and substance in them." In Oudh there are three native Reform Clubs, at Lucknow, Faizabad, and Gonda, and three native literary societies. In the Central Provinces the associations appear to be chiefly formed by schoolmasters, to afford opportunities for self-improvement, but there are also Native clubs. In Bombay the Students' Literary and Scientific

Society consists exclusively of natives, and has 111 members. Its course of lectures, in 1873, comprised one on Comte's three stages of thought, others on free will and necessity, on the life and doctrines of Buddha, &c. The Society supports three girls' schools, with 283 pupils, and has two branches called the Marathi and Gujrathi Dryanprasarah, at each of which lectures are also given. The information on his interesting subject from other parts of India is very incomplete, but it is clear that these Native societies and institutions are advancing with rapid growth, and springing into existence in all directions.

The numerous excellent missionary schools receiving grants-in-aid in the various provinces have already been referred to, but the whole subject of missionary enterprise in India has such an important bearing on the intellectual advancement of the people, that any notice of Indian education would be incomplete without giving some details respecting the work of the missionaries. A recent inquiry into the statistical details of missions in India, combined with the ordinary sources of information, furnish materials for estimating their progress which are authoritative and complete.

The Protestant missions of India, Burmah, and Ceylon are carried on by 35 missionary societies, in addition to local agencies, and now employ the services of 606 foreign missionaries, of whom 551 are ordained. They are widely and rather evenly distributed over the different Presidencies, and they occupy at the present time 522 principal stations, and 2,500 subordinate stations. The entire Presidency of Bengal, from Calcutta to Pesháwar, is well supplied with missionaries, and they are numerous in the southern portion of the Madras Presidency. The various missions in Calcutta, Bombay, and Madras are strong in labourers, and almost all the principal towns of the Empire have at least one missionary. A great impulse was given to the efforts of these societies by the changes in public policy inaugurated by the Charter of 1833, and since that period the number of missionaries, and the outlay on their missions, have continued steadily to increase. In 1852 there were 459 missionaries in India, at 320 stations, and in 1872 the number of missionaries was increased to 606, and of stations to 522.

This large body of European and American missionaries settled in India bring their various moral influences to bear upon the country with the greater force because they act together with a compactness which is but little understood. Though belonging to various denominations of Christians, yet from the nature of their work, their isolated position, and their long experience, they have been led to think rather of the numerous questions on which they agree than of those on which they differ, and they co-operate heartily together. Localities are divided among them by friendly arrangements, and, with few exceptions, it is a fixed rule among them that they will not interfere with each other's converts and each other's spheres of duty. School books, translations of the Scriptures and religious works, prepared by various missions, are used in common, and helps and improvements secured by one mission are freely placed at the command of all. The large body of missionaries resident in each of the Presidency towns form missionary conferences, hold periodic meetings, and act together on public matters. They have frequently addressed the Indian Government on important social questions involving the welfare of the native community, and have suggested valuable improvements in existing laws. During the last 20 years, on five occasions, general conferences have been held for mutual consultation respecting their missionary work; and in January last, at the latest of these gatherings, at Allahabad, 121 missionaries met together, belonging to 20 different societies, and including several men of long experience who have been 40 years in India. The railway system rendered such a gathering easy, and brought the members of the conference from all parts of the Empire.

The labours of the foreign missionaries in India assume many forms. Apart from their special duties as public preachers and pastors, they constitute a valuable body of educators; they contribute greatly to the cultivation of the Native languages and literature, and all who are resident in rural districts are appealed to for medical help to the sick.

No body of men pays greater attention to the study of the Native languages than the Indian missionaries. With several missionary societies (as with the Indian Government) it is a rule that the younger missionaries shall pass a series of examinations in the vernacular of the district in which they reside; and the general practice has been that all who have to deal with Natives who do not know English shall seek a high proficiency in these vernaculars. The result is too remarkable to be overlooked. The missionaries, as a body, know the Natives of India well; they

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have prepared hundreds of works, suited both for schools and for general circulation, in the fifteen most prominent languages of India and in several other dialects. They are the compilers of several dictionaries and grammars; they have written important works on the Native classics and the system of philosophy; and they have largely stimulated the great increase of the Native literature prepared in recent years by educated Native gentlemen.

The mission presses in India are 25 in number. During the 10 years between 1852 and 1862, they issued 1,634,940 copies of the Scriptures, chiefly single books, and 8,604,033 tracts, school-books, and books for general circulation. During the 10 years between 1862 and 1872, they issued 3,410 new works in 30 languages; and circulated 1,315,503 copies of books of Scripture, 2,375,040 school-books, and 8,750,129 Christian books and tracts. Last year two valuable works were brought to completion, the revision of the Bengali Bible, and the first publication of the entire Bible in Sanskrit. Both were the work of the Rev. Dr. Wenger, of the Baptist Mission in Calcutta.

The missionary schools in India are chiefly of two kinds, purely vernacular, and Anglo-vernacular schools. The former are maintained chiefly, but not exclusively, in country districts and small towns; the education given in them is confined pretty much to reading, writing, geography, arithmetic, and instruction in simple religious works, such as the "Peep of Day." In the Anglo-vernacular schools a much higher education is given, not only in those subjects which are taught in English, but in those in which the vernacular is employed; a higher knowledge even of the vernacular languages is imparted in these schools than is usually given in purely Native schools. These schools are most in demand in country towns, in the Presidency cities, and in the districts immediately around them. Bengal has long been celebrated for its English schools; and the missionary institutions in Calcutta still hold a conspicuous place in the system and means of education generally available to the young Hindus of that city. All the principal missionary institutions teach up to the standard of the entrance examination in the three universities of India, and many among them have a college department in which students can be led on through the two examinations for B.A., even up to the M.A. degree. A Table showing the number and range of these schools will be found in the Appendix.

In addition to the work of these schools, it should be noted that several missions maintain training colleges for their Native ministers and clergy, and training institutions for teachers. These colleges and institutions are 85 in number, and contain 1,618 students. The training institutions for girls are 28 in number, with 567 students. An important addition to the efforts made on behalf of female education is seen in the Zenana schools and classes which are maintained and instructed in the houses of Hindu gentlemen. These schools have been established during the last 16 years, and now number 1,300 classes, with 1,997 scholars, most of whom are adults. Of these, 938 classes, with 1,523 scholars, are in Bengal and the North-West Provinces. The effort has not yet much affected the other provinces of India.

The great progress made in these missionary schools, and the area which they occupy, will be seen from the following fact. They now contain 60,000 scholars more than they did 20 years ago. The figures are as follows: in 1852 the scholars numbered 81,850, and in 1872 the number was 142,952.

The high character of the general education given in the college department of these institutions may be gathered from the following facts. Between 1862 and 1872, 1,621 students passed the entrance examination in one or other of the three Indian universities; 513 students passed the first examination in Arts; 154 took the degree of B.A.; 18 took the degree of M.A., and six that of B.L. A considerable proportion of the amount expended upon education by the missionaries in India is provided by school fees which in recent years have been much increased. The statistical tables, however, do not give the exact amount, neither do they state the amount received from the Government grants-in-aid. In the higher education it is believed that little expenditure falls upon the missionary societies beyond the salaries of the superintending missionaries.

The statistical returns now referred to state very clearly and completely the number of the converts who have been gathered in the various Indian missions, and the localities in which they may be found. They show also that a great increase has taken place in the numbers of these converts during the last 20 years, as might be expected from the lapse of time, the effects of earlier instruction, and the increased number of missionaries employed. In 1852 the entire number of Protestant Native

converts in India, Burma, and Ceylon, amounted to 22,400 communicants, in a community of 128,000 Native Christians of all ages. In 1862 the communicants were 49,688, and the Native Christians were 213,182. In 1872 the communicants were 78,494, and the converts, young and old, numbered 318,363.

A very large number of the Christian communities scattered over India are small, especially in the country towns, and they contain fewer than 100 communicants and 300 converts of all ages. At the same time, some of these small congregations consist of educated men, have considerable resources, and are able to provide for themselves. From them have sprung a large number of the Native clergy and ministers in different churches, who have received a high education in English institutions, and who are now taking a prominent place in the instruction and management of an indigenous Christian church. The Native ministry contains also men who have been well trained through the medium of the vernacular languages; but this important body of men are encouraged to master the English language also, that they may secure access to the vast store of Biblical literature which it contains, and which will give them direct aid in their duties. The Native converts are thus distributed at the present time:—

NATIVE PROTESTANT CONVERTS IN INDIA, 1872.

Divisions.	Communicants.	Native Christians.	Native Ordained Ministers.	Native Contributions.	
Lower Provinces	13,502	46,968	35	Rs. 8,937	
North-Western Provinces and Oudh	3,031	7,779	19	5,265	
Punjab	707	1,870	14	1,661	
Bombay and Central India	2,256	6,686	26	6,583	
Madras	33,320	160,955	131	62,675	
Burma	23,514	62,729	77	42,736	
Ceylon	5,164	31,376	79	31,267	
TOTAL	78,494	318,363	381	159,124	= £15,912

The missionaries, in the course of their efforts, have found the populations of the great cities much more tenacious in their opinions, and firm in their social relations, than those of country districts. On the other hand, they are more intelligent; they are good listeners; appreciate argument and illustration; and their children flock to the mission schools. The rural population have been much more open to their instructions; the peasantry of large districts have been less bound by caste ties; and the aboriginal tribes and classes in the community, both in the hills and in the plains, have embraced Christianity in large numbers.

The religious movements which took place 40 years ago among the peasantry to the south of Calcutta, among the indigo ryots of Krishnagar, and in the thickly peopled swamps of Barisal, gave to the Province of Bengal three large Christian communities, which now number nearly 16,000 persons. They have been steadily cared for and well instructed, and have been consolidated into prosperous, well conducted communities. Within the last 20 years the German mission among the Cole tribes in the hills of Chota Nágpur, now divided into two branches, has greatly affected these simple yet manly people, and notwithstanding considerable social persecution, has led more than 24,000 persons among them to profess themselves Christians. Very recently the Santál tribes, in the same line of hills, have followed in their steps.

In the year following the mutiny a new Mission was commenced by an American Society in the provinces of Oude and Rohilkhand, and the Christian congregations already include 2,000 converts. The largest congregations in the North-West Provinces are found in Benares, Allahabad, Fathigarh, Agra, and Mirat (Meerut), and sprung from the boarding schools established in the great famines of 1838 and 1861. An important religious improvement has recently occurred in the dominions of the Nizam, under the conduct of Native missionaries, and 1,100 persons have become Christians.

A similar movement has taken place among the Telugu people of Ougole, under the American mission, which has resulted in 6,000 converts. More than

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7,000 are now included in the two missions at Cuddapah, and the Telugu missions in Guntur, in the Masulipatam district, and on the Godávári, have increased during the last few years from 1,500 Native Christians to more than 6,000.

But it is in the southern portion of the Madras Presidency that Christianity has most largely affected the rural populations. The Province of Tanjor, first instructed by the Danish missionaries, amongst them by the respected missionary Schwartz, has long possessed a large number of Christian congregations. These continue under the care of the Lutheran and the English Episcopal missions, and are reported to be in a prosperous condition. The Christians now number 11,000 persons in the Tanjor and Trichinapalli districts. In the neighbouring district of Madura the Americans have a flourishing mission, with 7,000 converts and a normal school.

The Tinneveli and Travancor missions are well known, and are reported to be in every way in a higher position, and exerting greater influence than ever before. These two provinces contain a very large aboriginal population, which has been but little affected by the Hinduism of Southern India. The Shannar tribe and their kindred connect themselves by tradition with the great demon-ruler of Ceylon, the celebrated Ravana, and from the numerous and marked peculiarities of their social and religious life have proved a most interesting study to the missionaries who have lived among them. They have been under instruction from the commencement of the present century. Good schools have flourished among them, by which girls have benefited as well as boys. Training schools have supplied well-taught schoolmasters, theological schools have in recent years provided a full supply of Native ministers and clergy, while the congregations have steadily multiplied, and the character of the whole people has been raised. Three missions have been carried on among them by the Church Missionary Society, the Society for the Propagation of the Gospel, and the London Missionary Society, and a large and influential English staff has conducted the affairs of these missions. The result is reported to be highly satisfactory. At the present time, 90,000 persons of all ages are professing Christians among the Shannar people; the districts are dotted over with flourishing villages and Christian churches; there are hundreds of Native teachers employed among them, of whom fifty-six are ordained, and are supported to a great extent by their congregations. Order and peace rule these simple communities, which give the Government little trouble, whether in the Madras Presidency, or under his Highness, the Maharaja, of Travancor while large tracts of country have been brought under cultivation, and the peasantry generally enjoy a larger share of material comfort than in days gone by.

Much the same may be said of the Church missions among the Syrians of Upper Travancor and Cochin. The congregations among them now include some 14,000 people, and the Syrian Christians at large have been greatly stimulated and improved through the efforts of the English missionaries carried on in their midst. Only one other mission needs special mention here, the American mission in Burma. This mission has drawn its converts chiefly from the Karen tribes, the aborigines of Burma and the Shan States, who have so heartily welcomed the English rule. Information respecting them has been scanty of late, but it is certain that 60,000 of them are Christian converts, and that the mission is largely supported by the people themselves.

Taking them together, these rural and aboriginal populations of India, which have received a large share of the attention of the missionary societies, now contain among them *a quarter of a million* native Christian converts. The principles they profess, the standard of morals at which they aim, the education and training which they receive, makes them no unimportant element in the Empire which the Government of India has under its control. These populations must greatly influence the communities of which they form a part; they are thoroughly loyal to the British Crown, and the experience through which many have passed has proved that they are governed by solid principle in the conduct they pursue. Dr. Hunter has recently set before the Government the importance of the hill races and other aborigines in India, reckoned at 70,000,000 in number, and both because of the simplicity of their habits, their general love of order, their teachableness, as well as their great numbers, has urged that new and large efforts shall be made for their enlightenment. In the same way many able missionaries advocate that the Christian efforts among them shall be increased. There is reason to believe that these estimable races will occupy a more prominent position in the Empire, in the future, than they have done hitherto.

But the missionaries in India hold the opinion that the winning of these converts, whether in the cities or in the open country, is but a small portion of the beneficial results which have sprung from their labours. No statistics can give a fair view of all that they have done. They consider that their distinctive teaching, now applied to the country for many years, has powerfully affected the entire population. The moral tone of their preaching is recognised and highly approved by multitudes who do not follow them as converts. The various lessons which they inculcate have given to the people at large new ideas, not only on pure religious questions, but on the nature of evil, the obligations of law, and the motives by which human conduct should be regulated. Insensibly a higher standard of moral conduct is becoming familiar to the people, especially to the young, which has been set before them not merely by public teaching, but by the millions of printed books and tracts which are scattered widely through the country. On this account they express no wonder that the ancient systems are no longer defended as they once were; many doubts are felt about the rules of caste; the great festivals are not attended by the vast crowds of former years; and several Theistic schools have been growing up among the more educated classes, especially in the Presidency cities, who profess to have no faith in the idol-gods of their fathers. They consider that the influences of their religious teaching are assisted and increased by the example of the better portion of the English community, by the spread of English literature and English education, by the freedom given to the press, by the high standard, tone, and purpose of Indian legislation, and by the spirit of freedom, benevolence, and justice which pervades the English rule. And they augur well of the future moral progress of the Native population of India from these signs of solid advance already exhibited on every hand, and gained within the brief period of two generations. This view of the general influence of their teaching, and of the greatness of the revolution which it is silently producing, is not taken by missionaries only. It has been accepted by many distinguished residents in India, and experienced officers of the Government, and has been emphatically endorsed by the high authority of Sir Bartle Frere. Without pronouncing an opinion upon the matter, the Government of India cannot but acknowledge the great obligation under which it is laid by the benevolent exertions made by the 600 missionaries, whose blameless example and self-denying labours are infusing new vigour into the stereotyped life of the great populations placed under English rule, and are preparing them to be in every way better men and better citizens of the great Empire in which they dwell.

The Catholic missions in India are efficiently continued, but they are almost entirely confined to their Christian converts, and have little to do with the non-Christian population. The missions are divided into two branches, those which maintain a connection with the Portuguese portion of the Church, under the Archbishop of Goa, and those which are under the vicariates of the Jesuit Mission. During the last 40 years both branches have been renewed and revived from the decay into which they had fallen, and seem to be well supplied with foreign as well as with Native clergy.

The Goa Church has the largest number of its converts and followers in Bombay and its coast districts, in Travancor, around Madras, and in Eastern Bengal. The number in Bombay is not known, but in other parts of India they are about 48,000.

The vicariates of South India, which sprang from the celebrated Madura Mission, are 10 in number; they contain about 16 regular clergy, who are foreigners, and more than 400 native priests. The converts under their charge are reckoned at more than 600,000; of these 150,000 are in the district of Madura, 90,000 in the French district of Pondicherry, and over 250,000 in North Travancor. A few years ago a large secession took place from the last-named mission. The fishermen on the coasts of South India, amongst whom St. Francis Xavier laboured with so much earnestness, still continue to profess the Christian faith, and regard him as their patron saint. There are six seminaries conducted by the mission in South India, employed both as boarding schools for lads and as training schools for native priests. Two of these are at Virapalli, the head-quarters of the Romo-Syrian Mission in Travancor; another is at Pondicherry, and a third at Negapatam was established through the earnest exertions of Father Clifford, though opened only after his lamented death. The number of the students in these institutions is not known, and very little information is given respecting the Catholic schools in India generally.

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THE Native States of India form one of the most important and difficult sections of administration. Every State, and the number, including the smaller feudatories, exceeds 460, acknowledges the supremacy of the British Government, but, in other respects their rights and obligations differ from each other. Some merely acknowledge our supremacy, like Nepal; others also undertake to follow our advice and to govern their subjects with justice; others again pay tribute, or provide for the maintenance of a contingent. Some have power of life and death, others must refer all grave cases to English judges. Nearly all have, since the mutinies, received guarantees that their chiefs will be allowed to adopt successors on failure of heirs; and their continued existence has thus been secured. This measure represents a great change of policy, and is a return to that which was advocated by Lord Metcalfe in 1837. He held that, even in the event of absolute failure of heirs, it would be more consistent with right that a people of a State so situated should be allowed to elect a sovereign for themselves, than that the State should be annexed. The policy is now unalterably fixed, by which existing native States will continue, through the admitted right of adoption, to maintain their positions as they are now admitted by treaty or agreement. In the numerous Native States openings are afforded for the natural ambition of the educated classes, who are thus enabled to attain to the highest rank as statesmen and administrators. It appears that in 1871 351 Hindus and 85 Muhammadans, received Government appointments in India, of not less than Rs. 15 a month in value. The outlet for the rest of the educated classes seeking administrative work must be in the Native States.

In reviewing the political events of the year 1872-73, which have been few and unimportant, it will be well at least to enumerate the Native States, and to explain very briefly the treaty rights and obligations of each, in order that all may have their due place in the general scheme of the Report. With the object of making this enumeration as clear and intelligible as possible, the following classification, with reference to geographical position, ethnological affinity, and political connection, is perhaps the best that could be adopted. The Native States may be classed in twelve groups:—

1. The Indo-Chinese group of States and Tribes, all (except Kúch Bahar) with Chinese or Burmese affinities, all forming a fringe round the Government of Bengal, and all being geographically contiguous one with the other. They may be further classed in two subdivisions, the settled States, comprising Nepal, Sikkim, Bhutan, and Kúch Bahar, and the hill tribes.

2. The aboriginal feudatory chiefships, consisting of Ghond and Kole tribes in Chota Nagpur, Orissa, the Central Provinces, and the Jaipur Agency.

3. The Native States along the slopes of the Western Himalayas, from the western frontier of Nepal to Kashmir, ruled generally by Rajput chiefs.

4. The Afghan frontier tribes beyond the Indus.

5. The Sikh States, in the Sirhind plain, on the hither side of the Satlej.

6. Three Muhammadan States, which, though geographically apart, have more in common with one another than any one of them has with any other group. These are Rampur, which represents the Rohilla State of the days of Warren Hastings, Bhawalpúr, and Khairpúr in Sind.

7. The States and numerous feudatory chiefships of Malwa and Bandelkand, in Central India, the former founded by Mahratta conquerors, the latter representing the older Rajput power.

8. The ancient sovereignties of Rajputana.

9 and 10. The two groups of Native States in the Bombay Presidency; the first in the north, for the most part speaking Gujrátí; the second in the south, representing the surviving remains of the old Maharatta power.

11. The great Muhammadan power of Haidarabad, in the Deccan.

12. The Malayálim States of Travancor and Cochin on the Malabar coast, in the far south.

The State of Nepal, containing the valleys of three tributaries of the Ganges, the Gogra, Gunduk, and Kosi, lies among deep ravines and ridges of the Himalayas, and is separated from the plains of India by a belt of pestiferous forest called the Terai.

Luckhimpur. Their constitution is democratic, every little village being independent. In its rear are the loftiest mountain peaks in the world. In about the year 1767 the Gurkhas, a hardy race of mountaineers, overthrew a previous dynasty in Nepal, and became the governing race. They were aggressive and turbulent, and not content with overrunning the territories of other chiefs on the Indian slopes of the Himalayas, they extended their excursions into Tibet, and plundered the sacred temple of Digarchy. This excited the wrath of the Chinese Emperor. A great army invaded Nepal, Major Kirkpatrick's intervention arrived too late, and the Chinese general dictated an ignominious peace in 1792, within a few miles of the capital. But the Nepalese Government declined any close alliance with England, and Major Kirkpatrick quitted Katmandu in March 1793. In 1801 a treaty was concluded, which provided for an English resident at Katmandu, and Captain Knox was the first envoy, but soon aversion was shown to the alliance, and he retired in 1804. This was followed by numerous insolent acts of aggression on the part of the Nepalese, which ended in a declaration of war in November 1814. Two very arduous campaigns were conducted by Sir David Ochterlony. The Gurkhas fought most bravely, and it was not until the 2nd of December 1814 that the Nepalese commissioners signed a treaty of peace at Sigauli, which was ratified in 1816. The Nepalese were confined within fixed limits, and were forced to abandon all their conquests in the Western Himalayas to the west of Gurhwal, as well as their acquisitions in the direction of Sikkim; they agreed to allow an English resident at Katmandu, to acknowledge the British Government as the paramount power, and not to employ any British or European subject without the consent of the Governor-General. Then followed a long series of hostile acts and aggressions; and the massacre of 31 chiefs in 1846 led to the rise to power of Jung Bahadur, who has ever since been minister and virtual ruler of Nepal. He is decorated with the Orders of the Bath (K.C.B.) and the Star of India (G.C.S.I.) In February 1855 a treaty was signed for the surrender of heinous offenders, and the assistance afforded during the mutinies led to the cession of the Oudh Terai by a treaty dated November 1st 1860. But Nepal is a frontier state over which the English Government practically has no influence; and this mountain strip intervenes between India and Tibet at points where excellent trade routes might be opened. Except the resident at Katmandu, no Englishman can enter, much more explore the country, and no survey can be executed: nor is the exact nature of the relations between Nepal and China correctly known; though it is said that a mission, with presents, proceeds to Peking every five years. This year it is reported that something has disturbed the amicable relations between the Nepalese and Tibetan Governments. The area of Nepal is believed to be about 54,000 square miles, the population 3,000,000, and the revenue about 430,000*l.* During the year 1872-73 active steps were taken to demarcate the Nepal frontier. A substantial bamboo hedge is to be planted along the whole line with a space kept clear on either side.

Sikkim is the small Himalayan state on the eastern border of Nepal, lying in the basin of the Tista valley and under the shadow of the loftiest peaks in the world. The area, which is about 1,550 square miles, chiefly consists of forest-covered mountains and profound ravines, and the population of Lepcha, Buteah, and Limba mountaineers numbers about 7,000. The capital is at Tumlung, where the Rajah resides from November to May, when he moves to Chumbi, on the Tibetan side of the range. On February 10th 1817 a treaty was signed with the Sikkim Rajah, defining the Nepal boundary and giving him a guarantee of his own territory. In February 1835 the Rajah signed a deed by which the Darjiling valley was ceded to England, for a compensation of 300*l.*, increased in 1846 to 600*l.* a year. The Rajah had always desired to secure an exchange of runaway slaves, which was of course refused, and, in the hope of forcing compliance, his officers suddenly seized and imprisoned Dr. Campbell and Dr. Hooker in 1849. They were released in December, the allowance was stopped, and a piece of territory, including the lower course of the Tista and Sikkim Terai, was annexed. Two cases of kidnapping in 1860 led to the signature of a treaty, on March 28th, 1861, by which all previous treaties were cancelled: the Rajah engaged to pay 700*l.* as indemnification, and never to permit acts of kidnapping or aggression, to abolish all monopolies and restrictions on trade, to protect merchants and travellers, to offer no hindrance in opening roads through his territory or in making surveys, and to give aid, when required, in time of war. Sikkim is allowed 100*l.* to 200*l.* a year by the Chinese Government at Lhassa; and last year, on the ground of poverty and of continued loyalty since the signature of the last treaty, the Rajah requested that his allowance from the British Government might be increased to 1,200*l.* a year. This favour has been granted on condition

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that every facility is given to trade with Tibet. The Rajah, with his brother and minister Chongzed Kabboo, a man of great natural powers and predominating influence over his countrymen, had an interview with Sir George Campbell at Darjiling in 1872. The Chongzed assured the Lieutenant-Governor that the prohibition of trade between India and Tibet, through Sikkin, was solely due to orders from Peking; and that the local officers would gladly facilitate a direct trade. Mr. Edgar, the Deputy Commissioner, was to visit Sikkin in 1873, to learn the actual state and prospect of the trade. His report, since received, furnishes some interesting notes of frontier geography and trade, an account of the relations between China and Tibet, and some striking pictures of Lamaistic observances.

On the east the state of Sikkin is bordered by Bhutan, where the mountains are inhabited by a turbulent race in close connection with Tibet. The temporal supremacy over the Bhuteas is vested in the Deb Rajah, and the spiritual in the Dhwan Rajah. Our first intercourse with the Bhuteas was in 1772, when they invaded Kuch Bahar in the plains. The Bhuteas were driven out, and, at the intercession of Tibet, Warren Hastings signed a Treaty, granting them peace, on the 25th of April, 1774; by which they restored all they had taken from Kuch Bahar. There was little further intercourse with the Bhuteas until the occupation of Assam, but since that time a closer neighbourhood has led to a more intimate but very undesirable acquaintance. The *Duars* are passes leading from the mountains into the Durrung and Kamrúp districts of Assam; and the Bhuteas used them for frequent raids and aggressions. These have been followed by the periodical occupation of the *Duars*, of which there are eleven bordering on Kuch Bahar and British territory between the rivers Tista and Monas, five on the north frontier of Kamrúp, and two on that of Durrung. At last the rude reception of Mr. Eden's Embassy in 1863, led to a war with Bhútan, and to the ultimate confiscation of the whole of the Duar. As, however, the Bhuteas depended mainly upon transit dues in the passes for revenue, it was arranged to allow them a subsidy of 5,000*l.* during good behaviour. The occupation of the two strong posts of Buxa and Dewangiri within their territory, serves as a material guarantee against future aggression. These arrangements were made by a Treaty dated April 25th, 1774. The population of Bhutan was estimated by Mr. Eden at 20,000. During 1872-73 Colonel Graham was engaged in demarcating the boundary between Assam and Bhutan. The whole of the frontier line from the Monas river on the west, where the demarcation of the Kuch Bahar frontier terminates, to the Deosham river on the east, where the territory of Bhutan proper merges in that of Towang Bhutan, a distance of 69 miles, has been fixed by masonry pillars at intervals. The hills are made over to Bhutan, except at the very important post of Dewangiri, which is retained. Here the line runs into the mountains, so as to bring that strong position within British territory. A map has been sent to the Bhutan Government, with an injunction to observe the line very carefully for the future. Little information can be obtained respecting the interior politics of Bhutan.

Kuch Bahar is a small state at the foot of the Bhutan Duars which, when the English expelled the Bhuteas in 1772, agreed, by Treaty dated April 5th, 1773, to acknowledge subjection and pay a large tribute. The state is now being managed by English officers, as the Rajah is a minor, and much improvement is reported in its administration. The area of Kuch Bahar is 1,292 square miles, with a population of 532,565 souls. The revenue is about 92,066*l.*; and it pays a tribute of 6,770*l.* It is surrounded by the British districts of Jalpigori and Rungpur.

The Towang Bhuteas occupy the southern slopes of the Himalayas to the eastward of Bhutan proper, of which state they are independent. A considerable trade between Lhasa and Assam is carried on through them. The Towangs are quiet and friendly. In 1844 they relinquished all rights to the *Duars*, on receiving a payment of 500*l.* a year. After Colonel Graham had, in 1872-73, demarcated the line along Bhutan proper, he proceeded to lay it down on the north face of the Durrung district of Assam, westward from the river Deosham to the Rowta, which comprises the frontier of the Towang Bhuteas, from the Rowta to the Ghabru. Eastwards of the Towangs are the Char Dwár and Thebengea Bhuteas, two small clans, which are not as a rule troublesome. The territory of the Char Dwárs extends from the Rowta to the Ghabru.

From Bhutan to Burmah the frontier of British India is occupied by wild and lawless hill tribes, of Chinese physiognomy, who have been very difficult to manage. They have received money payments in lieu of black mail. Next to Bhutan are the Akhas, whose raids were formerly frequent. They now receive 67*l.* in lieu of *posa* or black mail. Then come the Dufflas, along the frontiers of Durrung and north of

of its neighbours. There are 238 headmen, who draw 254*l.* as compensation for *posa*. Some Dufflas had settled in British territory, and on the night of the 12th of February, 1872, a village of these colonists was attacked by 300 hill Dufflas, sacked, and 44 persons carried off to the mountains. The hill men chose to think that a disease, with which they were visited, came from the plains; for which they demanded compensation, the attack following on a refusal. It is intended to blockade the hill Dufflas, in the hope that they will be induced. The Abors, Miris, Mishmis, Singhpos, and Kamptis, are the tribes which inhabit the mountains round the extreme north-eastern frontier of British India. During the year under review they were quiet and peaceable. The Abors, as a rule, occupy the inner hills, while the Miris keep on the skirts of the plain, and even occupy villages within the settled tracts. The Abors are reported to be a dangerous, sulky race, over whom we have at present little hold. But since 1862 they have been tolerably quiet, keeping the peace along their border, and receiving small annual presents of cloth and hoes. The Mishmis are in the hills on the north-east frontier, in communication with Assam on one side and the Chinese of Bhathang on the other. The Kamptis are Shans of the Buddhist religion, near Sadya, on both sides of the Brahmaputra. They are now peaceable, and with some civilisation, having a language and literature of their own. The Singhpos are south of the Brahmaputra, and are supposed to be identical with the Kakhyens of Burma.

The mountains on the southern side of the upper part of the Assam valley are inhabited by the Nagas; and the policy with regard to them is to establish political control without any assertion of actual government. They extend from the hills south of the Singhpo country to the Khasi hills; and over the mountains between Assam and Burma. Little is known of many of the clans; but since 1866 an officer has been stationed among those between Manipúr and Assam. During 1872-73 Captain Butler and Major Godwin Austen were engaged in trying to settle a boundary between Manipúr and the Naga hills. This little state of Manipúr is on the frontier of Burmah, and as long ago as 1762 a treaty was made with its Rajah against the Burmese. On the breaking out of the first Burmese war, in 1823, the Rajah of Manipúr was declared to be independent, and a Political Agent was appointed in 1835. The state has an area of about 7,584 square miles; much covered with forest, and its boundaries are quite unsettled. The object of the exploring party in 1872-73 was to survey a boundary to the Tellizo, and then to examine the watershed as far north as the Patkoi pass. The attempt to fix a limit to any future encroachments on the side of the Naga hills was most distasteful to the Maharaja of Manipúr, who threw obstacles in the way of progress. But one very important geographical fact was established. The watershed, instead of running directly north-east from Tellizo, takes a deep bend to the south, so as to form a valley, watered by the Lamier, a considerable river flowing north. This region must be surveyed before the Burmese boundary can be settled; and there will be a geographical exploring expedition in 1873-74. There is no trace of any intercourse between the tribes known to us and the Burmese country, from the latitude of Manipúr to that of Sibsagar. Here a high and difficult mountain barrier intervenes between Assam and Burma.

The hills to the south of Manipúr, and the great belt of forest highland between Chittagong and Burma is inhabited by a number of clans, often hostile to each other, and known generically as Kukis. Large colonies of them have settled in Cachar and the Kuki tribe south of Cachar is known as the Lushais, and gave much trouble, both on the side of Cachar and Chittagong, until the military expedition of 1872 established an understanding with them. Those on the side of Chittagong are known as Sylus and Howlongs.

Between the Lushai country and the British district of Tipperah lies the hill territory of the Tipperah Rajah, who pays a succession duty to the paramount power. This state was long quite independent, but it is now practically a feudatory power with a political agent. It pays a succession duty of half the revenue on the accession of a new chief, according to a Government resolution of March 3rd 1870. The population of Tipperah is about 35,000.

The Lushais and tribes in the wild tracts of Chittagong were quiet in 1872-73, and the eastern part of hill Tipperah has been found to be quite uninhabited. There will be measures taken for establishing a political police among the wild tribes, so as to become familiar with them. While left unknown in obscure hills and jungles, there is no security against raids, but when once there is intercourse, the mountaineers soon become amenable to authority. A definite boundary line will be fixed, and

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guarded by posts, beyond which there will be an exercise of political influence, but no direct interference or control. There will also be an "inner line" round Lakhimpur, which will be surveyed, and beyond which no British subject will be allowed to pass without a licence, in order to avoid collisions with, or complaints from the hill tribes.

Westward, between the Nagas and the Garo hills, are the Khasi Confederacies, a collection of small states with chiefs elected for life. There are 25, of which five have more independence than the others, as having always been on friendly terms with the Government. They all manage their own internal affairs. The whole of the Khasi tribes number about 85,000 souls.

The Garo hills, although hitherto unexplored, are surrounded on three sides by long civilized districts of Bengal and Assam. Last year the Garos made raids on some dependent villages, and it was resolved that they should be brought under the direct control of the Deputy Commissioner. An expeditionary force was accordingly organised, which advanced in three columns; one, under Captain Davis, entered the Garo hills from Goalpara to the north, the second, under Mr. Daly, advanced from the Bengal district of Maimansing to the south, and the main body started from Toora, the head-quarters of the Garo hill district, under Captain Williamson, who was accompanied by Lieutenant Woodthorpe as surveyor. The expedition was singularly successful, all the villages submitted, and the Garos are now peacefully employed in opening paths in several directions, which they will be required to maintain hereafter.

Thus the chief political business of the year in Bengal has been the very useful ones of demarcating frontiers, advancing the interests of trade, and humanising the wild hill tribes.

In the hill country of Chota Nágpur, to the south of the Ganges valley, in the mountains overhanging the littoral plains of Orissa and Vizagapatam, and in the Central Provinces, there are many feudatory chiefships, the inhabitants of which are mainly the wild Khonds and Koles, aborigines of the country. The Khonds* are worshippers of the goddess who presides over the productive energies of nature, and who could only be propitiated by the blood of human victims. In 1826 the Rajah of Buster sacrificed 25 men before setting out on a journey, and the *merias* or victims were bought from man stealers at from 50 to 80 rupees, according to the sex. Crowds came to the sacrifices offered to the earth goddess, in the Vizagapatam district, the victim being torn in pieces by the people. Thousands of human beings have thus been tortured to death; and it was not until 1836 that steps were taken to suppress the custom. Roads were made, fairs and markets were established, and the Khonds were invited to hold intercourse with their civilized neighbours. When Colonel Campbell at length persuaded them to sacrifice beasts instead of men, they prayed: "Do not be angry with us, O goddess, for giving you the blood of beasts instead of human blood; but vent your wrath on that gentleman, who is able to bear it." Gradually the Khonds were induced to renounce their ancient rites, and to deliver up the surviving *meriahs* or victims to the British officers. Between 1837 and 1854 there were 1,552 victims rescued, of whom 789 were girls. Of the latter many were married to Khonds of suitable age and means, and others went to school at Calcutta. Now the practice has been rooted out.

The special agency for the suppression of the *meriah* sacrifices was abolished in 1861, consequent on the organisation of efficient police in Vizagapatam. In the hills bordering that district of Madras, and especially in the wild Zemindary of Jeypur, both *sati* and human sacrifices were common practices, at least until 1855; boys and girls being bought from the poorer classes and reared as *meriahs*. In 1863 an English agent, for the first time was sent into the hill portion of Jeypur, and now there are four sub-magistrates among the wild Khonds, and an effective police.

On the South-Western Frontier or Chota Nágpur Agency, there are 21 *mehals* or chiefships in the four groups of Sumbalpur, Patna, and Singhbúm; many among the wild sal forests of the Mohenadi valley. The chiefs are bound to administer justice, but cannot inflict a heavier sentence than seven years' imprisonment. Singhbúm was confiscated for rebellion in 1857. They all pay a tribute, and are bound to perform general service. The Cuttack Tributary Mehals consist of 18 estates, two of which have been annexed, owing to the misconduct of the chiefs, and 16 are held on con-

* The best accounts of the Khonds are the work by Macpherson (1841), and a paper read before the Royal Asiatic Society, in March 1858, by Lieutenant Frye.

dition of the payment of tribute, the Rajahs administering justice under the control of the superintendent. The largest estate, that of Mokurbhung, has an area of 4,243 square miles, and the population of the whole is 1,283,309. The Cuttack Mehals are on the whole well managed, and the tribute is regularly paid. In the Central Provinces there are 18 feudatory chiefs, with territory covering an area of 28,000 square miles, a population of 1,095,000 souls, a revenue of 54,500*l.*, and paying 13,52*l.* of yearly tribute. There are seven of these chiefs in the Sambalpur district, two in Bilaspur, four in Raipur, one in the upper Godávári, and one in Hoshungabad. These chiefs are uncontrolled in the administration of the internal affairs of their territories, so long as they maintain order and refrain from oppression; and each state is ruled according to its own laws. The two largest, Bastu in the upper Godávári, and Khawagurh, are under Mahratta chiefs.

The Native States along the slopes of the Western Himalayas were revived by the English Government, after the Nepalese War in 1814. They had all, at least as far as the Satlej, been overrun and subdued by the Gurkhas, and the chiefs were fugitives, or reduced to poverty. By the treaty, Nepal renounced all claim to territory west of the river Kali, and their lands were restored to the hill Rajahs on certain treaty conditions, except Dehra Dún, Kamaun, part of Garhwal, Sabathu, and a few military posts, which were annexed. All are under the Punjab Government except Garhwal, which is within the jurisdiction of the North West Provinces. At the end of the Nepalese War, the old Rajah of Garhwal was found living in great poverty at Dehra. The portion of his hereditary dominions west of the Alikamunda river was restored to him, the land to the east, and Dehra Dún, being appropriated by the British Government. In March 1862, the Rajah of Garhwal received a *sanad* guaranteeing the right of adoption. He pays no tribute, and has no troops, his revenue being about 8,000*l.* a year, and the population of his dominions about 200,000.

There are 32 Himalayan Hill States under the Punjab Government, including Kashmir; which may be conveniently grouped, with reference to geographical position, in the following order:—

Six in the Himalayas beyond the river Satlej:—

Kashmir.	Sukeit.
Chumba.	Kailut.
Mandi.	Bassahir

Twenty-six in the highlands on the hither side of the Satlej, in four groups, according to position.

In the northern group there are seven:—

Mangal.	Kumharsain.
Bhagal.	Kotgurh.
Bhajji.	Kanuti.
Shangri.	

In the east central group are ten:—

Keonthal.	Raienguoh.
Koti.	Balsan.
Madban.	Dargoti.
Theog.	Tarochi.
Gund.	
Pandur.	

} Tributary
to Keonthal.

Six in the west central group:—

Mailog.	Kuthar.
Bega.	Kunhiar.
Baghat.	Dhami.

And three in the southern group:

Nalagurh.	Jubal.
Nahun.	

By far the most important is Kashmir, the ruler of which holds a most commanding position as regards trade routes, and rules over a country with great natural advantages, and the resources of which are capable of much future develop-

ment. The State of Kashmir was founded by Golab Sing, a Dogra Rajpút, who began life as a horseman, and afterwards became a trusted officer under Runjít Sing, who conferred upon him the principality of Jammu. He subsequently extended his authority over Ladak and Kashmir; and eventually secured his power by a separate treaty with the English at Amritsar, on the 16th of March 1846. He bound himself to acknowledge the supremacy of the British Government, and to refer all disputes to its arbitration. Golab Sing died in 1857, and was succeeded by his son, Runbír Sing, the present ruler, to whom the right of adoption was guaranteed by a sanad, dated the 15th March 1862. He is a G.C.S.I. The ruler of Kashmir issued an Annual Administration Report for the first time in 1872. The population of Kashmir and Jammu is 1,537,000, and the revenue 843,000*l.* A military force of 26,975 men is maintained. A tribute of one horse, twelve shawl goats, and three pairs of shawls is paid to the British Government. The value of the silk industry has increased from *Rs.* 8,000 to *Rs.* 186,000. The jails and dispensaries are carefully attended to, and the state contains 220 village and 12 higher schools, which are well managed. Of the other states north of the Satlej, Chumba, Mandi, and Sukeit are ancient Rajpút principalities, to all of which the right of adoption was conceded by sanads in 1862. Mandi has an area of 1,080 square miles, with a population of 135,000, a revenue of 37,500*l.* and pays a tribute of 10,000*l.* a year. Chumba has an area of 3,216 square miles, a population of 110,000, a revenue of 18,550*l.*, and pays a tribute of 500*l.* a year. Sukeit has an area of 420 square miles, a population of 44,966, a revenue of 6,340*l.*, and pays a tribute of 1,100*l.* Chumba and Bassahir rent their valuable deodara forests to the Forest Department, and Chumba made over the land for the sanatorium of Dalhousie to the British Government.

The twenty-six hill States to the south of the Satlej are very small, and were all created after the expulsion of the Ghurkas by sanads in 1815. The most important is Nahun or Sarnúr, in the southern group, whose chief receives a salute of seven guns, and has 90,000 subjects. The State of Baghat has had two failures of heirs within the last 40 years, and was twice saved from annexation, by Lord Ellenborough in 1842, and by Lord Canning in 1862, when it received a sanad guaranteeing the right of adoption. The cantonment of Kussowli is built on land obtained from the Chief of Baghat. The Rajah of Kunthal has authority over six smaller States, which pay him tribute. Transit dues were abolished in the hill principalities in 1847, and a compensation amounting 1,373*l.* a-year, to be divided among them, is paid by the British Government. These hill chiefs, who are Rajpúts of good lineage, have all received sanads guaranteeing the right of adoption.

The Affghan and Biloch tribes, which form a very troublesome fringe along the border of the British territory beyond the Indus, have always been a source of disquietude and anxiety. Between 1849 to 1855 there were 15 expeditions against these robber tribes, and seven between 1856 and 1864. The fringe is described by Sir Richard Temple as commencing from the top of the glen of Kaghán, a dependency of Hazára, at the north-west angle of the Kashmir territory, then passing round the north-west boundary of Hazára, crossing the Indus, and winding round the north and north-west boundary of the Peshawur valley to the Khaibar pass, thence round the Afridi hills to Kohat, along the western boundary of the Kohat district, and the Waziri hills to Bunnu and the head of the Sulaimani range; and lastly, down the base of the Sulaimanis to the confines of Sindh. The length of this line is 800 miles.

Adjoining the frontier of the Hazára district are the Hasanzais in a strip of mountainous territory between the frontier and the Indus, dwelling, therefore, on the left bank of that river. The principal hill, called the "Black Mountain," from its dark and gloomy aspect, was scaled by a British force employed in furnishing a raid, in 1853. The number of Hasanzais is guessed at 2,000 fighting men. Next, below the Hasanzais, are the Judúns of Mount Mahábun, on the right bank of the Indus. They have lately been quiet; but at the foot of this mount, and on the banks of the Indus, was the fanatic colony of Sitana, followers of a Ghazi, or warlike devotee who rose against the Sikhs, and was eventually slain by a son of Runjít Sing. These people were ill-conditioned, and endeavoured to arouse the bigotry of the surrounding Muhammadan tribes, especially of the Swatis. The King of Swat was, indeed, elected to his present position from among them. In 1863 there were prolonged operations against the fanatics of Sitana, entailing a total loss of 847 killed and wounded; but the fanatics were expelled. Beyond Judún on the north-west, is the Bunur country, extending from the lower range of the Hindu Kush, down to the hills which command the plain of Yusufzai, with Swat on its western frontier. The Bunurs are said to be numerous.

The Swat country consists of a long valley, separated by a lofty range from the British frontier. The river, after fertilising the Swat valley, forces its way through a gorge in the hills, and flowing across the Peshawur valley, falls into the Kabul. The population of the Swat valley is about 100,000, of whom 20,000 are fighting men. They form several clans united under an elective chief, called a King, with an Akhund, or high priest, who is held in great veneration. Between the Swats and the British frontier are the Ranizais and Osman Kheyls. These people gave much trouble by their raids, and in 1852 a force under Sir Colin Campbell advanced into their country, and inflicted severe chastisement. The Ranizais submitted, and have never given further trouble. The Osman Kheyls have also profited by the lesson. The Yusufzais are within British territory, and are a martial and brave race, but they have now become good subjects, and the allowances to their chiefs have been confirmed.

Then come the Momands, whose country extends from the Swat border to the Kabul river. Their capital, Lalpura, is on the left bank. They own a nominal allegiance to the Kabul Government, and are divided into six clans, three of which border on the Peshawur valley. They number about 17,000 fighting men, and as the grazing lands of the villages in the valley are immediately under the Momand hills, their temptations were certainly great. It was necessary to give them a motive for forbearance, and in 1851 Sir Colin Campbell took the field against Saadit Khan, their chief. After two campaigns they were sufficiently beaten, the fort of Michmi was garrisoned to overawe them, and they have never again appeared in a body. The three clans on the border were left to make their own arrangements. They agreed to pay a small tribute and to remain loyal, and they have adhered to their bonds.

After the Momands come the Afridis, who form the most important tribe on this frontier. Their territory borders on the western frontier of the Peshawur valley, and, projecting abruptly into British territory, separates the districts of Peshawur and Kohat. The Afridi hills lie between these two districts, and are crossed by the Kohat and Jewaki passes. The Afridis are independent, fierce, and treacherous, and can muster 24,500 fighting men, 697 of whom are now serving in the Punjab frontier force. They are fine, tall, athletic highlanders, lean but muscular, with long gaunt faces, high noses and cheek bones, and dark complexions. The different clans have feuds among each other, and while operating against one, others can always be induced to be our allies. The Afridis of the Khaibar pass are considered the most faithless. Those of the Kohat passes are great traders, carrying the Kohat salt to Peshawur, and cutting and selling firewood. In 1849 it was agreed to pay them 570*l.* a-year to protect the pass, but in the next year a party of sappers, working on the roads, was cut to pieces by them. Sir Charles Napier then marched into their country and destroyed their villages. In 1853 an arrangement was made by which six Afridi clans received allowances and undertook to keep the pass open. The Orakzais are another tribe bordering on Kohat, numbering about 30,000 fighting men. There are two other clans forming part of this tribe, the Sipahs and the Bazotis. In 1854 the Orakzais were in open feud, and Sir Sydney Cotton marched against them and destroyed their villages, inflicting severe loss. They have been tolerably quiet since, but the Bazotis are great cattle lifters. The Waziris are the robbers of the Gomul pass, and other parts of the Sulaiman range. They are one of the largest and most important tribes, as holding a pass through which much of the traffic is conveyed between India and Central Asia. Their total fighting strength is 43,900, some within British territory, one clan at Bunu, others on the higher spurs of the Sulaiman range, where there is a little cultivation in the valleys, and on plateaux at the bases of high mountains. The Waziris owe no allegiance to Kabul. The Batanis are a tribe of Afghans on the outer spurs of the Waziri hills, adjoining the southern side of Bunu, and the northern limit of the Dera Ismail Khan district, from the Shamla Kurd pass to the Gomul valley. They often act as guides to the Waziri raiders. The Biloch frontier tribes, further south, including the Kasranis, Bozdars, Khutrans, Kosahs, Lagharis, Gurchanis, Murris, and Bugtis, number about 130,000 fighting men. The Kasranis extend from the Korak pass for about 50 miles, and muster about 1,200 men, who are great thieves. Then come the Bozdars, who extend along the British frontier for about 20 miles, in a range intersected by the Sungurh and eight other passes. The Khutrans are a tribe of 3,000 fighting men, but they are Pathans, surrounded by Bilochis, and live behind the Bozdar hills. The Kosahs consist of 1,200 fighting men, partly in the plains, at enmity with the Bozdars above them, and Lagharis below them, but on good terms with the Khu-

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trans. The Lagharis have always been a loyal and well affected tribe. The Gurchanis are a debased and thieving set, numbering about 2,000, of whom only one is respectable. The Murris are a strong tribe, numbering over 4,000 fighting men, who used to commit raids in the lower extremity of the Derajat. The Bugtis often serve in the Punjab cavalry and Sind horse. They are subjects of the Khan of Kelat.

During the former year 1871-72 the frontier was at peace, but in July 1872 there was a raid of the Waziris of the Jalla Khel clan; and on the 21st of March, 1873, Major Macdonald was foully murdered by an Afghan of the Momand tribe, named Bahram Kham, at the Michmi fort. The assassin himself, who seems to have had no adequate motive, is still a fugitive, but steps have been taken to punish accomplices. A frontier police is being organised, and very light assessments are being settled on frontier villages, as payment for police services.

The important group of Sikh States, on the Sirhind Plain, occupies a large space of the classic land between the Satlej and the Jamna now needing irrigation, and thirstily waiting for the Sirhind Canal, but once watered by the historic Saraswati. The connection of these States with the British Government commenced when Runjit Sing, by the Treaty dated April 25th, 1809, engaged to make no encroachments on the rights of the chiefs on the left bank of the Satlej. Afterwards there was a proclamation, dated May 2nd, 1809, promising protection to the Sirhind chiefs, exacting no tribute, but requiring service in time of war. After the first Sikh war, all but ten larger Sirhind States were deprived of sovereign power, and bound to pay a commutation tax, in lieu of military service, of two annas in the rupee, or 12½ per cent. on their incomes. The sovereign Cis-Satlej States are Patiala, Jhind, Nabha, Kalsiah, Maler Kotla, Faridkôt, and three small ones, Dyalguri, Muundôt, and Raikôt. The State of Kapurthala is separate from the others, and actually on the banks of the Bias. Of these, Patiala is far the largest and most important.

The founder of the Patiala State, a Sidhu Jât named Choudri Phul, rose to power about two centuries ago, and his descendants, who are Sikhs, have been sovereigns for about five generations. The chiefs of Patiala, Jhind, and Nabha, have a common ancestor in Phul, and their families are known as the Phulkian houses. The Chief of Patiala, for his aid in the Nepalese war, received portions of the Baghat and Kunthal Hill States; and in 1830 he gave up Simla to the British Government, in exchange for three villages in the plains. In 1847 he received a sanad confirming him, and his descendants for ever, in his possessions, and binding him to administer justice and promote the welfare of his people, to relinquish all transit dues, and to attend with his forces in time of war. The Government gave up all claim to tribute, or to any share of the Patiala revenue. In 1857 the Patiala troops did excellent service by keeping open the grand trunk road during the mutinies. In 1860 the Patiala Chief received a new sanad, in which the British Government promised never to demand tribute, conferred the right of adoption in default of heirs, and conceded the power of life and death. The chief was bound to co-operate in war, and to furnish material and grant land for railways on payment. In 1861 Narindar Sing, the late Maharajah of Patiala, was invested with the Star of India, and became a member of the Governor General's Council for making laws and regulations. He died on November 13, 1862. The present Maharajah, Mahindar Sing, was born in 1852. He has been well educated, speaking English and Persian. He takes the greatest interest in the progress of his country and the good of his people, and has introduced the English systems of civil and criminal procedure. A branch of the Sirhind Canal will be under his direct management. He has received the Star of India (G.C.S.I.), and is entitled to a salute of 17 guns. His territory has an area of 5,412 square miles, and a population of 1,650,000. The revenue is about 380,000*l*. The Jhind Chief, a well informed and able ruler, is of the same clan as Patiala, being descended from a common ancestor. He was the first to march against the mutineers at Delhi, his troops being the vanguard of the English army; and he remained in the camp until Delhi was taken. For this service he received a grant of additional territory, and a sanad, in 1860, with full privileges of adoption, and the right to a salute of 11 guns. The Rajah of Jhind will also have charge of a branch of the Sirhind Canal. He performs all important administrative work himself, decides cases, and conducts correspondence. The Jhind territory has an area of 863 square miles, with a population of 189,475, and yields a revenue of 40,000*l*. The Rajah of Nabha comes from the same stock as those of Patiala and Jhind, but belongs to the elder branch.

In 1860 Nabha received a sanad granting full rights of adoption. The present Rajah was only installed in August 1871, but he has shown considerable ability. This chief has also been guaranteed the right of adoption, and is entitled to a salute of 11 guns. Nabha has an area of 863 square miles, a population of about 227,155, and yields 65,000*l.* yearly revenue. Kalsia, Maler Kotla, and Faridkhôt also have the right of adoption. Kalsia has an area of 155 square miles, a population of 62,000, and a revenue of 13,000*l.* Maler Kotla is a Muhammadan State, the ancestors of the chief having been originally natives of Kabul. The chief who reigned in the beginning of this century joined Lord Lake, and did good service. The area of Maler Kotla is 165 square miles, the population about 46,200, and the revenue 25,900*l.* The Chief of Faridkhôt is a Jât. His territory lies south-east of Patiala, and covers an area of 643 square miles, with a population of 68,000, and a revenue of 30,000*l.* The three last chiefs are entitled to salutes of 11 guns. The minor Cis-Satlej Chiefs are reduced to the rank of ordinary Jaghirdars, or rent-free landholders, only male heirs having a right to the succession. They are eight in number, the largest having a revenue of 7,000*l.* The State of Kapurthala is separate from the group, and occupies an area of 598 square miles along the banks of the Bias, with a population of 253,293, and a yearly revenue of 75,700*l.* The family of the chief originally came from Alu, in the Bari Doab. The first treaty of the Rajah of Kapurthala with the English, signed on April 23rd, 1809, bound him to furnish supplies in time of war, but the then chief fought against the English at the battle of Aliwal, and his Cis-Satlej States were confiscated. He was, however, allowed to retain his property in the Jallandhar Doab, where his present State is situated. In 1849 the chief was created a Rajah, and, as a reward for good service during the mutinies, he asked for and received some hereditary property of his family in the Bari Doab. Kharah Singh, the Chief of Kapurthala has received a sanad guaranteeing the right of adoption. He pays a yearly-tribute of 13,100*l.* to the British Government. Full particulars respecting the origin and history of the Cis-Satlej States, and of Kapurthala, will be found in a work entitled "The Rajas of the Punjab," by Lepel H. Griffin, Esq., B.C.S. (Lahor, 1870).

There are three Muhammadan States, besides Maler Kotla, which will most conveniently be grouped together. One on the Ramgunga, in the basin of the Ganges; the other two in the valley of the Indus—namely, Rampur, Bhawalpur, and Khairpur.

Rampur recalls recollections of the days of Warren Hastings and the Rohilla war. In the troublous times at Delhi, after the invasion of Nadir Shah, a Rohilla Afghan, named Ali Muhammad Khan, became the leader of a large force, received the title of Nawab, and after the Afghan inroad under Ahmad Shah, he made good his supremacy over the territory of Rohilkhand, which was confirmed to him by the Delhi Emperor. In 1792 the Rohilla chiefs, successors of the founder of the family fortunes, made an alliance with the Nawab of Oudh against the Mahrattas, agreeing to pay 40 lakhs to Oudh for protection. The Rohillas failed in their payments, and the Nawab of Oudh obtained the aid of Warren Hastings in his design to conquer Rohilkhand. The chiefs made a most gallant defence, but were completely crushed by the force under Colonel Champion, and the survivor, named Faizulla Khan, fled into the hills with the remnant of the Rohilla army. Colonel Champion signed a treaty, in 1774, by which Faizulla was guaranteed the possession of the estate of Rampur, in the centre of Rohilkhand, on condition of military service to the Nawab of Oudh; which was commuted, in 1783, to a payment of 150,000*l.* In 1794 his successor was allowed to succeed to a portion of the territory, and was continued in possession, when Rohilkhand was ceded to the British Government in 1801. The Nawab of Rampur is bound by an engagement to govern his people with justice, and to provide for the inferior Rohilla chiefs. In reward for services in the mutinies he received an additional grant of lands yielding 10,440*l.* a year, with the condition of respecting the rights of the landholders; and was assured that any succession to Rampur, in accordance with Muhammadan law, would be upheld. The Nawab is entitled to a salute of 13 guns. He is aged 39, is well read in Arabic and Persian, and knows English and Hindi. Rampur has an area of 1,140 square miles, and a population of 485,000 souls. The annual revenue is about 100,000*l.*, and a force of 1,700 men is maintained.

The Muhammadan State of Bhawalpur is separated from the Punjab by the Satlej, and is bordered on the south by the great desert, and on the west by the Indus: being 300 miles long, with a mean width of inhabited and cultivated territory of about 20 miles. The total area is about 15,000 square miles, and the area of cultivated territory, recently surveyed by two parties of the British Revenue Survey

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is 4,596 square miles. Of the latter area there were 788 square miles under cultivation, and 2,260 lying uncultivated, leaving 1,568 square miles of uncultivable waste. In the rear, to the south, there is also an area, now overlaid with sand-drift from the great desert, but which yet contains a vast extent of excellent soil, the irrigation of which is a mere question of money. The uncultivated area affords pasture for vast herds of camels, horned cattle, and sheep. An account of the irrigation of Bhawalpur has been given in a previous Section.* The dominant race are the Daudputras (or Davidsons), who claim descent from Abbas, the uncle of the prophet; and Sir H. Elliott holds them to be of the same stock as the Kulora dynasty of Sind. In 1737 their ancestor, Daud Khan, was a powerful chief settled in Sind, who, unable to hold his own against the governor of that province appointed by Nadir Shah, crossed the Indus with his clan, and gradually obtained possession of the tract now known as the Bhawalpur State. Afterwards Mubarik, the son of Duab, received a large grant of land on the other side of the Sutlej, from the Viceroy governing Multan under the Emperor of Delhi. The chiefs of the clan retained virtual independence until Bhawal Khan the First, grandson of Daud, reduced the whole to submission and consolidated his power. It was this chief who received Mr. Elphinstone's Embassy in 1808, when on its way to the Durani Court. Runjit Sing stripped his grandson, Bhawal Khan the Third, of all his possessions beyond the Sutlej, and would also have absorbed Bhawalpur, had not the Nawab fortunately obtained an alliance with the British Government in 1827. On February 2nd, 1833, the first Treaty was signed, securing the independence of the Nawab, and opening the traffic on the Indus and Sutlej at a fixed tariff. The schedule of dues was revised by subsequent Treaties in 1835, 1838, 1840, and in 1843 were reduced one-half. In 1838 the Nawab loyally repaid our protection, by services rendered to the army marching against Kabul; and was rewarded by a second Treaty, dated October 5th, 1838, by which the British Government was recognised as supreme, and the Nawab bound himself to act in subordination to it. During the rebellion at Multan the army of the Nawab co-operated with Sir Herbert Edwardes; when the rebels were defeated, and hemmed within the walls of Multan until the arrival of the British army. This Nawab left the State prosperous and improving, but the Daudputra chiefs, after his death, intrigued to regain their independence by weakening the authority of his successors. In 1860, the reigning Nawab had addicted himself to such excesses and atrocities, that he incurred the grave displeasure of the British Government. He died in 1866, leaving an only son, a child then under his mother's care, who was a beautiful woman of good Daudputra lineage, though the daughter of a poor wood-cutter. In the same year the management of the State, during the minority of the Nawab, was assumed by a Political Agent, invested, under the general supervision of the Punjab Governor, with full powers for its reorganisation and administration. The principle laid down was to govern the country as far as possible through native officials, and to organise the administration on such a basis as that, at the Nawab's majority, which is fixed at 18 years, the government might be handed over to him in a condition to go on without check or friction in native hands. At the time of our assumption of the government, the State was in the last stage of exhaustion. Only two men of position were left in the country, the rest of the Daudputra chiefs were killed or dead in exile, and their families remained in abject poverty owing to the confiscation of their land for rebellion. There was no executive, and no officials worthy to be trusted in responsible positions. The treasury was empty, the officials were living on the people, the canals were falling into decay, and many cultivators had left the country and were working as yearly tenants, beyond the border. The first thing was to get money, and an honest treasurer. The late Nawab's debts were scheduled and are now being paid off, and arrangements were made to prevent embezzlement. The powers of the various State officers were restricted and defined, and a *levée en masse* of the people was made to clear the more important canals. This was the work of the first few months; and there have been steady efforts to organise the administration and develop the country, during the last seven years. The revenue used to be taken in kind, the Government share differing in every village, and the numerous cesses being of arbitrary amount, according to the pleasure of the revenue officer. This system has been replaced by cash payments at a fixed uniform rate for each kind of crop, arrived at by a division of every holding into fields with fixed boundaries and registered areas; the village area having first been scientifically surveyed. The assessment is light, and a vast extension of the cultivation of valuable crops, such as

* See page 51.

sugar-cane and tobacco, has been the consequence. There are 1,497 old rent-free grants, which have been demarcated and classified. The result of these measures has been that all the Bhawalpuri cultivators, who had abandoned the country, have returned; and many other agriculturists, with mattock on shoulder, and wife and children mounted on the plough bullocks, have come to work for the now prospering landholders. Efforts have been made for the peopling and cultivation of the waste lands, splendid work has been achieved on the irrigation canals, and transit dues have been abolished. The manufactures are confined to silk fabrics, the material for which is purchased from the Povindah merchants. There is one aided mission school in the capital, and 34 village schools. But perhaps the most important duty of the Agent was the education of the young Nawab, which was commenced in April, 1871, he being then ten years of age. He was a shy timid child, full of ideas of his dignity, having been brought up entirely among women and priests. He is now a hearty manly boy, thoroughly in hand yet full of fun, and entering heartily into all manly sports and exercises. He shoots well with a rifle, rides boldly, plays wonderfully at polo, is a good swimmer, runner, and jumper, and would hold his own with most English lads of his age and weight. He has an English tutor, and several relations of his own age are brought up with him. So that there is every reason to hope that, in 1879, the State of Bhawalpur may be handed over to a manly and well-informed native ruler, who will continue the good work that has been commenced.

Khairpur is the one native State in Sind in which the Mir Ali Murad Khan Talpur, by separating himself from his kindred, succeeded in retaining his paternal inheritance. When the Talpurs drove the previous dynasty of Kalhoras from the sovereignty of Sind, Mir Sohrab Talpur received, as his share, the district of Khairpur. He abdicated in 1811, and was succeeded by his son, Mir Rustam. But by a will dated 1829, the country was divided among Sohrab's three sons, Rustam, Mubarak, and Ali Newad, the former being Rais, or head of the family. Rustam and Mubarak combined to avail themselves of the youth and inexperience of Ali Murad, the youngest brother, who was only fifteen in 1830. When he grew up, Ali Murad resolved to lose no opportunity of retaliation. On April 4th, 1832, the British Government recognised the political individuality of Khairpur by signing a treaty with that State, to provide for the use of the river Indus, and of the roads in Sind. Another treaty was signed with Mir Rustam by Sir H. Pottinger, on December 25th, 1838, providing that the fort of Bukhar on the Indus should only be occupied by the English during war. Thus the separate individuality of Khairpur, as regards the Mirs of Haidarabad in Lower Sind, was recognised. Mubarak died in 1839; and in 1842 the family feuds rose to such a height that a battle was fought, ending in an agreement signed on September 15th, 1842, and known as the "Nounahar Treaty." On the arrival of Sir Charles Napier in the same autumn, Ali Newad complained to him that Rustam was intriguing to rob him of his rights in favour of his own son, and Sir Charles engaged to support his claim against his nephew, but not against his brother, Mir Rustam. From that moment Ali Murad took his side. Rustam was now aged 85, and when vast cessions of territory were demanded by Sir Charles he became terrified, and, with other Mirs of his family, fled into the desert. Ali Murad then became Rais of Khairpur. The battle of Mian followed, and all Sind was annexed with the exception of Khairpur. Ali Murad had his revenge. The State then contained a population of 800,000 souls, and yielded a revenue of 150,000*l*. But the astute Rais overreached himself. In the "Nounahar Treaty" he alleged that Rustam and Nasir Khan, a son of Mubarak, had ceded to him certain territory which he claimed. But it was discovered that he had committed a forgery, by substituting the word "district" for "village," and interpolating several names. A Commission reported his guilt, and in a proclamation of Lord Dalhousie, dated January 21st, 1852, he was degraded from the rank of Rais, and deprived of all his territory except the hereditary possessions allotted to him by his father, Mir Sohrab Khan. Ali Murad is now aged 60, and has several sons, Mir Shah Nawaz being heir apparent to the chieftainship of the Khairpur State. This principality is bounded by the Indus on the west, and the Rajput state of Jasalmir on the east, about 120 miles long by 70 broad, with an area of 6,109 square miles. It consists of a great alluvial plain, divided into six districts, and has 106,888 cultivated acres watered by six canals, including the Eastern Narra.* The revenue is collected in kind, on the old *battai* system,† and yields about 45,350*l*.

* See page 56. † See page 30.

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The States of Central India, consisting of the territories of Sindia, Holkar, the Begum of Bhopal, Dhar, Dewas, the Bandelkhand States, and numerous feudatory chiefships, lie on the elevated tract between the Narbada and the valley of the Ganges. The valleys of the Narbada and the Son form a continuous and almost straight line of depression from the Gulf of Cambay to Patna on the Ganges; and thus the plateaux of Malwa and Bandelkhand, which comprise the territories of the Central India Native States, form a vast triangle, with the line of the Narbada and Son as the hypotenuse to the south, the Ganges valley as a second, and the Clittore hills and Chumbul river as a third side. To the south the great rock escarpment of the Vindhyan hills abruptly terminates the table land, and overhangs the valley of the Narbada, presenting the appearance of a weather-beaten coast line. From its summit the northern slope to the Ganges commences, the region consisting of a broken plain country with ranges of hills, watered by the rivers Chumbul, Sind, Betwa, Tonse, and Son, all flowing north to the Jamna and Ganges. This country was the scene of an ancient civilisation. Here, at the Court of Oujein, flourished the famous dramatist Kalidasa, and centuries afterwards, at the same city, the astronomer Jey Sing erected his observatory. But in later years the plateau was the scene of incessant wars; it was crossed and recrossed by Mahratta armies, whose generals, Sindia and Holkar, carved out sovereignties for themselves at the expense of native Rajpút chiefs, and to these visitations succeeded the atrocities of the Pindari robbers. It is hardly possible to exaggerate the disorder and confusion which prevailed in Central India, when at last the British Government interfered in 1817. When the Peishwa Baji Rao overran Malwa in 1737 he only exacted *chout*, or a fourth of the revenues, but the state of the country, seventy years later, had become more dreadful than can be conceived. The Mahratta armies made annual expeditions for the purpose of devastating the possessions of their weaker neighbours; hordes of undisciplined marauders, called Pindaris, ranged with fire and sword from one end of Malwa to the other, the filthy dregs of a corrupted and savage people. The campaign of 1817 against the Pindaris, was one of order against anarchy, and at its close Sir John Malcolm became Political Agent of Central India. In 1817 there was not a district which was not in a state of ruin and confusion. In 1821 there was not an open enemy to the public peace.

The most important State of Central India is that of Gwalior, ruled over by the Maharaja Sindia. This prince's ancestor, Ranaji, originally a carrier of slippers to the Peishwa, rose to the command of a Mahratta army, and his son Malhoji Sindia, a powerful chief in Malwa, first opened intercourse with the British Government in 1781, when he signed a treaty of neutrality. He died in 1792, and his son Dowlet Rao Sindia officered his army with Frenchmen, and made a league with the Raja of Berar against the English, but his power was completely broken by General Wellesley, and he sued for peace. By the Treaty of Surji Arjengaum, signed on December 30th, 1803, he was stripped of all his territory in Hindustan, and deprived even of Gwalior. But this stronghold was restored to him by a subsequent treaty, dated November 23rd, 1805, when the river Chumbal was fixed as his northern boundary. He was also deprived of all claims to tribute from any state east of Kanpur; for the Mahrattas had overrun all the territories of Rajputana, and oppressed the Rajput chiefs with heavy exactions. On the 5th of November, 1817, Sindia signed a Treaty against the Pindaris, and ceded Ajmir to the English by another deed on June 25th, 1818. From that time the territories of Sindia came more immediately under the supervision of the English Political Agents. In 1817 there was not a district in Sindia's territory which was not in a state of anarchy. In 1821 its revenue had risen 25 per cent., and there was a deduction of 15 per cent. in the cost of collection. He then possessed about 33,119 square miles of territory with his capital at Gwalior. The revenue was 1,276,845*l.* in 1819, and 1,432,022*l.* in 1824. Dowlet Rao Sindia died in 1827 without a son, and his widow Baiza Bai was regent until 1833, when Ali Jah Jankoji Rao was adopted. He died in 1843, also childless, and his widow, Tara Rani, adopted a very distant relation named Babaji Sindia. The insolent folly of the Gwalior chiefs led to their total route in the battles of Punna and Maharajpur in 1843, and Lord Ellenborough generously refrained from using his right of conquest. A treaty was signed at Gwalior, on January, 13th, 1844, by which Sindia ceded territory for the maintenance of a contingent force, which was reduced to 6,000 horse and 3,000 foot, and for the payment of debts and the expenses of the war. In 1857 the contingent mutinied, and Sindia, who remained loyal, with his able minister Dinkur Rao, fled to Agra. As a reward for fidelity his arrears were remitted, and he received a grant of territory, including the parganahs of Jaund

Nimuch, which again brings him in contact with Rajputana. In 1859 he was assured of the full right of adoption, and he selected a youth who was educated as heir apparent for seven years, under the name of Ranozi Rao Sindia. But in 1872 the Maharaja obtained the consent of the Governor-General to cancel the adoption. By a treaty signed on December 12th, 1860, an exchange of territory was effected. Sindia gave up all territories south of the Narbada, consisting of the Panch Mahals, except seven hereditary villages, in exchange for land on the Betwa river; and in 1861 the seven villages were exchanged for land on the Paluj. He agreed to pay 2,000*l.* towards the Malwa Bhil Corps, and a subsidy for the construction of the Agra and Bombay road. Sindia is decorated with the Star of India (G.C.S.I.), and is entitled to a salute of 19 guns. His territory has a population of about 2,500,000, and yields a revenue of 854,961*l.* There are 12,390 villages in the 58 pargannahs of Sindia's territory, yielding a land revenue of 655,883*l.*; the customs yield 60,000*l.*; and the tribute 139,078*l.* The expenditure for 1872-73 was 947,614*l.* Sindia is building a magnificent palace in the Italian style, on the plain below the south-east corner of the Gwalior Fort, with a front 142 yards, and side faces 176 yards long. The Maharaja has also contributed loans for two State Railways within the territory of Gwalior. In February, 1873, he held a camp of exercise at Gwalior, consisting of 5,000 infantry, 3,470 cavalry, and 40 guns, himself commanding the attacking force, and sharing the bivouac with his men. The strength of his army amounts to 22,539 officers and men. The Maharaja personally superintends the administration.

Holkar, the second great chief of Central India, is descended from Mulhar Rao, a Sudra of the shepherd caste, who was a general in the first Mahratta invasion of Northern India. Jeswunt Rao Holkar made war on Lord Lake, was defeated, and fled across the Satlej, where he signed a treaty on December 24th, 1805, depriving him of a large portion of his territory. He died in 1811; and his successor, Mulhar Rao Holkar, signed the Treaty of Mundisore, in January, 1818, resigning all authority over, or claims to tribute from the Chiefs of Rájputána. From that time the peace established by Sir John Malcolm in Malwa, secured increasing prosperity to Holkar's State, the capital of which is Indor. In 1817 his revenue was only 144,168*l.*; in 1821 it was 169,618*l.* In 1813 only 2,038 villages were inhabited in Holkar's territory. In 1818 the number was 2,343, and in 1820 there were 2,656 villages.

There was adoption and was guaranteed the full India (G.C.S.I.), and territory, lying to the population of about maintains 24,800 in

The third great distinguished in each was assigned to Am widow of his descendant Sindia and Holkar 1819, Dhar was 1857 the State was belonged to it, was afterwards restored guaranteed the right an area of 2,091 which 1,965*l.* is Mandu, overlooking are in the territory

The ancestor of from the Peishwa Sindia, Holkar, and the English, in two chiefs in Dew They are guaranteed The area of Dew revenue of about ance of troops.

Bhopal is the Vindhyan Mount

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the Narbada. It was founded by an Afghan in the service of the Emperor Aurungzib, who established an independent principality at Bhopál, and died there in 1723. The present family was founded by the Wazir Muhammad, who, for many years, maintained the integrity of Bhopál against the repeated attacks of the Mahrattas. Between 1809 and 1812 Sindia and Blonsla of Nágpur made incessant attempts to crush the little Muslim State; and, when Bhopál was besieged by them, Muhammad made a gallant and successful defence. He died in 1816, and his son Nazar Muhammad made an alliance with the British Government against the Pindaris. By a Treaty dated February 26th, 1818, the independence of Bhopál was guaranteed, and it was arranged that the State should maintain a contingent force of 400 foot and 600 horse. The Nawab died the same year, leaving an only daughter, Sikandar Begum, who, by a cousin named Jehanghir Muhammad Khan, had an only daughter named Shah Jehan, born in 1844. Sikandar Begum, who conducted the administration with great vigour and ability, was proclaimed Ruler of Bhopál, with her daughter Shah Jehan as her successor. For her services in 1857 she received the pargana of Bairsiah, confiscated from the Dhar State, and was guaranteed the right of adoption. In 1863 she went on a pilgrimage to Mekkah and, dying, was succeeded by her daughter. The present Nawab Shah Jehan of Bhopál was decorated with the Star of India (G.C.S.I.) at Bombay in 1872, and is entitled to a salute of 19 guns. The area of Bhopál is 6,764 square miles, and the population 663,656. The revenue is 137,625*l.*, and the State maintains a force of 723 horse and 3,428 foot, besides 73 guns and 223 artillerymen.

The Nawab of Jáwra is the second Muhammadan chief of Central India; the founder of the family having been a brother-in-law of the Pindari chief Amir Khan. He has a sanad guaranteeing him the right of adoption, and is entitled to a salute of 13 guns. The area of Jáwra is 872 square miles, including the best poppy growing land in Málwa, which yields 100 chests of opium a year. The population is about 85,500. Out of the revenue of 65,524*l.*, a contribution of 16,181*l.* is paid for the maintenance of troops; and the State of Jáwra has 600 infantry and 175 cavalry.

Before the Mahratta invasion, great numbers of Rajpút chiefs held sway over the villages of Central India. Their property was parcelled out among the Mahrattas, and many of the chiefs fled to refuge in mountains and jungles,

which they had been quiet by allowing the tributary to Sindia, three. The British rights existing at the between the tributary under of supremacy British Government. superior shall be As regards suc- s unless there has the feudal superior, power of life and efs, paying tribute ce most important D, paid 8,400*l.* to tish Government. 4,839. It is the e of 36,406. The nistressed by Mir Ratlám, and are f Jáwra, the res- roads of the wild curs entered into Agency there are ir subjects being he chief of Dhar hat of Amjhera der the Maunpur -four to Bhopál, are immediately

dependent on the British Government. Altogether there are ninety of these tributary chiefs in Central India.

The Central Indian States are divided, for purposes of superintendence and diplomatic intercourse, into eight Political Agencies. The West Málwa Agency has Rájputána on the west, Indore and the Vindhyan hills on the south, Bhopál on the east, and Kota and the plain of Haraoti on the north. A broken scarp, with wild hilly country in the rear, connects the Vindhyan with the Arávali hills in Rájputána. In its rear is the Bhíl Agency, controlling the wild tribes in the western extreme of the Vindhya, and including Amjhera and Dhar. The Deputy Bhíl or Manapur Agency is chiefly on the south side of the Narbada, to the foot of the Sápura hills. The Indor Residency includes Holkar's Territory, Dewas, and Bagli, belonging to Sindia; the Bhopál and Gwalior Agencies are conterminous with those States, and that of Gúnal comprises a broken and difficult part of Sindia's territory.

Bandalkhand forms the eastern part of the great triangular plateau of Central India, and is inhabited by the peculiar Hindu tribes of Bandelas on the west, and Bhagelas in Rewah on the east. To the west is the river Betwa flowing to the Jamna; to the east is the Son, with the Kaimur range, a continuation of the Vindhya, rising up along its left bank. The Púna range, with deep ravines and isolated crags on its north-western face, traverses Bandalkhand, and there is a broken plateau between the Púna and Kaimur ridges, watered by the Tonse, a tributary of the Ganges. Here is the military station of Nagode, and below the Púna ridge is Nowgong; but still on the higher ground. To the north Bandalkhand terminates in an amphitheatre of precipices, shaping the country below into a bay, bounded by sandstone cliffs, which again advance to near the Jamna at Mirzapur. These were the cliffs of a great sea in the far off days, when the *sivatheria* and other gigantic Sawalik mammals roamed over the lower Himalayas; and the wild scenery indicates the changes of the passing ages.

The largest of the native States on this plateau, which bounds the Ganges valley on the south, is Rewah, whose Rajah, in 1812, agreed to acknowledge British sovereignty, to refer all his disputes to arbitration, and to permit British troops to march through, or be stationed in, his territory. But he attempted to starve one detachment on June 2, 1813, he had to sign a treaty, fixing his relations more clearly. The Maharajah of Rewah was received, and reward, sources of Narbada

guaranteed the right and is entitled to a Kaimur range and an area of 12,773 square 260,000L, of which is reported to be sacred

The next State on the end of the plateau, chief is of the most subjection by the British Government sovereignty, the Maharajah made such an admission sunnud guaranteed guns. The area of

Duttia, to the Maharajah Peishwa in the treaty signed on March 1813 has received the right of his dominions land. Sumptur (generation before an area of 175 square receives a salute of estate under a salary Calcutta, and is near range, from the plateau

There are 32 states

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deeds of allegiance, holding their estates under sanads. The area they cover is about 6,300 square miles; and the size of the estates varies from 15 up to 1,240 square miles, and from a population of 2,500 to one of 120,000. Eight of the chiefs are descended from Chattersal, the founder of the Bhandela chiefships; and only one, the Nawab of Baoni, with an area of 127 square miles, and 19,000 subjects, is a Muhammadan.

The most ancient sovereignties of India cluster round the Aravalli mountains, and in the valleys bordering on, or within, the Great Desert. The States of Rájputána have their eastern boundary on the Clittore hills and the river Chumbal, on the south they rest on the wild hill tracts inhabited by Bhil tribes, near the Gulf of Cambay, and to the north and west is the expanse of desert. The Aravalli mountains are thus within Rájputána, and Mount Abu rises to a height of 5,650 feet, near its southern border. The area is about 114,390 square mile, and the population may be 11,000,000 souls.

The Rájputs were established in this country before the dawn of history, and some of their chiefs claim descent from the Dynasty of the Sun. They offered a heroic resistance to Muhammadan invasion. Rana Sanka, of Odeypur, was the most formidable adversary of the Emperor Baber, and his family has ever been conspicuous for pride and exclusiveness. The other Rájput chiefs were glad to ally their daughters with the Emperors of Delhi, but the Ranas of Odeypur always haughtily stood aloof. The early Emperors, Akbar, Jehanghir, and Shah Jehan, never interfered with the religion of the Rájputs. They were philosophically indifferent, and Dara, the ill-fated son of Shah Jehan, wrote a book to reconcile the Muslim and Brahman tenets. The Rájputs, therefore, remained loyal; but the bigotry of Aurungzib drove them to support the Mahratta invasion, and led to much future suffering. Rájputána was periodically overrun by savage armies of marauders. Sindia and Holkar enforced tribute from the Rájput chiefs, and the Pindari robbers reduced them to the verge of ruin. There were some treaties with Rájputána chiefs between 1803 and 1806; but they were broken off by the policy of non-interference introduced by Lord Cornwallis and Sir George Barlow; and it was not until 1817, when it was finally determined to destroy the Pindaris, and establish order in Central India, that negoti- The object was to force a barrier against the

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is the highest in rank of Rana, the King pendant Kanaksen in bgurh, are offshoots ia, Hollar, and the at distress, a Treaty the 13th of January ay, to submit all e for five years, and action, and that the rtions to secure the er means, had fallen in the arrangement placed temporarily e it was determined -west of Odeypur. share of the Political Resident, years doubled the t, and in 1846 the es with feudatory rmer Ranas; and a them and their Lawrence, did not d the population is enjoyed by the in 1861. He is ute of 17 guns.

The next Rájputána State is that of Jaipur, which was founded in 967 A.D. The chief, who is a Cuchwaha Rájput, also claims descent from Rama. The family made alliances with the Delhi Emperors, and produced an astronomer and statesman, the illustrious Jey Sing. In 1803 political relations between Jaipur and the British Government were commenced, and a Treaty was signed on January 15th, 1804 with a view to excluding the Mahrattas from Hindustan. The chief of Jaipur heartily co-operated with Lord Lake against Holkar, yet, in spite of remonstrances from the General, Sir George Barlow, following a policy of non-intervention, broke the Treaty and dissolved the alliance. When overtures were re-opened in 1817, Jaipur naturally felt some reluctance to renew the alliance. But on April 2nd, 1818 a treaty was signed by which the chief of Jaipur agreed to pay a tribute of 80,000*l.* until the revenue exceeded 40,000*l.*, and five-sixteenths of the excess in addition. In exchange he received British protection. In 1842, owing to the large arrears of tribute, there was a remission of 460,000*l.*; and the annual payment was reduced to 40,000*l.* The present Maharaja is very anxious to obtain a change in the article of the treaty which makes the tribute fluctuate with the revenue. At present a sum of 35,000*l.* is spent on public works and irrigation, out of an income of 423,165*l.* There are receipts from the portion of the great salt lake of Sambur which belongs to Jeypur, amounting to about 40,000*l.* The area of Jaipur is 15,000 square miles, and the population about 1,900,000. A force is maintained of 4,600 infantry, 5,142 cavalry, and 452 artillery men. The Maharaja of Jaipur has received a sanad recognizing his right of adoption, is decorated with the Star of India (G.C.S.I.), and is entitled to a salute of 17 guns.

The chief of Jodhpur, or Marwar, is a descendant of the Rahtore Rájput King of Kanouj; and his ancestor founded Jodhpúr in A.D. 1459. The chiefs of Marwar were tributary to Akbar, served as generals in the imperial armies, and often inter-married with the family of Timúr. Maun Sing, the chief, in 1804 assisted Holkar; but on January 6th, 1818, a treaty was signed by which the tribute payable to Sindia was transferred to the British Government, and a contingent of 1,500 horse was to be maintained, in exchange for protection. The share of the Marwar chief in Maiwara was made over to the English in 1824 temporarily, and no definite arrangement has yet been made. On the 7th of December, 1835, the undertaking to maintain a contingent was commuted to an annual payment of 115,000*l.* towards the maintenance of the Jodhpúr army, which was then raised. It mutinied in 1857, and its place is now taken by British troops. The chief, who is also a magistrate, had become Rájá of the house of Jodhpúr in 1843, on failure of his predecessor. A portion of the fort and district of Udaipur was annexed to the British Empire, the population about 1,000,000. The chief is decorated with the Star of India, and has the right of adoption.

The Maharao Raja of this territory, on the 15th of January, 1818, but a treaty with the British, by which the chief bound himself to the British. The Maharao's second son was born in 1818, with a population of 1,000,000 and a force is maintained of 1,500 horse. The Raja of Bundi is entitled to a salute of 17 guns.

Kotah and Jhalla. The ruler of Kotah, 25000. A treaty was signed in 1818, by which the Mahrattas was to be excluded. In the 18th century Kotah had a population of about 250,000. The chief introduced a military system, and attempted to keep the population at less than 240,000. The British guaranteed to him a population of about 250,000, and the Chief gave a contingent of 1,500 horse.

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a new state, taken from Kota, for the descendants of the great minister, Zalim Sing, by a treaty dated April 10th, 1838. The state has an area of 2,500 square miles, a population of 220,000, and pays 8,000*l.* a year as tribute.

The State of Karauli, along the right bank of the Chambal, paid a tribute of 2,500*l.* a year to the Peishwa, who handed it over to the British Government by the treaty of Poona in 1817. In 1871 the income of the State was 45,098*l.*, and the expenditure 44,911*l.*; but the State is still heavily in debt to the Imperial treasury. The Maharaja Jaising Pal is, however, an intelligent, well-meaning man, and does a good deal of the work of the State himself. He has the right of adoption, and is entitled to a salute of 17 guns. The area is 1,260 square miles, and the population 140,000.

The State of Kishengurh is an offshoot from Jodhpúr, and its status is settled by a treaty dated March 26th, 1818. It pays no tribute. The Maharaja has the right of adoption, but he has two sons of his own, both lads of considerable promise. He is entitled to a salute of 15 guns. The area of Kishengurh is 720 square miles, the population 70,000, and the revenue about 60,000*l.*

The State of Ulwar was founded by Pertab Sing, an officer at the court of Jaipur. Observing that there were rings or circles in his eyes, a mark of royalty, the Maharaja made an attempt on his life, but he escaped to Bhurtpur in 1764, and afterwards, in the crisis of a battle with Jaipur, went over with his forces to his old master, and secured the victory. He was rewarded by restoration to favour, but on the death of the Chief of Jaipur he assumed independence at the head of the Naruka clan, and captured Ulwar, where he founded a dynasty. Pertab Sing died in 1791. In 1814 Eunni Sing became Chief of Ulwar, and reigned until 1857. He introduced a money revenue settlement, and collected a fine library. Under his son, Sheodan Sing, every department fell into utter confusion. It soon became necessary to assume the administration, and Captain Impey took charge in 1858; but the Rajah was allowed to take the reins in 1864. By 1870 the State was bankrupt, and anarchy existed in every department. The Maharao Raja, who is an impracticable violent man, was again pensioned off, and the administration was placed in the hands of Captain Cadell, the political agent. The Ulwar State is about 80 miles long by 60 miles, and has an area of 3,000 square miles; bounded on the east by Bhurtpur and the British district of Gurgan; on the north by Patiala and Nabha; on the west by Nabha; and on the south by Jaipur and Bhurtpur. The soil is fertile, and highly cultivated, and to the west is rocky, precipitous, and intersected by a range of hills. A census taken in April 1872 showed a population of 119,266. The revenue is 165,000*l.*

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allegiance to Pahlampur. In 1845, the Rao of Serohi ceded Mount Abu to the British Government as a sanatorium, on condition that no cows or pigeons were killed on the hill. In 1857 he did good service, the amount of his tribute was reduced to 750*l.*, he received the right of adoption, and is entitled to a salute of 15 guns. Serohi has an area of 3,000 square miles, and a population of about 55,000. The receipts of revenue, in 1871, amounted to 23,444*l.*, and the disbursements to 23,434*l.*

Dungurpur is also an offshoot from Odeypur, and paid a tribute to the Mahrattas, which was transferred to the British Government by a treaty dated December 11th 1818, to the amount of 2,738*l.* The Maharawal, who is a highly intelligent native prince, and a good ruler, received a sunnud, giving him the right of adoption in 1862, and is entitled to a salute of 15 guns. His daughter is betrothed to the Maharawal of Jasalmir, and the State will be much impoverished by the large dower. The area of Dungurpur is 1,000 square miles, much of it a wild, hilly tract, inhabited by feudatory tribes. The revenue of the State is about 7,500*l.*

Pertabgurh, another junior offshoot of Odeypur, became connected with the British Government by a treaty, dated October, 1818; and pays a tribute of 5,688*l.* to Holkar through the Imperial treasury. The Maharawal has the right of adoption, and is entitled to a salute of 15 guns. His management of the criminal jurisdiction of his territory is reported to be very good. Pertabgurh has an area of 1,460 square miles, a population of about 150,000, and a clear revenue of 26,000*l.*

Banswarra was originally part of Meywar. By a treaty, dated December 25th, 1818, the Maharawal agreed to pay tribute not exceeding three-eighths of his revenue, which is about 30,000*l.*, and thirty-three feudatories receive 11,000*l.* out of it. He is entitled to a salute of 15 guns. The area of Banswarra is 1,500 square miles, and the population about 150,000.

The two Jât States of Rajputana are Dholepur and Bhurtpur, on the left bank of the Chumbul, facing Gwalior. Dholepur was founded by Luchindar Sing, Rana of Gohud, in 1799; and by a treaty, dated November 23rd, 1805, he received Dholepur, Bori, and Rajkerah, the river Chumbul being fixed as the boundary between his territory and that of Sindia. The Rana, who is a faithful and loyal feudatory, has the right of adoption, is decorated with the Star of India (G. C. S. I.), and is entitled to a salute of 15 guns. His heir is his grandson, a sharp and intelligent lad. The area of Dholepur is 1,626 square miles, and the population about 100,000.

Bhurtpur State was founded by a freebooter, *(Bijay Singh)*, who built an almost inaccessible rock. His descendant, *(Bijay Singh)*, in 1803, followed Lord Lake's long and memorable campaign with heavy loss. After the surrender, in 1805, when Runjit Singh received agnate sovereignty of 220,000*l.* In 1826 a dispute was a second siege, the fort was stormed. The Maharawal of Bhurtpur has received a sanad, and is entitled to a salute of 17 guns. The population of 650,000, and the revenue is 1,000,000*l.*

Tonk is the only Muhammadan State in Rajputana. It was founded by the celebrated Pindari chief, *(Mir Asaf-ud-Daula)*, in November 9th, 1817, agreed to a treaty with the British, and the land he held in the territory was handed over to the British in connection with the Pindari war in 1857. The present Nizam of Hyderabad has an area of Tonk is 1,800 square miles, and the population is 1,080,000.

The political affairs of the States are managed by the Resident or Governor-General, who resides at the capital. Each State has a Political Agency, each under the supervision of the Resident. The States of Dungurpur, and Banswarra were the head quarters of dacoits, and were handed over to Sindia, and the States of Jaipur, Kishengurh, and Jodhpur and Jasalmir. The British have a jurisdictional Court of Appeal at Jaipur. During 1872, it held sessions at Jaipur.

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cases, of which 82 were highway robberies. The Harauti Agency overlooks the States of Bundi, Kota, Jhallawar, and Tonk; as well as the small State of Shahpura, whose chief, an offshoot from Odeypur, holds the Pargana of Khyrar from Odeypur, and Shahpura from the British Government, as part of Ajmir, paying 1,000*l.* a year as tribute. The Eastern States Agency includes Dholepur, Bhurtpur, and Kesowli. There is a special Agency for the Administration of the State of Ulwur; and finally the Political Superintendency for Sirohi completes the system. In Ulwur much accurate statistical information will now be obtained, and the Administration Reports from native ministers of some of the other States are yearly improving.

9. The Native States of the Bombay Presidency occupy 63,252 square miles, or one-third of the entire area, and have a population of 9,250,000 souls. They are divided, by race, language, and geographical position, into two main groups, the Gujrát States to the north, and the Maharati to the south.

The principal northern state is that of Baroda, occupying the largest portion of Gujrát, with parts of Khandesh and Katiwár, an unmeasured area, with a population of 2,600,000 souls, and a revenue of 150,000*l.* Khundi Rao Dharaboy was one of the most distinguished of the first Maharati leaders, and Damaji Gaikawar was his second in command. The former died in 1721. In 1755 the Gaikawar, a grandson of Damaji, wrested all Gujrát from the Moghuls, and entirely subverted their power at Ahmadabad. He was still the nominal feudatory of the Peishwa, and farmed the revenues for him over a vast region. On January 26th, 1780, a treaty offensive and defensive with the Bombay Government acknowledged the Gaikawar's independence of the Peishwa. Subsequent treaties arranged for the support of a contingent; and, when the agent of the Gaikawar was assassinated at the Peishwa's Court, the Bombay Government forced the latter to renounce all further claims on his former feudatory. This was followed by a treaty, signed on November 6th 1817, by which the Gaikawar agreed to certain exchanges of territory for purposes of consolidation, to increase the subsidiary force to 3,000 cavalry, and to a mutual surrender of criminals. Anund Rao Gaikawar died in 1819, and was succeeded by Syaji Rao Gaikawar, who reigned until 1847. The debts of the State rose to an enormous sum in his time, and he committed himself to a long series of unfriendly acts. He was succeeded in 1847 by Gunput Rao Gaikawar, who was followed in 1856 by Khundi Rao Gaikawar. This ruler ceded land for the Bombay Railway, and in 1858 agreed to keep up a force of 3,000 men for police purposes in tributary districts, the former payment for regular troops. He prohibited slavery in 1856, and has the right to control salt works, and open new mines. Malhar Rao Gaikawar, aged 44, has been proclaimed ruler. He has received a guarantee of the right to possess arms and guns.

Baroda, consisting of groups of States which were acquired by the Gaikawars by conquest or payment of tribute. The Mahi Kanta, the Rewa Kanta, and the Kach may be described as being on a plateau to the west. This is bounded by the Aravalli hills, and forms the western rear of the country slopes towards the Bombay Political Agencies. The country is watered by the river Narmada, and the Gulf of Cambay, as well as the Ghils, Kulis, and other

lies to the north of the Kach, and on the south by Rajputana. The chief State in the tribe, who is the Dewan of Pahlampur through an arrangement made to suppress previous disorders a very long time until 1848, but now under British inspection. Zarawur

Khan, the Dewan of Pahlampur, now aged 50, was loyal during the mutinies, and has received the right of adoption. He has one son. The area of his State is 2,700 square miles, with a population of 215,972; and a revenue of 40,000*l.* A force is maintained of 294 horse and 697 foot. The State of next importance in this Agency is Radhampur, founded by an adventurer named Bahadur Khad, who came from Isfahan about 250 years ago, and received a grant from the Moghul Subadar of Gujrat, confirmed by a sunnud from the Gaikawar in 1756. In 1813 the Bombay Government induced the Gaikawar not to interfere in the internal affairs of this State, which pays no tribute. Zorawar Khan, the present Nawab, is aged 50, and is able to read and write Gujrati a little. He has four sons, and has received a sunnud authorizing adoption. The population of his State is 91,579, and it contains one school. The revenue is about 50,000*l.* The State maintains a force of 248 horse, and 362 foot. Of the nine petty chiefships, one only, that of Kankrej, pays 512*l.* tribute to the Gaikawar.

The native States round the Gaikawar's head quarters at Baroda were, in former times, subjected to his most devastating method of forcibly collecting the revenue. An army was periodically sent out on circuit, to take as much as could be obtained while also maintaining itself. It is astonishing how the people continued to exist under such a system. In 1812 the Government of Bombay induced the Gaikawar to accept its mediation, in the Mahi and Rewa Kantas, and in Katiwar, to effect settlements for the payment of tribute of fixed amount, instead of the rough and the barbarous exactions formerly extorted. This measure was an immense boon, indeed the saving of this part of India. The group of States in the Mahi Kanta entered into an engagement for a perpetual settlement of this kind, in 1812; and in 1839 a Court of Criminal Justice was established, under the presidency of the Political Agent. This group occupies an area of 4,000 square miles, and has a population of 447,000 souls. The principal State is that of Edur, which was founded by some younger brothers of the Rajah of Jodhpur, who also acquired Ahmadnagar, Morasa, and Bayer. They had numerous conflicts with the Rajput proprietors, and with difficulty held their own against the Gaikawar. In 1812 there was a family division of the estates, one branch taking Ahmadnagar, and the other Edur, the latter being under British management or control from 1837 to 1859. For when Jowan Sing of Edur died in 1833, there was a forcible *sati* of his widow, and the sons fled to the hills, eventually receiving an amnesty. The Ahmadnagar chief succeeded to the Rajahship of Jodhpur in 1843, and that of Edur then reverted to the Gaikawar, which now has a population of 217,382; for which the revenue is about 60,000*l.*, and 3,033*l.* The present Maharaja of Edur is only aged eleven. Like the Jodhpur chief, he is descended from the Dynasty of the Sun. He is being also 78 petty chiefs in the Mahi Kanta, most of them belonging to families of no account to the Gaikawar. But about 30 schools are maintained. Peace is maintained.

The Rewa Kanta is a group of States, with only one chief, with first-class jurisdiction. They have retained their independence from the Gaikawar, and pay no tribute. In 1821 it was agreed that from this State, paid through the Gaikawar, also directed to pay 2,000*l.* The estimated population of the Rewa Kanta is with 463 pupils. Transit dues of the revenue is 80,000*l.* The States of Deoghur Baria, Lunawara, and 59 petty chiefships. Chohan Rajputs of the same name, in 1803, under the name of the Gaikawar, the other States, transit dues. The area of the Rewa Kanta is of about 487,647, and 4,000 souls. Bhils and Mewassis, and other tribes, they, presided over by the Gaikawar. It will here be convenient to mention the States of Khandesh, Nasik, Tanna,

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of 129,536, and a revenue of 45,000*l.* Near Súrat are the States of Sachin, Dharampur, and Bansda. Sachin, with a population of 19,000, is the State of Nawab Sidi Ibrahim, aged 42, a Muslim of Abyssinian descent belonging to the Jinjira family (*which see, further on*). Dharampur, with a population of 68,135, pays a tribute of 900*l.* to the British Government. Its Raja, now aged 32, is a Sisoda Rájput. Bansda, with a population of 32,379, also pays tribute. The Raja, aged 38, is a Solanki Rájput. Jawar, near Tanna, has an area of 534 square miles. The State pays no tribute. The population is 37,406, and revenue 8,200*l.* The Raja, aged 21, is still prosecuting his English studies at the Poona High School. His State was founded by a freebooter about 500 years ago. The State of Cambay was established by Mumin Khan, the Governor of Gujarat. The Nawab pays a tribute of 2,700*l.* to the British Government out of a revenue of about 35,000*l.* The population of his State is 83,494, in an area of 350 square miles; and there are 15 schools with 758 scholars. The Nawab, aged 59, knows Persian, and has been well educated. He has six sons. The Nassik State is Peint, which, from a revenue of about 5,000*l.*, pays 35*l.* of tribute to the Gaikawár and Bombay Government. It is under the direct management of the Political Agent. The population of the State is 47,033. The Mehwasí Tracts of Chickali, Gauli, Katli, Singpur, Nal, and Nawalpur are in the country between the Narbada and Tapti, in the north-west corner of Khandesh. The population is 6,780, and the revenue 4,178*l.* The Collector of Khandesh, as Political Agent, tries all serious criminal offences, and others are settled by the chiefs. The inhabitants of this wild forest region are Bhils, and the principal income of the chiefs is from the manufacture and sale of the liquor called *mawra*. The Taluk of Surgána is in the south-west corner of Khandesh, and has an area of 360 square miles. There is also a small State in the Panch Mahals, the district ceded by Sindia in 1860, called Narakot, which pays a tribute to the Gaikawar and the Bombay Government, and has a population of 6,837, and one school. It is managed by British officials, who pay half the revenue to the chief. The ruling family belongs to the aboriginal race of Kulis, and the people belong to two tribes, Kulis and Naikras, the latter a turbulent race closely allied to the Bhils. Narukot is a forest-covered State, as are the twenty-two chiefships in the Dangs of Khandesh, which cover an area of a thousand square miles, with a population of 30,000; and a revenue, derived from fees on timber, of 7,167*l.* The hills and dales of the Khandesh Dangs are covered with dense forest and the chiefs are of the Bhil race.

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often only a fraction of a village. There was a system of sanguinary boundary disputes, murders, robberies, and outlawries for purposes of depredation. The crime of infanticide was almost universal among the Jhareja and Jetwa Rájputs of Katiwár, and in 1807 Colonel Walker persuaded twenty chiefs and their *bhayads* to sign an agreement prohibiting it, and giving the British Government the right to punish offenders. In 1825 an Infanticide Fund was formed, from fines and other sources, to induce the poorer Jharejas not to murder their daughters by paying the marriage expenses, the dread of which outlay being the chief motive for the crime. Thus Katiwár was a troublesome region to manage, the poverty and discontent of the *bhayads* forming the chief danger to the public peace.

In 1863 there was a change of policy in Katiwár, and the jurisdictions of the chiefs were classified. The great chiefs have civil and criminal jurisdiction, and the political assistants have the power of zillah judges, with appeals to the political agent; while the native Thanadars act as civil judges in 134 divisions. A tribunal, called the Rajasthanik Sabha, has also been established, at the cost and with the consent of the chiefs, for the decision of disputes respecting *giras* or hereditary estates, between them and the *bhayads* or *girassias*. The president is chosen by Government from a list of persons proposed by the chiefs.

There are four chiefs of the first class in Katiwár, all paying tribute to the Gaikawar and the British Government, and all but one have sanads conferring the right of adoption. The first is a Muhammadan, the Nawab of Junagarh, whose dynasty was founded by a soldier of fortune in 1735. The Junagarh Nawab, with the other chiefs, made an agreement with the Bombay Government, in 1808, to renounce and uproot piracy, and in 1846 to exempt ships from dues which put into his ports from stress of weather. His tribute amounts to 7,000*l.*, out of an estimated revenue of 200,000*l.*, and the population of his State numbers 380,900 souls. For these there are 39 schools provided, with 2,300 pupils. The Nawab of Junagarh is decorated with the Star of India (K.C.S.I.). The next is the Jam of Nauanagarh, a Jhareja Rájput, with a large *bhayad*. The family came from Kach, and founded Nauanagarh in 1542, driving out the Jetwa family. The Jam's territory lies along the gulf of Kach, and possesses the two finest harbours in India, Poshetra and Sernaia. He pays 12,000*l.* of tribute, out of a revenue of 150,000*l.*, and his State contains a population of 290,847, for whom there are 26 schools, with 12,768 pupils. Bhaunagarh is the third first-class chiefship, and the best governed. The family settled in Katiwár in A.D. 1200, under Sejik, their head, from whom descend the chiefs of Bhaunagarh, Lath, and Palitana. The capital was founded by Bhau Sing in 1742, and succeeding Thakurs of Bhaunagarh took great pains to root out piracy and to improve trade. This led to an intimate connection between Bhaunagarh and the Bombay Government between 1740 and 1770, which has since continued. The Thakur, out of a revenue of 258,911*l.*, pays a tribute of 16,291*l.* The population of his State is 403,700, and he has established 80 schools, with 4,353 scholars. The Thakur of Bhaunagarh is aged 15, and is receiving his education at the Rajkumar College. The fourth chief of the first class is the Raj Sahib of Drangadra, whose State has a population of 87,940, for which there are 15 schools, with 550 scholars. The revenue is 30,000*l.*, out of which 8,794*l.* is taken as tribute. These chiefs maintain a small military force of 2,000 to 3,000 men each.

There are nine Katiwár chiefs of the second class, who have capital jurisdiction over their own subjects only: of Murvi, Wankanir, Palitana, Dharol, Limri, Rajkot, Gondal, Wadwan, and Jafirabad. All, except Jafirabad, pay tribute to the British Government and the Gaikawar, and seven to the Nawab of Junagarh also. Jafirabad is ruled by the Sidi Nawab of Jinjira. The population of these States vary from 20,000 to 130,000, and their aggregate population is 464,864. There are 95 schools in these States, with 8,076 scholars. Their total revenues are 266,700*l.* Four of the second-class chiefs—of Murvi, Limri, Rajkot, and Gondal—are minors, and the three first are being educated at the Rajkumar College. The Chief of Gondal is only eight, and is still under private tuition. Besides the above, there are ten minor tributary chiefs, the most important of which is the Rana of Porbandar, who has been temporarily reduced from the second class. In October, 1872, a new railway, from Wadwan to Viramgaon, was opened in Katiwár, which will tap a rich cotton-producing region. The Rajkumar College, which is most successful, was established for the education of the young chiefs of Katiwár. There are now 22 inns, and the Thakurs of Bhaunagarh, Limri, and Rajkot form the first-class. Their conduct is excellent. They all have ponies, and a good gymnasium is provided where they show considerable spirit, as well as at games in the playground.

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The remarkable region of Kach, with the gulf on the south, and the Rann dividing it from the mainland on the north, is an important native State, from its being a centre of active trade, and a nursery of excellent seamen. It is 170 miles long by 50, with an area of 6,500 square miles, and a population of 500,000 souls. The ruler of Kach is of the Jhareja family, which is said to have emigrated from Sind in the 15th century, led by Jam Lakha, son of Jhara, whence the name of the race. After a few generations there was a disputed succession, and a dispossessed claimant, named Khengar, aided by the Muslim King of Ahmadabad, who gave him the title of Rao, acquired possession of the whole country. His descendants have ever since been Raos of Kach. In October, 1809, there was a treaty between Kach and the British Government, by which the Kachis agreed to renounce all claim to interfere in the countries east of the Rann and gulf, and to suppress piracy. But the piracies continued, and the reigning Rao was guilty of atrocious cruelties. In 1816 a British force moved into Kach, and on June 14th of that year a treaty was signed, by which the Rao agreed to pay indemnities and to suppress piracy, while the English Government undertook to reduce all the petty chiefs of Kach to the Rao's authority. Fresh disorders broke out, and in 1819 the Rao was dethroned. A new treaty was then signed, on October 13th, 1819, providing for a Regency, consisting of the British Resident and some Jhareja chiefs, until the Rao's son, named Daisul, should come of age. The territory was guaranteed, as well as the estates of the chiefs, and it was provided that a British force should be stationed in Kach. In 1822 the district of Anjar was restored, on the annual payment of 8,800*l.*, besides 20,000*l.* for the expenses of the troops. Rao Daisul was placed in power in 1834; in 1836 he abolished the slave trade, and he died in 1860. The present Rao Pragmul of Kach has received a sunnud giving him the right of adoption, and he is decorated with the Star of India (G.C.S.I.). The revenue of his State is increasing, and he has introduced several useful measures. A revenue survey, by English officers, has been determined upon. The State has 32 schools, with 2,305 pupils; has vigorously suppressed infanticide, and the Rao recently co-operated very zealously with Sir Bartle Frere in measures for the suppression of the slave trade at Zanzibar, so far as his subjects were concerned in it.* He received his education privately at his capital of Bhuj, and is now 53 years of age.

10. The Native States in the south part of the Bombay Presidency represent the remains of the Mahratta Empire. Satara, where the elder branch of the founder of Mahratta power reigned, was annexed in 1848. The younger branch of the House of Sivaji, however, still retains sovereignty in the small State of Kohlapur; descendants of ministers and officers of the old Empire hold jaghirs in Satara and the Southern Mahratta country, and there is one other Mahratta State, that of Sawantwari. Kohlapur is enclosed between Belgaum and Sawantwari to the south, and Satara to the north. On the east it has the Krishna river, and on the west the hills of Sahyadri, and the Ratnagiri Collectorate. The territory thus enclosed has an area of 3,184 square miles, and a population of 202,691 souls, partly of Mahratti and partly of Kanarese race. The elder Satara branch recognised Kohlapur as a distinct principality in 1731, but the direct descendants of the founder Sivaji became extinct in 1760, when a member of the Bhonsla family was adopted as Raja of Kohlapur. In those days his power reached to the sea, and the piratical habits of his subjects were so troublesome that in 1765, and again in 1792, expeditions were prepared against him at Bombay. At last a treaty was signed, on November 25th, 1792, by which the Kohlapur Raja agreed to pay compensation for losses to merchants since 1785; and by an agreement in 1811 he further ceded his forts, consented to give up armed vessels, and to abstain from all hostilities, and in return his territories were guaranteed. For the next ten years the reigning Raja was engaged in robbing his jaghirdars, or great landed proprietors, and driving them to rebellion. This led to a treaty dated March 10th, 1826, by which the Raja undertook to respect the rights of the jaghirdars, to reduce his army, attend to advice, and not to grant an asylum to rebels. From 1842 to 1862 the State was under British management, and when it was restored, the Raja received first-class jurisdiction, including the right of trying capital cases, the guarantee of being allowed to adopt, and was required to be guided by advice. On the melancholy death of the Raja at Florence, in 1872, the administration of Kohlapur was entrusted to the Political Agent, the young Raja being only ten years of age. He has a tutor and attends the State vernacular school. The revenue of the State is 13,22,446*l.*

* An account of the trade and intercourse of the natives of Kach with the east coast of Africa see p. 114.

The State of Sawant-wari forms the most southern part of the Konkan, and is bounded on the south by the Portuguese territory of Goa. The area is 800 square miles, and the population 190,814. The Sawants were hereditary Deshmuks of Wari near Goa, and belong to the Bhonsla family. In 1707 Khem Sawant received from Sahoji, the successor of Sivaji, a deed confirming him in full sovereignty over this mountainous principality. In 1730 the English made a treaty with his nephew against the pirate Kanoji Angria, chief of Kolaba; but in 1765 his own piracies led to an expedition against Sawantwari, and to continuous complaints. At last a British force invaded the country, and a treaty was signed on February 19th, 1819, by which the Sawant-wari chief acknowledged the supremacy of the British Government and ceded Vingorla, receiving in return a promise of protection. On September 15th, 1838, another treaty was signed by which the chief ceded the right to levy land and sea customs, the Government paying him an amount equal to the average receipts for the three preceding years. The turbulent nobles of this State were constantly in rebellion, and the Government was obliged to assume management in 1839 and 1844. A Political Superintendent is now administering the affairs of the State, as the young chief, Raghunath Sawant Bhonsla, is only 11. He is to be educated at Kohlapur with the young Raja of that State. The revenue of Sawant-wari, is about 27,284*l.*, and there is a local corps of 463 men. There are 26 schools with 1,325 pupils.

Of the piratical States of Western India, so famous in the last century, Kohlapur and Sawant-wari remain. But the most notorious of all, against which Lord Clive and Admiral Watson led an expedition, has passed away. Kanoji Angria, the servant of Sivaji, eventually made his peace and his little principality of Kolaba was guaranteed to him, but his last descendant died in 1840, and the territory was annexed. The State of the Abyssinian Sidi, however, the Admiral of the Muhammadan fleet, who held his jaghirs from the King of Bijapur, still exists. For many successive years the Sidis stood sieges against the Mahratta army, in their stronghold of Jinjira; and on December 6th, 1733, the then Sidi signed an offensive and defensive treaty with the Bombay Government. From that time the Sidi, in his piracies, always spared British ships. The Hubshi* Sidi is now called Nawab of Jinjira, and rules a country between Bombay and Ratnagiri, with an area of 324 square miles, a population of 72,000 souls, and a revenue of 32,000*l.* The Nawab, who is aged 53, has not received a sanad authorizing adoption. He is also chief of Jafirabad in Katiwar.†

The Satara Jaghirdars, whose possessions were guaranteed by the Treaty of 1819 with Satara, are descendants of ministers and courtiers of the old Mahratta Empire. On the annexation of Satara they became feudatories of the British Government. The Pant Sachev of Bor was one of the eight hereditary ministers of the kingdom founded by Sivaji. His descendant holds a jaghir of 500 square miles, with a population of 111,689 and 49,277*l.* revenue. The Daslé is a Jat, and holds 700 square miles, containing 70,665 souls, and yielding a revenue of 7,985*l.* The Pant Pratinidhi has 350 square miles, yielding 12,416*l.*, with a population of 58,980; and the Nimbalkar Chief of Phaltan obtains 12,017*l.* from his 400 square miles and 59,536 subjects. The Rajah of Akalkot has a small territory of 20 miles south-east of Sholapur, bordering on the Nizam's dominions. He is a boy of 5 years of age, and the State will, therefore, be under direct management for several years. The area is 295,572 acres, and a revenue survey was completed in 1871-72; irrigation is effected by means of 1,731 wells. The population is 81,068; and is provided with Anglo-vernacular school, 15 vernacular, and 6 Persian, with 1,004 pupils.

There are eight Southern Mahratta Jaghirs, whose chiefs derive their origin from three large families called Putwardhan, Bhawa, and Gurapuray. The Jaghirs contain an aggregate population of 610,034 souls. The Partwardhans, who are Brahmans, hold the jaghirs of Sangli, Jamkhandi, two of Miraj, and two of Kurandwar. Sangli is the largest and most important, with a population of 283,663, and a revenue of 64,300*l.* All of these, except Jamkhundar, behaved well in 1857, the year of the mutinies. They all pay tribute to the British Government. The Bhawa family got into serious trouble during the mutinies. Two branches held the two strongest fortresses in the Konkan, Nurgund, and Ramdrug. Nurgund was very gallantly defended against Tippoo in 1784 by Venkut Rao of this family, who was treacherously carried off a prisoner to Seringapatam, and not liberated until the fall of the Mysore tyrant. He was restored to Nurgund; but his descendant Bhaskar Rao was hanged in 1857

* Abyssinian.

† See also Sachin, p. 180.

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for the murder of Mr. Manson, the Political Agent, and Nurgund was confiscated. The Ramdrug branch remained; and its chief, Ram Rao, a benevolent and popular ruler, died in 1872, being succeeded by his son. The Gorapuray family holds Mudhol. Its founder rose to power in the time of the kings of Bijapur, and opposed the encroachments of Sivaji; but the family eventually submitted to the Peishwa. The Mudhol chief is now a boy of 12, and is being educated at Kohlapur. The most southern of existing Mahratta States is that of Sandur, a valley surrounded by hills in the Madras Collectorate of Balari. The family of Ghorepuras is of most ancient Mahratta stock, identical with the Bhonslas of Satara. The founder was an officer in the army of the King of Bijapur, and his grandson seized upon the valley of Sandur, driving out a Beder Poligar, in about A.D. 1710. This valley has a central position in the Balari district, surrounded by a cordon of hills, with the isolated rock of Ramandrug, 1,200 feet above the plain and 3,150 above the sea, rising in its centre. After long struggles with Hyder Ali and his son, the ruler of Sandur surrendered his valley to General Monro in 1818, but was reinstated by a sanad dated July 7th, 1826, by which Sandur was conferred upon Shera Rau Ghorepura and his heirs for ever, with the management of the revenue, police, and justice, on condition of allegiance. He is improperly merely called a Jaghirdar in the sanad, but he is truly a Rajah. Sir Thomas Munro declared that "he was as much a Sovereign" "in his own valley as any Prince in India." Shva Rau was succeeded by his adopted son Vencat Rau, who received a similar sanad dated January 12th, 1841. In 1846 the Rajah of Sandur gave permission for a convalescent station for troops to be formed on the lofty hills of Ramandrug. Vencat Rau died in 1861, and his eldest son succeeded, who is the present Raja Siva Shun Mukho Rau, now aged 27. He received a sunnud guaranteeing him the right of adoption in 1862. He has introduced many reforms into his valley, especially with a view to giving security to the tenures of land, and the ryots are allowed to take firewood and timber for all agricultural purposes free of charge. The population of Sandur is now 14,000, and the revenue, in 1871, was 4,500*l.*

The most southerly State in the Bombay Presidency is that of Savanur, extending over an area of 66 square miles, in the Dharwar Collectorate. It has a population of 17,187 souls, and yields a revenue of 8,167*l.* The chief is a Muhammadan of Afghan descent, a boy of 12, now under special tuition at Dharwar.

As many as 19 States in the Bombay Presidency, with a population of 4,759,523, are now under direct English management, owing to the minority of their chiefs. Of these the most important are Kohlapur, Sawantwari, Bhaunagar, Murvi, Limri, Rajkot, and Gondal in Kattiawar; Edar and Akalkot. The others are Baria, Lunawara, and Sonth in the Rewa Kanta; the Pant Sachew—one of the Satara Jaghirdars; Mudhol—one of the Southern Mahratta Jaghirdars; Sachin, near Surat; Peint, near Nasik; Jawar, in Tanna; Narukot, in the Panch Mahals; and the Nawab of Savanur, in Dharwar.

The territory of the Nizam of the Deccan is the same as the Subah of the Deccan of Moghul times, and forms now by far the largest and most important of the native States of India. This territory, traversed by the rivers Godavari and Krishna, in their courses from the western ghauts to the Bay of Bengal, occupies the central plateau of the peninsula. The area of the State is about 95,337 square miles, with a population exceeding 10,500,000. Asuf Jah, a son of one of Aurungzib's ablest officers, after a long life of political intrigue at Delhi, established his independent power as Subadar of the Deccan in 1724, with Haidarabad, on a tributary of the Krishna, as his capital, and founded the Asuf dynasty. His successors, in alliance with M. Dupleix, the French Governor of Pondicherry, employed a body of French troops under Bussy; but when the war broke out in 1756 the policy was changed. The first treaty with the English Government was signed on March 14th, 1759, when the Nizam Salabut Jung ceded the district of Masulipatam and agreed to dismiss the French. The Nizam Ali Khan, who succeeded in 1761, reigned until 1803. The second important treaty was signed on November 12th, 1766, by which the districts of Ellor, Guntur, and Rajahmandri were ceded to the English, and the Nizam, on payment of 90,000*l.* a year, agreed to furnish troops in war. Disputes as to arrears of payments followed, and in 1790 the league against Tippoo was formed, on the principle of an equal division of conquered territory. By the treaty of September 1st, 1798, the Nizam's subsidiary force was raised to six battalions, costing 241,710*l.* a year, and made permanent. Then followed the final war with Tippoo, and the partition treaty, signed on July 13th, 1799. By a subsidiary treaty, dated October 12th, 1800, the English Government guaranteed the integrity of the Nizam's

territory; but, to enable them to fulfil this engagement, the subsidiary force was increased, and the Nizam ceded all the conquered country he had acquired from the Mysore Partition Treaty, in order to provide for the pay of the troops. This arrangement was followed by the signature of a commercial treaty in 1802, limiting the duty on imports and exports to 5 per cent., all transit and other dues being abolished. The Nizam Ali died in August, 1803; and was succeeded by his son, Sikandar Jah, who confirmed all existing treaties.

When the war against the Pindaris was organised in 1817, the success of which effected such incalculable good in Central India and Rajputana, the Nizam's troops did useful service, which resulted in a treaty concluded at Haidarabad between the Nizam and Sir Charles Metcalfe on the 12th of December, 1822. The Nizam was released from all demands of *chout* which had been due to the Peishwa, and to the claim for which the English Government had succeeded; and the Nizam guaranteed the rights of all landholders in territories that had been made over to him by exchange or otherwise. Several exchanges of districts were made. The Nizam's Government was oppressed with debt, the chief creditors being Messrs. Palmer & Co., bankers, who had been established in Haidarabad since 1811. Their claim, in 1823, amounted to 787,067*l.*; and the English Government made out a claim of 200,000*l.*, as the excess in the collections of districts ceded to the Nizam in 1822, over those ceded by him. Relief was obtained by the Nizam surrendering a *peshcush* of 70,000*l.* a year to which he was entitled from the Northern Circars, in exchange for 1,166,666*l.* down. The Nizam Sikandar Jah died in May, 1829, and was succeeded by his son Nasru-d-Daulah, who, in a treaty dated the same year, confirmed all previous treaties. The country was wretchedly governed, the assessments, in money in some parts of the country, but generally in kind, left scarcely anything for the cultivators, and the Government was in a chronic state of financial embarrassment. In 1847 the Nizam employed an army of 50,219 men, of whom 5,747 were Arabs, 100 Bilochis, 2,875 Rohillas and Sikhs, and 18,326 of the line, the rest being mercenaries from other parts. The Nizam and his Government were, in a great measure, in the hands of the Arab mercenaries.

The reform of the State dates from the year 1853, when Salar Jung became Minister, and the new treaty was negotiated by the Resident, Colonel Low. The basis of this treaty was that the Nizam should be relieved from his debts and from all future payments for the contingent, on condition that he ceded territory of the value of 360,000*l.* a year to the British Government. The auxiliary force was in future to consist of 5,000 infantry, 2,000 cavalry, and four batteries of artillery. But the Nizam objected to cede territory in perpetuity. He agreed to hand over to the exclusive management of the British Resident districts yielding 500,000*l.*; any surplus, after all charges were satisfied, being paid to the Nizam. The Berars, the Raichar Doab, and the Dharaseo district were then assigned for this purpose. In May, 1857, Nasru-d-Daulah died, and was succeeded by the present Nizam, Afzulu-d-Daulah, who continued Salar Jung as Minister. In the Malwa campaign of 1857-58, the Nizam's contingent did very excellent service, and he himself remained steadily loyal. As a reward a treaty was signed on December 31st, 1860, by which the territory of Shorapur, confiscated for the rebellion of the Raja, was added to the Nizam's territory, the Raichur Doab and Dharaseo were restored to him, and a debt of 500,000*l.* was cancelled. He was also decorated with the Star of India (G.C.S.I.). It was intended to retain as much of the assigned districts as would leave a revenue of 320,000*l.*, required for the regular payment of the contingent. The Raichur Doab and Dharaseo, yielding 210,000*l.*, were restored to the Nizam, while the administration of the Berars, the present Haidarabad Assigned Districts, was retained under British management.

Salar Jung has conducted the internal administration of the Nizam's territory, since 1853, with remarkable ability; and has been decorated with the Star of India (G.C.S.I.). The Nizam died on the 26th of February 1869, and was succeeded by his infant son, Mir Mabbub Ali Khan. The administration is entrusted to Sir Salar Jung and Shums-ul Umra, K.C.S.I., as guardians of the young Nizam. The Nizam's army numbers about 30,000 men, of whom upwards of 6,000 are Arabs; and altogether there are about 10,000 foreign mercenaries in his territories. As the nobles and chiefs claim exclusive jurisdiction over their retainers, the police of Haidarabad are inefficient; and the village watchmen and Nizamut police in the rural districts are not much better. The land revenue is still collected in kind, in some parts of the country, the rate, for irrigated crops, being half to the Government and half to the cultivator. In the parts where it is paid in money, the rate is much the same, about 8 annas for the rupee on the value of the crop. The

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only feudatory of the Nizam is the Rajah of Gudwal, who is not interfered with so long as he pays 11,500*l.* a year as tribute.

12. The State of Mysore has now been under the direct management of English officers for many years, and the history of its administration is recorded in the annual reports. The old Rajah, who just remembered the siege of Seringapatam, died in 1868; and in April of the previous year it was resolved that his right of adoption must be recognised. So, on the 23rd of September, 1868, his successor, Chamrajendra Wadiyar, then in his seventh year, was duly installed. He is receiving a most careful education, under the able supervision of Colonel Malleon; and every effort is being made to impart a liberal and manly tone to his tastes, by instruction, by travel, and by encouraging him to vie in sports with companions of his own age. It is truly said, in the Mysore Administration Report, that "when the time comes for his accession to power he will succeed to a flourishing exchequer, and to a system of land revenue thoroughly settled. Seldom will a monarch have assumed the reins of Government under fairer auspices."

In the Madras Presidency there were originally many feudatory Rajahs and Polygars. Those in the Northern Circars were at first treated as feudatories, paid tribute, and were expected to keep the hill tribes in order. But in 1802 a permanent settlement was introduced, and the proud chiefs became zemindars, retaining the management of the land revenue of their estates, but being themselves handed over to the judicial power, and no longer with a political status. In Vizagapatam there are 16 of these zemindars, all of ancient lineage. The most important is the chief of Vizianagram, whose ancestor is said to have led four Rajpút tribes into Telingana in A. D. 591. The family moved into Vizagapatam in 1652, and founded the fort of Vizianagram in 1713. The present chief holds extensive estates and pays 50,000*l.* as the rent due to Government. He was born in 1825, and has managed his property so admirably since 1852, when he succeeded to it, that the Governor-General conferred upon him the title of Maharaja by a sanad dated February, 1863. He has been decorated with the Star of India (K.C.S.I.), and is entitled to a salute of 13 guns. Only one Native State remains on the Carnatic side of the Madras Presidency, namely that of Puthu-kottei (Poodocottah), lying between Madura and Trichinapalli, about 42 miles long and 43 broad, with an area of 1,380 square miles; half being jungle and rocky land, the rest cultivated, and with innumerable tanks, some over a mile long. In the heart of the Puthu-kottei territory is the capital, a fine city, with the palace in the centre, surrounded by jungle. The Rajah or Tondiman of Puthu-kottei is the acknowledged head of the Kullan, or thief caste, one of the thirty branches of the Kannia, or agricultural caste, in the southern districts. When all the southern Polygars were in arms against the British Government in the last century, the Tondiman remained faithful; and his descendant is the only southern chief who pays no tribute. The Tondiman's subjects, numbering about 62,000 souls, are chiefly of the Kullan caste.

Among the other Madras Zemindaris the most illustrious in ancient times was the chiefship of Ramnad, in the eastern part of Madura. The founder of the ancient Marava dynasty of Sethupatis, or guardians of the Isthmus and sacred temple of Ramesaram, was appointed by Rama himself. The Sethupatis of Ramnad were vassals of the Pandyan and Naik kings of Madura, but they were the chiefs of all the vassal polygars; and when the Sethupati was dethroned, the people continued to clamour and rebel until his grandson Sadeika Tevan was restored in 1605. Under the English the Sethupatis became mere Zemindars, with a permanent settlement, and lately, with an appeal to the Privy Council as to whether the Zemindar of Ramnad has the right of adoption. The Marava caste inhabit Ramnad, a fierce race in former days, but now devoted to agriculture. They also form the population of Shivaganga, the other great Zemindary in Madura. There are a considerable number of minor Zemindaries, namely, 52 in Ganjam and Viagapatam, four in the Godavari, six in the Kistna, five in the Nellor, five in the North Arcot districts, and one in Karnal; six in Trichinopoly, eleven in Madura, besides Ramnad and Shivaganga, fourteen Polygars in Coimbatore, and twenty-two Zemindars in Tinnevely, altogether 126.

On the western side of the Madras Presidency there are two Native States, which are specially interesting; for it was on this Malabar coast that the first direct trade with India commenced, in the days of Vasco da Gama and Albuquerque. Here still dwells that Zamorin of Calicut whose name so often occurs in the "Lendas" of Gaspar Correa; and here we meet with most of the places described in the earliest

records of European intercourse with India. The dominion of Cheruma Perumal, formed a thousand years ago, was broken up on his retirement, and all the present chiefs of Malabar assert that their ancestors received grants from this famous Viceroy. To the Zamorin's ancestor he gave his sword, and the sovereignty of as much land as a cock could be heard crowing from on a neighbouring temple, with the title of "Zamorin," or lord over the other Rajahs, leaving him to make good his title as best he could. The native name for Calicut is *Kozi-kughikota*, "the fort from whence the cock crew." There were other superior Rajahs such as he of Cochin, and numerous Kaimuls, or lesser lords, while in the extreme south were and are the dominions of the Raja of Travancor. England commenced her trade with Zamorin's dominions in 1664, and in 1729 the Company acquired the famous pepper monopoly. In 1766 Malabar was conquered by Hyder Ali, and groaned under the cruel oppression of the Mysor tyrants until 1791, when the chiefs and people agreed to acknowledge the supremacy of the British Government, and to pay tribute and taxes. Soon afterwards the Zamorin and other great lords ceased to exercise independent jurisdiction, and for many years Travancor and Cochin have been the only two native States on the Malabar coast. The peculiar custom of the Nairs and higher castes of the Malayalam speaking people, which is one of political importance, is that of female succession, by which the children of a sovereign have no rights but from their mother, and his successor must either be a brother or the son of a sister.

Cochin, though the smaller of the two Malayalam States, takes precedence, as its Raja is of the highest caste. He is of pure Chettiar race, while the Zamorin and the Raja of Travancor are only Sudras. The Cochin State contains 1,131 square miles. It is bounded on the north by British Malabar, on the south by Travancor, on the west by the sea, and on the east by the central mountains. It is divided into hills covered with glorious forest; plains between the hills and the backwater which traverses the length of the State; and the strip between the backwater and the sea, covered with cocoa-nut trees. From 1776 to 1791 Cochin was under the yoke of Hyder Ali, and his son; and the first agreement of its Rajah with the English was in 1793, when he bound himself to pay 20,000*l.* a year as tribute, and received a guarantee of all his rights. Owing apparently to French intrigues, the conduct of the Cochin Dewan became suspicious, and a fresh treaty was exacted in 1809. The subsidy was raised to 27,603*l.*, but in 1818 it was reduced again to 20,000*l.*, and all military stores were surrendered. From this time uninterrupted harmony has prevailed between Cochin and the English Government. In 1862 the full right of adoption was conceded; that is to say, if there is no brother or son of a sister, the eldest female *Tumbaran* (member of the family) succeeds as Regent, until an heir is born; and if the female *Tumbarans* become extinct, ladies may be adopted to carry on the succession. Rava Virmah, the present *Muta Tumbaran*, or Raja of Cochin, succeeded on May 5th, 1853, and is now aged 46. He is decorated with the Star of India (K.C.S.I.). His reign has been marked by a series of reforms, and the general prosperity of his subjects is now on a level with that of the people in neighbouring British districts. The population is about 400,000, and the revenue 125,458*l.*; being 14,664*l.* in excess of the expenditure. There is a good high school at Erna-collum, which educates up to the University entrance examination, with 190 pupils; and 476 other scholars were receiving instruction at State schools. Roads and bridges are made and maintained, there is a system of forest conservancy, and cultivation is extending, the coffee plantations on the Neliampathy hills especially yielding excellent crops. There is no more prosperous native State in India than Cochin, unless, indeed, it be her neighbour Travancor.

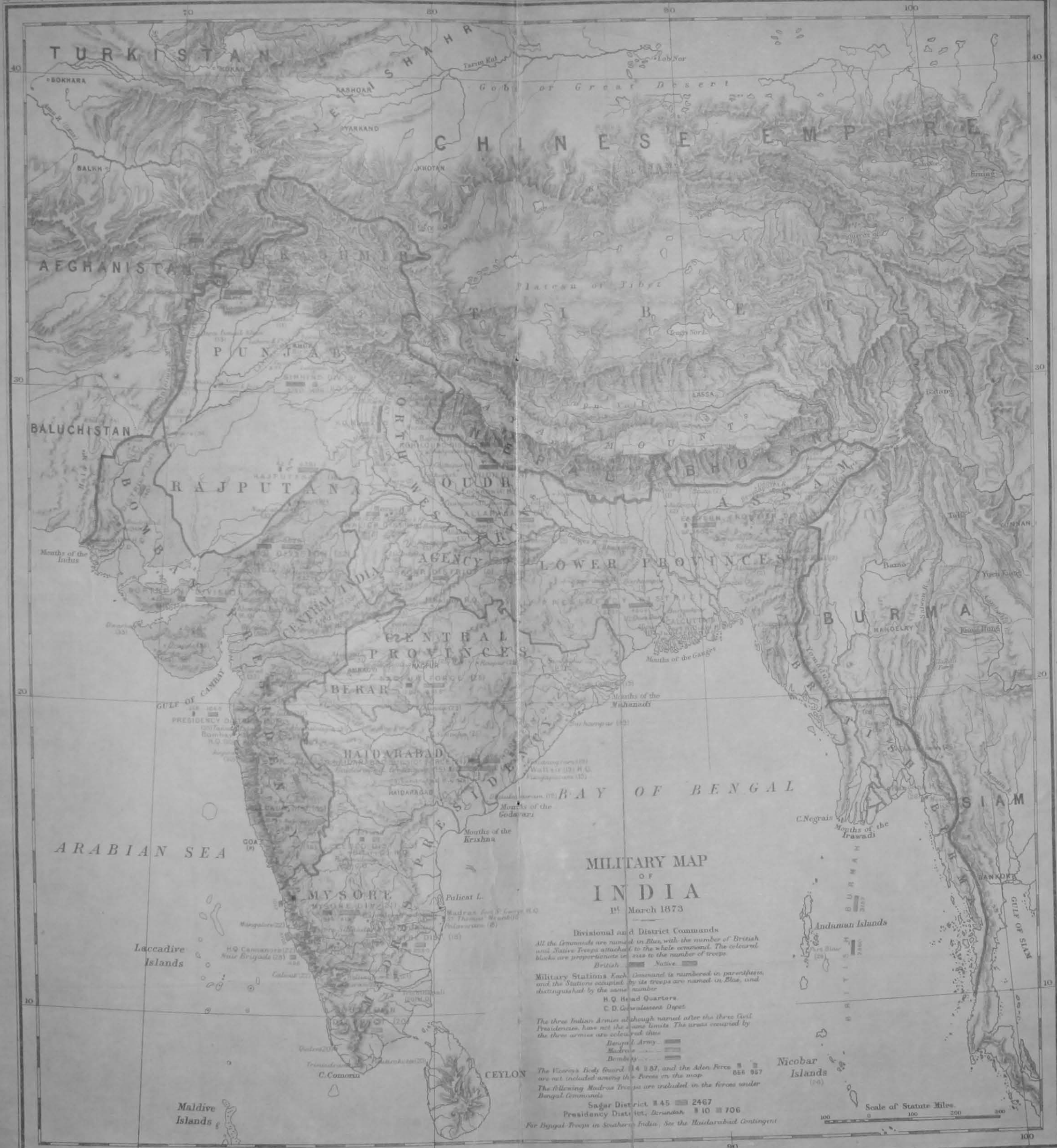
Far south, between the mountains and the Indian Ocean, lies a rich, damp country, which was ruled by many chiefs, until, in the eighteenth century, they were gradually brought under the authority of the ancestor of the present Raja of Travancor. This Waji Baula Perumal had an army disciplined by a Flemish adventurer, and held sway from 1758 to 1799. He was a steady ally of the English during the war with Tippoo. In 1793 he signed the "Pepper Contract," by which he undertook to supply the Bombay Government with a large quantity of pepper for ten years, in exchange for arms and European goods. Two years afterwards, in 1795, he signed a treaty, agreeing to pay a subsidy sufficient to maintain a small contingent force. His successor, by a subsequent treaty in 1805, increased the subsidy and the force. Eventually the subsidy was fixed at 80,000*l.* a year. The present Raja, Rama Wurnia, received a sanad, dated March 11th, 1862, assuring him that, in the event of heirs failing, the right of adoption would be recognised.

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This was a very important matter, for in 1857 the ladies who continue the race actually had become extinct. These princesses resided at a place called Attingah, and are known as the Tumbrattis of Attingah. The last was the present Raja's sister, who died in 1857, and the family would have become extinct on the death of the Raja, his brother and nephew, for there was no female of the race to continue it. Two were, therefore, adopted with the sanction of the British Government, and they have been carefully educated. The present Raja, an amiable and accomplished prince, has been decorated with the Star of India (G.C.S.I.). His able Minister, Sir Madava Rao, K.C.S.I., who carried on the administration with remarkable skill and judgment for several years, retired in May, 1872, and was succeeded by the present Dewan Sashia Sastri. Travancor has an area of 6,653 square miles, with a population of about 1,300,000. The land revenue amounts to 165,992*l.*, and coffee cultivation continues to extend and flourish on the Travancor hills. The customs revenue is 130,421*l.*, there having been during 1872-73 a considerable increase in the export of cocoa and areca nut, coffee, and pepper. The latter article ceased to be a monopoly in 1861, a duty of 5 rs. per candy being substituted. The total income was 957,577*l.*, and the expenditure 549,365*l.*, leaving a balance to be carried to next year's account of 408,209*l.* Out of the expenditure a sum of 55,473*l.* was spent on the Devassum, or religion, and an extraordinary sum, only for that year, of 9,098*l.* on the *Pudmagarbhom* ceremony. The Trivandram College has a high reputation, and its students take good places at the Madras University. There are 16 other English teaching schools, with 808 scholars, 29 vernacular schools, and 138 village schools. Excellent roads have been constructed, especially one up the Pcermede ghaut, and across the wild hill tract to the Madura district, which is nearly finished; and there was extraordinary activity in all branches of the Public Works Department in 1872-73. If all the Native States of India could bear comparison with Cochin and Travancor, the British districts would have to look to their laurels.

A general review of the treaty relations and positions of the Native States throughout British India, from Kashmir to Travancor, and from Manipur to Khairpur, and of their rulers, would be more satisfactory if it could be accompanied by a summing up of the statistics of the several groups, with reference to population, revenue, trade, and the condition of the people. But, although here and there the statistics of particular States, especially of those under direct management, are accessible, the figures, generally speaking, cannot be correctly given. With the above exceptions, the figures in the present section are mere approximations; though, by degrees, a higher standard of accuracy will surely be attained in future Reports. It is roughly calculated that the Native States cover an area of 610,000 square miles, and contain a population of over 55,000,000, paying a revenue of 14,500,000*l.* The amount of tribute paid to the paramount power is 741,465*l.* The military force of the whole of the Native States consists of 314,598 men and 3,488 serviceable pieces of artillery. The whole force, scattered over the Native States throughout India, is composed of 64,172 cavalry and 241,036 infantry.

Notices of the treaty relations with the outer circle of States that surround India, such as Yemen, Maskat, Persia, Kelat, Afghanistan, Eastern Turkistan, and Burma, would complete a review of her political relations; nor are these of minor importance. But it may be doubted whether this branch of the subject, so vast even when confined to a mere sketch, quite comes within the scope of the present Report. Even a general review of our relations with only the numerous Native States would, without good arrangement and classification, be altogether bewildering; and it is feared that the present attempt to make this important subject clear and intelligible will not be altogether successful.



MILITARY MAP OF INDIA

1st March 1873

Divisional and District Commands

All the Commands are named in Blue, with the number of British and Native Troops attached to the whole command. The coloured blocks are proportionate in size to the number of troops.

British Native

Military Stations *Keoh* (Command) is numbered in parenthesis and the Stations occupied by its troops are named in Blue, and distinguished by the same number.

H.Q. Head Quarters
C.D. Commissioner District

The three Indian Armies although named after the three Civil Presidencies, have not the same limits. The areas occupied by the three armies are coloured thus:

Bengal Army
Madras
Bombay

The Viceroy's Body Guard, 14 187, and the Aden Force 654 957 are not included among the Forces on the map.

The following Madras Troops are included in the forces under Bengal Commands

Sagar District 45 2467
Presidency District, Secunderabad 10 706

For Bengal Troops in Southern India, See the Hyderabad Contingent

Scale of Statute Miles
0 100 200 300

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MILITARY.*

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THE established military force of British India numbers 193,005, including officers; of whom about 128,447 are Natives and 60,613† English (exclusive of officers). Of the Natives 47,814 belong to the Bengal army, 27,221 to the Madras Army, and 24,712 to that of Bombay. The British forces are chiefly stationed in the Punjab and along the valley of the Ganges. There are 38,011 English soldiers in the Bengal Presidency, of whom 12,690 are in the Punjab; 10,068 are in the Bombay Presidency; and 11,612 in that of Madras, including the Nizam's territory and the Central Provinces.

It may be taken as a general rule that where English troops are stationed there will be a larger force of Native troops, in proportion to the difference between the numbers of British and Native troops in the whole force; but of course there are many smaller and less important posts where only Native troops are stationed. Throughout all Bengal proper, north and east of Calcutta and Assam, except a few men at the hill station of Darjiling, there is not a single European soldier. The peace of the eastern frontier districts is entrusted to 4,898 Native troops, without cavalry or artillery, and to local police.

But up the valley of the Ganges the British infantry are stationed at regular intervals, 1,560 at Calcutta and Dum Dum, 909 at Hazáribagh, 735 at Dinapur, 388 at Benares, 782 at Allahabad, 830 at Cawnpur, 331 at Fathigarh, and 4,234 and 1,974 in Oudh and Rohilkhand. At Agra, Delhi, and Mirat (Meerut) there are 945, 425, and 579 respectively; while to the south of the Ganges valley 840 are stationed at Morar near Gwalior, 591 at Jabalpur and Sagar, and 395 at Jhansi. The rest of the British infantry are massed within the territory of the Punjab Government, 917 at Ambala, 669 at Jallandar, 1,079 at Lahor and Mian Mir, 910 at Ráwal Pindi, and 1,706 at Pesháwar. Of the cavalry, the 10th Hussars are at Mattra, the 21st Hussars are at Lucknow, the 15th at Meerut, the 11th at Ambala, the 4th Hussars and 5th Lancers at Ráwal Pindi and Siálkot, besides 20 regiments of Native cavalry spread over the presidency. The artillery are distributed in due proportions, four batteries in the Presidency District, six batteries in the Allahabad Division, five batteries in the Oudh Division, in the Sagar Division two batteries, in the Gwalior three, at Bareli one, in the Meerut Division seven, in the Sirhind four, in the Lahor seven, in the Ráwal Pindi and camp of exercise six, and in the Pesháwar three. The whole artillery force consists of 11 batteries of horse artillery, 26 field guns, and 11 garrison guns.

The Punjab lies at the foot of those mountains whence India has been invaded from time immemorial, and here it is necessary that a considerable force should ever be on the alert, and that outposts should be stationed at the points where the passes open upon the plains. There were 17,127 British and 18,758 Native troops in the Punjab, a total force of 35,885 men, and 97 field guns. Of these 5,839, with 19 guns, are at Pesháwar, and 3,567, with 12 guns, at Ráwal Pindi. A large Punjab frontier force is also placed under the orders of the Lieutenant Governor, numbering 12,416 officers and men; including 8,928 infantry, 2,852 cavalry, and 634 artillery. The infantry belonging to this force is composed entirely of Punjab, Sikh, or Gurkha regiments, except 111 men of the 41st Regiment. The artillery, also, is all composed of native batteries, one Pesháwar and two Punjab mountain batteries, two other Punjab batteries, and the Hazára mountain battery. The cost of the Punjab frontier force was £361,954. There were no raids from Hazára, but on February 15th, 1873, 200 men of the Hasanzai tribe attacked a village, and got off, only four being wounded. Twice Povindah merchants were attacked within our frontier, and the robbers escaped. But, on September 29th, 1873, when a party of Waziris carried off 74 head of cattle, they were recovered and one robber was captured. In the Derajat there were only two raids, five killed and eighteen wounded and but four kidnappings in 1872-73.

The 9,545 British and 21,021 Native troops which form the effective force in

* The details respecting the effective strength of the British army in this section have been taken from the Quarter Master General's returns for March, 1873.

† The Adjutant General's return makes it 61,502.

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the Bombay Presidency are stationed in Central India, along the West Coast, and Sind. In Central India there are 1,867 British infantry soldiers at Nasirabad, Mau, Indor, and Nimach, and 792 at Dîsa. The principal Bombay military division is Poona, in which there are 2,169 British infantry, while at Bombay there are 268. In the Bombay Presidency there are two batteries of Royal Horse Artillery, ten field, and six garrison batteries. All the 9-foot bronze guns have been replaced by wrought-iron guns, and there are now six batteries with new wrought-iron guns. The only English cavalry regiment in the Bombay Presidency is the 3rd Hussars, but the three regiments of Bombay Native cavalry and the Poona Horse number 3,514 men. In Sind there are 945 British and 2,029 Native infantry, and the three regiments of Sind Horse, with their head quarters at Jacobabad. The Aden force is composed of 633 British and 791 Native infantry, 128 gunners, and the Aden troop of horse, composed of 100 men. Among the European troops in the Bombay Presidency, 23 officers, 23 non-commissioned officers, and 621 men have passed through a full course of gymnastics. There were 231 deaths among the European troops, and 249 were invalided. The average age of the men in the Bombay Native army is 30 years and five months; the average height 5 feet 6 inches, and average weight 8 stone 12 lbs.

The army under the Commander-in-Chief in the Madras Presidency numbers 38,833 men, including 25,013 Native and 8,172 British infantry, 931 Native and 901 British cavalry, 11 fieldbatteries and eight batteries of garrison artillery, 622 horses were purchased in 1872-73. This force has to supply troops for the Central Provinces, the Nizam's Territory, Mysor, and Burma, as well as for the Madras Presidency. The stations for English infantry are Kampti (Nággpur), in the Central Provinces, where there are 833, Sikrandabad 1,684, Belari 924, Bangalor 1,011, Madras 646, Trichinapalli 169, and the coast of Malabar 874. In British Burma there are 2,232 British soldiers but no cavalry. There are three corps not under the orders of the Madras Commander-in-Chief, the Nair Brigade in Travancor, which is a small force of Native infantry, the regiments of Mysor Sillahdar Horse, and the Haidarabad Contingent. The Mysor Sillahdar Horse was raised from the ruins of Tippu's cavalry, after 1799. They have not been on field service since 1824, except for a short time in 1857, when three regiments were in the ceded districts. Low pay, bad horses and arms, reduced the number and impaired the efficiency of the force until 1872, when reforms were instituted, and the men are now carefully drilled. There are now 47 Native officers and 2,098 men armed with lance and pistol. The pay of the men is *Rs.* 26 a month. The horses are bought from Persian and Kandehar dealers, and number 1,138 horses and 851 mares; and at Kunigal there is a breeding farm with 27 stallions. The Mysor infantry force, called "Bar," is also a relic of Tippu. It consists of 256 officers and men in three regiments, one armed with percussion, and the other two with old flint muskets. Their duties are confined to jail and treasury guard.

The geographical distribution of British soldiers throughout India shows in round numbers 13,000 men along the valley of the Ganges from Calcutta to Hurdwar, 16,000 between Amballa and Pesháwar, 10,000 in Central India, and 1,200 near the mouth of the Indus. Along the west coast, from Dîsa to Belgaum, there are 6,000, besides 950 in Malabar. On the eastern side of the Peninsula, including Mysor and the Ceded Districts, the number is about 7,000. There are no British troops south of Trichinapalli, but detachments of Native infantry are stationed at Paliamkota, Quilon, Trivandram, and Trichur. The railway system is now completed, and lines connect all the stations where British forces are stationed, excepting those in Sind.

During 1872, the number of deaths among the British troops was 1,425, or about 24 per 1,000, the ratio of sick per 1,000 being 56. The hill sanitarium, where there were, on an average, 1,575 convalescents at a time during the year, are so placed in the mountains overhanging the chief military stations, throughout India, as to supply health resorts for the different divisions. Darjiling sanitarium is provided for the troops in Bengal; Naini Tal for Oudh and Rohilkhand; Landaur, Ránikhet, Chakrata, and Kasauli for the North-West Provinces; Dalhousie and Marri for the Punjab. In Central India are Mount Abu and Puchmuri. For the Bombay Presidency there is the hill sanitarium of Púrandhar, and the seaside convalescent stations of Kolába and Ghizri Bande. Rámandrug furnishes shelter from the burning plain of Ballari, and Jakatala on the Nilgiri hills is the sanitarium for the rest of the Madras Presidency. In the Madras Native army there were 241 deaths in 1872-73, or a percentage to the strength of 0·82.

The great mass of the British troops, however, have not been stationed in the hills, though such a disposition of them has often been suggested, one of the great practical difficulties being the want of carriage to get them down on the occasion of an emergency. They are posted at the points of greatest strategic importance throughout the country; and the construction of healthy permanent barracks thus becomes a question of paramount importance.

In former days the accommodation for English troops in India consisted of low narrow buildings but slightly raised from the ground, and unprotected by verandahs. The men messed in their sleeping rooms, with tables between the rows of beds. The first improvement consisted in the erection of some upper-storied buildings, both floors being occupied as dormitories, and afterwards special quarters were supplied for married men. In Fort William a lofty barrack of this kind was erected, and another, called the "Ellenborough Barrack," in the fort at Allahabad. During Lord Dalhousie's time much was done to provide British soldiers with more healthy accommodation. Very lofty one-storied barracks, with rooms 25 feet high, and separate messing accommodation, were built in the Punjab at Lahor, Silkot, Rāwal Pindi, Nauwshahra, and Peshāwar. But the accommodation was incomplete even for the existing force of 45,000 men, before the mutinies. In 1857, additional European troops were thrown into the country, to the amount of 25,000 men; and there is a permanent increase, since the mutinies, of 16,000 men.

In 1863 the Government of India resolved to adopt a regular plan for completing permanent barracks for the whole British force, at an estimated cost of 10,000,000*l.*, the expenditure of which was to be extended over a term of years. Colonel Crommelin was appointed as Inspector General of Military Works, to assist in dealing with the various questions connected with construction of barracks, and he prepared a series of recommendations and memoranda as to the designs of the buildings, the size of the rooms, the space per man, and the number of stories. Specimens were prepared for guidance, suitable to different parts of the country; the Army Sanitary Commission approved the designs; and, from 1864, the work has been proceeded with as rapidly as the estimates could be submitted and sanctioned.

The main feature of the new barracks is that they have an upper story, which is occupied as a dormitory, while the lower story is set apart for mess rooms, libraries, orderly and store rooms. The height of the rooms in the upper storey is 16 feet, and in the lower 20 feet, and the space per man is 90 superficial feet. The height serves as protection against the effects of radiation, and as a means of efficient ventilation, and is also necessary in the construction of the verandahs; for the provision of a row of clerestory windows above the verandahs is found to be very important. The original models have been generally adopted, but at Peshāwar and in Burma different descriptions of barracks have been built, and the plans have been modified in other places, according to the special requirements of the localities. In 1870, it was resolved that the order of confining the dormitories to the upper stories need not be acted upon in dry climates, but only in damp situations, and where there is much rain. The old barracks have been utilised in the Punjab, and also those which were built immediately after the mutinies at Oudh; and other large barracks existing before the mutinies have been altered and adapted to present requirements.

It has been said that the upper stories are excessively hot, but there is in reality no difference between the two stories when the roofs are properly constructed. A number of thermometrical observations have been taken in all descriptions of barracks throughout India, and it is found that the temperature does not differ in lower or upper storied buildings. At night, indeed, when the dormitories are wanted, the upper stories are cooler.

In the hill stations a different, and much less expensive style of buildings has been adopted, with an allowance of 71 instead of 90 superficial feet per man. The barracks at Dalhousie, built in 1872, are single-story huts of stone with slate roofs.

The permanent barracks, though the original outlay for their construction is great, will largely reduce the heavy expenditure on repairs; while the estimated increase of cost is placed at one-seventh. Unfortunately there have been two serious failures in the new barracks at Sāgar and Nasirabad, owing to the malconstruction of masonry, which will entail considerable additional expense.

From 1862 to 1871 the expenditure on new buildings in the plains has been 2,592,205*l.*, and on improving the old barracks, 1,920,737*l.* On the hills the sum of

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371,500*l.* has been expended during the same period, on new and old buildings, to which, for all barracks, must be added a sum of 371,856*l.* for 1871-72. The total expenditure on all military works whatsoever, including barracks, fortified posts, roads, drainage, water supply in cantonments, and roads to hill sanitarium, from 1862 to 1872, has been 10,800,000*l.*, or an average of about a million a year. But permanent accommodation for about 5,000 British troops remains to be completed. During the last ten years, including the old barracks, the new accommodation supplied in the Bengal Presidency provides for 41,956 married and unmarried men. The original estimates have been unavoidably exceeded, owing to the great rise of rates of all kinds in the last ten years. The cost per man, including hospitals and buildings of every kind connected with the barracks, has been from 18*l.* to 28*l.* The cost of Chelsea barracks per man was 168*l.* A further sum of about 1,250,000*l.* is required to complete the permanent barrack accommodation for all the British troops in India. All troops arriving in or departing from India now pass through Bombay.

The native troops are generally expected to hut themselves in their own lines (an allowance, however, being made), but shelter has been furnished for them at Silang, Alipur, and several other stations, and in the hills for the Gurkha regiments.

During the year under review the establishments connected with the British and Native Army Schools have been improved and extended at some additional expense; while the pay of the British soldier has been revised and improved at an estimated cost of £60,000 per annum. A scheme proposed by the Government of India for facilitating the retirement of a certain number of field officers of the Staff Corps, by offering them the present value of their prospective claim to colonel's allowances, has been sanctioned. A certain financial saving is anticipated as the result of this measure, with the further advantage of transferring to the retired list many officers for whom, under the new system, it is difficult to find employment, on account of their rank, and of bringing the Staff Corps at an earlier date to its normal state as regards the proportion of its several grades, disturbed by the influx of a very large number of officers of the old army, under the rule for its formation in 1861 and 1866.

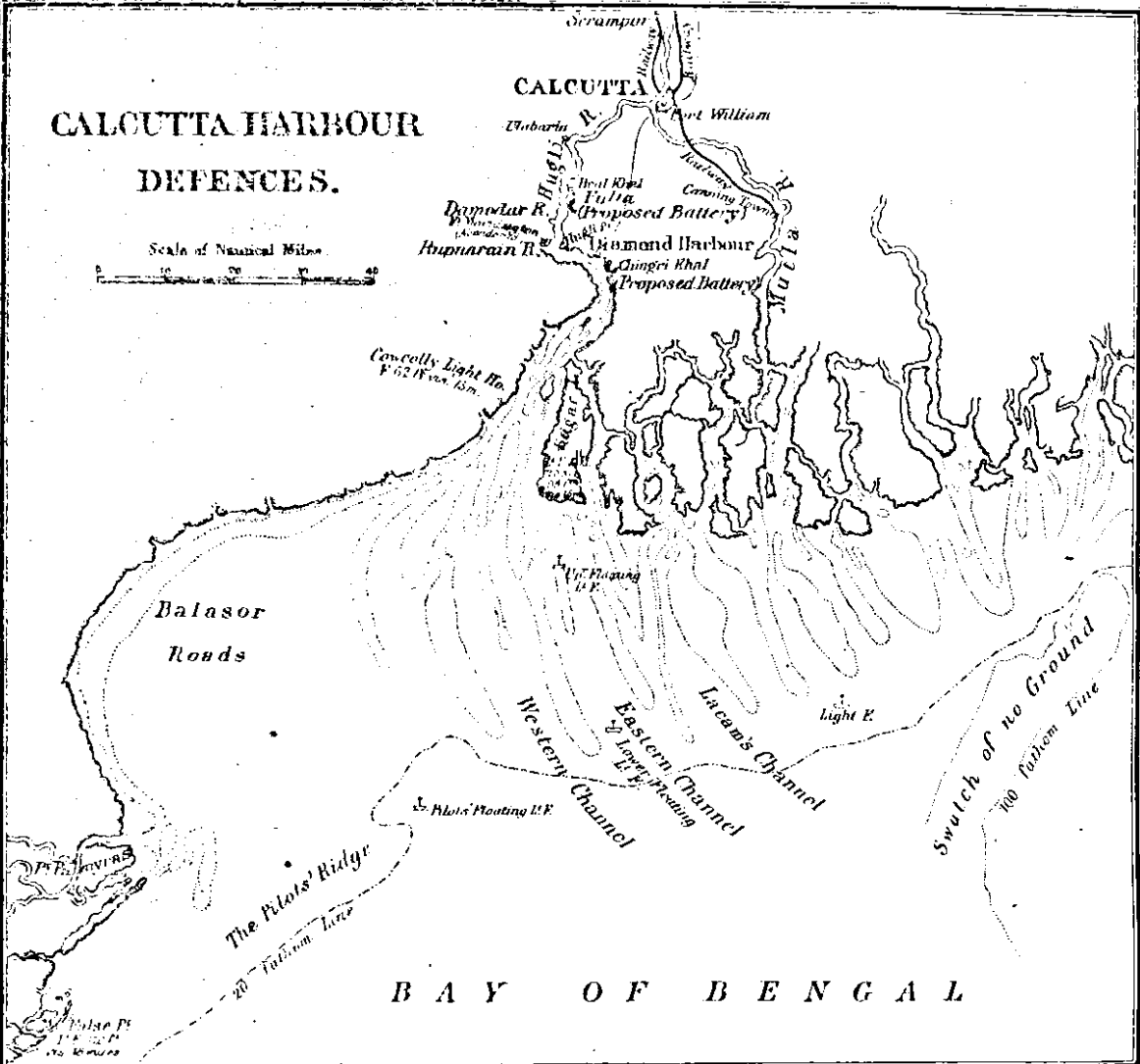
The defence of the wealthy seaports of British India against the attacks of any possible enemy is a question which, it is generally felt, should not be postponed until war actually breaks out or is imminent. Yet it is not altogether to be regretted that such defences have not been completed, and that where works have been commenced they are not so far advanced as to make an alteration in the plans very costly; for the science of attack and defence has been developed very rapidly of late years. The harbour defences of Bombay, as they were originally designed some eight years ago, consisted of six distinct works. The most costly and important is the fort on the Middle Ground Shoal, in the midst of the anchorage, and 1,800 yards from the shore. There were to have been twelve 300-pounders on it, in iron-fronted casements, and two 600-pounders in a turret. The foundations of this work have been completed to a height of a few feet above high water. Another fort was to have been built on the Oyster Rock, a patch dry at high water near the south end of the anchorage, 1,000 yards from the shore, and 3,000 south-west of the middle ground. The foundations of this work have been completed and a temporary battery of eight 10 and 19-inch guns has been placed upon them. The third work is a battery on Cross Island, towards the north end of the anchorage, 1,000 yards from the shore, and 4,000 from the Middle Ground, to be armed with seven 300-pounders. The top of the island has been cut down, and a battery of six guns has been placed on the platform thus levelled. A tower on a shoal called the "twelve-foot patch," 4,000 yards north-east of the Middle Ground, is to have two 600-pounders, and the foundation of this work has been formed. There is an earthen battery, with five 7-inch guns "en barbette," at Malabar Point, on the other side of Bombay Island, where it is proposed to erect a tower, with two 300-pounders in a turret, for the defence of Back Bay; and at Kolaba Point there is a battery, armed with four 68-pounders "en barbette" and four 13-inch land service-mortars.

Two iron-clad monitors, the "Abyssinia" and the "Magdala," specially designed to aid in the defence of Bombay Harbour, arrived there early in 1871; their armaments consist of four 10-inch guns in two turrets.

Colonel Jervois reported upon this scheme for the defence of Bombay Harbour in April 1872. He pointed out that the numerous duties imposed upon a sea-going fleet render a dependence upon it for the defence of harbours unreliable; and that ports and coaling stations must, therefore, be rendered secure, independently of the action of a fleet. Monitors or floating batteries, although they are most valuable

CALCUTTA HARBOUR DEFENCES.

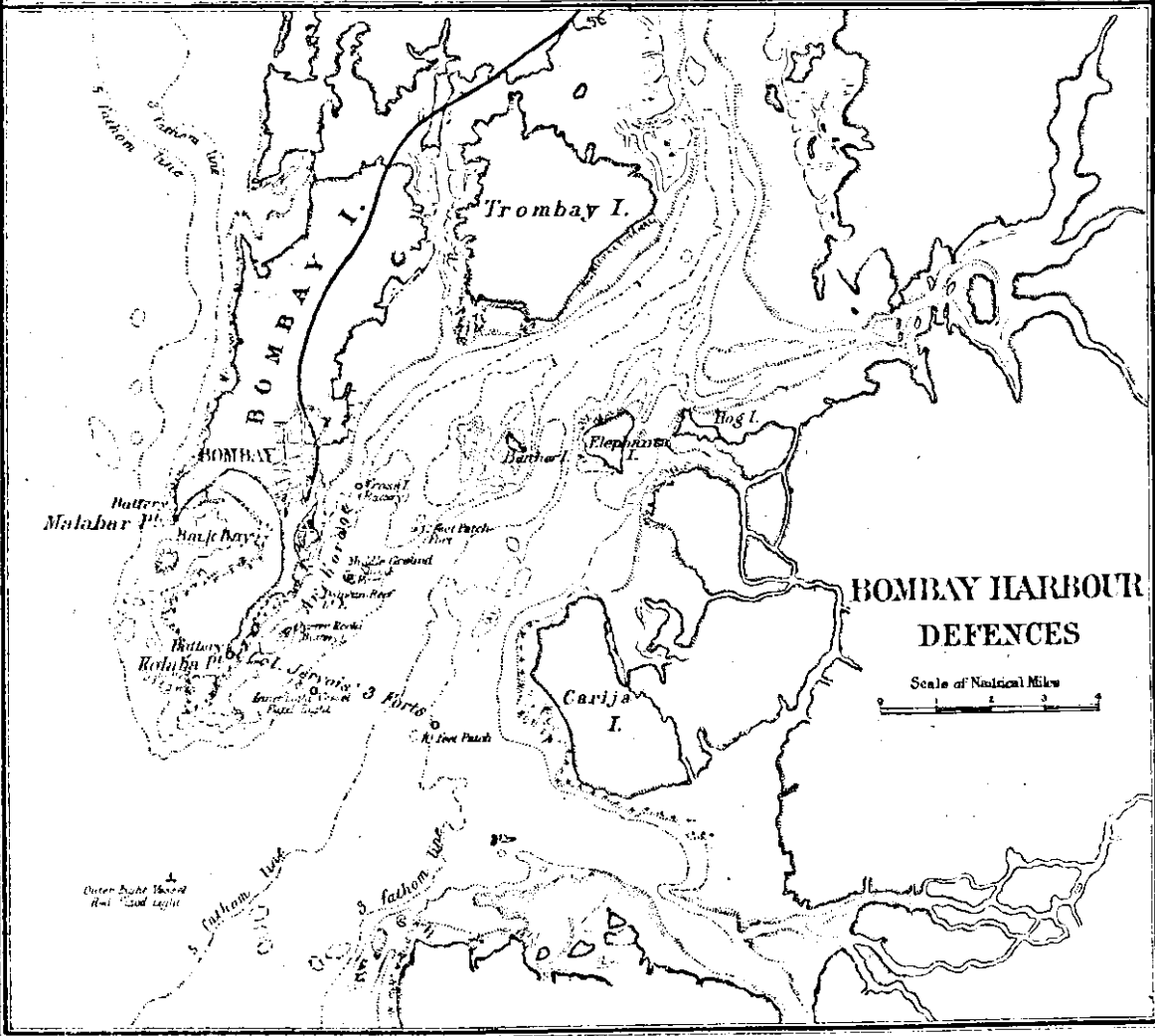
Scale of Nautical Miles
0 1 2 3 4



BAY OF BENGAL

BOMBAY HARBOUR DEFENCES.

Scale of Nautical Miles
0 1 2 3 4



From Saunderson's India, 1856.

auxiliaries in conjunction with fixed defences, must not be exclusively relied upon. They afford an unsteady gun carriage, are liable to be penetrated by the guns of the present day, and may be ordered away from a particular post for general service. One important function of floating batteries would be to guard torpedoes at night, and prevent an enemy's boats from tampering with the mines, but this service would be as well performed by gunboats; and 18 suitable gunboats could be provided for the same cost as one monitor.

With regard to the scheme for the land defences of Bombay, Colonel Jervois has pointed out that an enemy might enter the harbour, passing 6,000 yards from the Oyster Rock, and take up a position 4,000 yards from the Middle Ground, and 5,200 from the Oyster Rock and the "twelve-foot patch," and thence shell the town or exact a few millions. An enemy should be prevented from entering the harbour at all. With this object Colonel Jervois recommends that forts should be built at the entrance of the harbour, similar to those at Spithead or Plymouth Sound, the depth being less than that on the side of the Plymouth Sound Fort, with a rocky bottom. He would build two such forts, circular, and each with 18 25-ton guns; one in 33 feet of water, 3,900 yards from Kolába Point, and the other on what is called the "10-foot patch," 4,000 yards west of the Coringa. They will be 5,400 yards from each other, and a fort on Kolába Point completes the line of defences. An enemy would be detained under their guns by electric torpedoes placed in the channel, and exploded by observation from the forts; while the two monitors and the three gunboats of the "Blazer" class, carrying 25-ton guns, would complete the scheme. The cost of such a system of defences, including the gunboats, is estimated at 932,000*l*.

The approach to the rich city of Calcutta by the River Hugli still remains undefended, but the question has been receiving very careful consideration. It has been proposed to erect a fort at Chingri-Khal, 40 miles above the entrance of the Hugli at Ságar, where the passage narrows to a channel half a mile wide, close to the left bank, and another 15 miles higher up at Falta. A torpedo committee, with Colonel Hyde as president, has been making experiments with gun cotton, and it recommended that five distinct systems of torpedoes should be placed at different points of the river, with gunboats to aid in the defence.

Colonel Jervois concurs in the proposal to construct batteries for powerful rifled guns at Chingri-Khal and Falta, and in the scheme for employing submarine mines to detain an enemy under the fire of the guns from these works; and he also thinks it very desirable that gunboats, adapted for the defence of the Hugli, should be provided. Fort William will be looked upon as a secure arsenal or place of refuge in case of mutiny or a rising of the natives; the armament being three pieces on Moncrieff carriages to sweep the *maidan*, and two or three converted 64-pounders in each lower flank. The cost of the proposed works for the defence of the Hugli is estimated at 160,000*l*. For the defence of Rangún Colonel Jervois recommends the construction of a battery at Chokey Point, 14 miles up the river, where it takes a bend, so that the fort would be able to rake a vessel approaching from seaward, and another battery might be erected for the defence of the approach to Mulmein.

At Aden the defences have been chiefly designed to guard against attacks from the land side, and the works on the isthmus leave little to desire.

On the land side the borders of India are safe from attack so long as a strong British force is massed in the Punjab and the passes leading from Afghanistan are watched by the field force under the orders of the Lieutenant-Governor. Still it is considered politic that a strong British garrison should be stationed at Pesháwar, numbering not less than 800 infantry. Works will at once be proceeded with, consisting of new barracks on a fortified position, with improved water supply, and every other appliance for preserving the health of the troops in a climate which has hitherto been found most prejudicial to Europeans.

At the time of the transfer of the Government of India to the Crown, funds existed in the several Presidencies in India to which military and medical officers and chaplains in the service of the East India Company contributed. The object of some of these institutions was to provide pensions for the widows and children of

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subscribers, at their death, and of others to provide annuities for officers on their retirement from the service.

Soon after the transfer of the Government of India to the Crown, the subscribers were acquainted that if they were willing to transfer the assets, liabilities, and management of the institutions unconditionally to Government, the Secretary of State for India in Council would guarantee to the subscribers and their families the benefits to which they were entitled under the regulations of the several institutions.

The following funds have been accordingly transferred to Her Majesty's Government, in accordance with the vote of the subscribers, under the Act 29 Vict. c. 18, which was passed in 1866 to legalise transfers, and the business is carried on in the Military Funds Department of the India Office. The funds referred to are:—

Bengal Military Fund.
 " Military Orphan Society.
 " Medical Retiring Fund.
 Madras Military Fund.
 " Medical Fund.
 Bombay Military Fund.
 " Medical Retiring Fund.
 Indian Navy Fund.

The valuations of, and reports on, several of these funds have, from time to time, been made by Mr. Samuel Brown, the well-known actuary, and these have led the Secretary of State in Council to increase the benefits granted under the rules of the Bengal Military and Orphan, and Bengal, Madras, and Bombay Medical Funds. In the case of the Madras Medical Fund the increase was very considerable.

In April 1871 Major-General Hannington and Mr. Samuel Brown reported on General Norman's proposal for the establishment of a fund for the grant of pensions to the widows and children of military and medical officers and chaplains admitted into the service of the Government of India subsequently to the date on which the several Military and Medical Funds which have been transferred to Government were closed to new subscribers.

General Hannington's draft rules were approved, and the Government of India was authorised to create the fund, which came into operation on the 1st of January 1873.

The fund itself is founded on insurance principles, and the subscriptions and donations are therefore liable to alteration, the intention being to ascertain by periodical valuations that the payments are sufficient, and no more, to provide the pensions granted under the regulations. No burden will consequently be thrown on the revenues of India, nor, on the other hand, will they benefit by the institution of the fund, as the pensions will be granted in addition to those now allowed to Indian officers' families out of Indian revenues, under the Royal Warrant of 1855.

XV.

SURVEYS AND STATISTICS.

SURVEYS are the basis of all accurate statistics; and their importance was recognised in British India from the year that Englishmen assumed the sovereignty of Bengal. But their progress, though steady, has been slow; and only now is there a tolerably near prospect of a completion of the triangulation and mapping of India, for the first time. The surveys have been at work for more than a century, and they have progressed in efficiency and precision as the progress of science has developed better methods and more accurate instruments.

At first the geographical work was confined to route surveys. In 1763 Major Rennell, the father of Indian geography, commenced his labours in Bengal, which were continued over a period of 19 years, until 1782. They covered a territory 900 miles long by about 300 broad, from the eastern confines of Bengal to Agra, and from the foot of the Himalayas to Calpi. The distances were chained, and observations, as checks, were taken for latitude and longitude at certain intervals. His maps of the rivers Ganges and Brahmaputra, with reference to the changes which have since taken place in their courses, and to the causes which influence these changes, are still valuable. Other officers followed in the footsteps of Rennell, surveyors accompanied every army in the field, and from their work general maps were compiled, which gradually superseded the first modern map of India by the great French geographer, D'Anville, published in 1755.

But it was not until the end of the last century that a trigonometrical survey was generally allowed to be the only accurate basis for mapping a country. General Roy began the trigonometrical survey of Great Britain, by measuring his famous base on Hounslow Heath, in 1784; and British India was very little behind-hand. Her forwardness was due to the zeal of an individual officer. In 1800 Major Lambton proposed a mathematical and geographical survey of the peninsula, and the measurement of an arc of the meridian; and in 1802 he obtained the necessary instruments, and commenced the great work by measuring a base line near Madras. Trigonometrical surveying is divided into three distinct branches. First, the selection of sites for base lines to form the ends of ranges of triangles, their setting out, and their measurement with the utmost attainable accuracy. The base line becomes the side of a triangle, the length of which is thus known, and by trigonometry the distance of other points visible from its extremities can be ascertained through angular observations with suitable instruments. Second, the construction of the range of triangles, which is done by ascertaining the position of selected points of the earth's surface by angles taken at first from the ends of a measured base line, and then carried on from point to point in succession, so as to form a network or series of positions, fixed by this triangulation along a belt of country. The accuracy of the work is checked by the base lines which terminate it. The primary triangulation is completed by a sufficient number of such belts across the area of the region to be surveyed, both in the direction of latitude and longitude. Third, as a further check to the triangulation, astronomical observations for latitude and longitude are taken at selected points. The first fixed position, or point of departure of the Trigonometrical Survey of India, when it was commenced in 1802, was the Madras Observatory. A series of triangles was then carried across the peninsula, a second base line being measured at Bangalore. Major Lambton then commenced the measurement of an arc of the meridian, known as the "Great Arc Series," southward from Bangalore to Cape Comorin, and northward in the direction of the Himalayas. Major Lambton himself, ever hopeful and buoyant, calculated upon personally completing it as far as Agra. In 1815 he crossed the Tungabudra into the territory of the Nizam. In 1818 he became a Fellow of the Royal Society; and finally his position was recognized by the Government, and the survey was ordered by Lord Hastings to be denominated the "Great Trigonometrical Survey of India." In 1818 Captain Everest was appointed Lambton's chief assistant. But the old surveyor was gradually wasting away from anxiety and hard work. In June 1819 was the last occasion that Colonel Lambton

ever took part in the work of triangulation. "Men cannot last for ever," wrote his assistant, Everest. He died at his post, at Hinganghat, in January 1823.

George Everest was appointed to succeed his master, Colonel Lambton. He came to England in 1825, in order to procure the best instruments of that day, and returned to India in 1830, with a set of the compensation bars invented by Colonel Colby. His first operation was the measurement of a base line near Calcutta, which was completed in January 1832. He then had to extend Lambton's "Great Arc Series" across the plain of the Ganges to the foot of the Himalayas, encountering and overcoming difficulties which could only have been surmounted by a combination of qualities which are rarely found united in one man. First, a series of 35 stations had to be selected, with masts 70 feet high, on which to display blue lights; and then permanent towers, 50 feet high, were erected, with the instrument on the summit, completely isolated from the stage on which the observer stood. These preliminaries required the exercise of much administrative skill and judgment, but at length they were completed, and the work of measuring the most northern base of the "Great Arc Series" was commenced in the end of 1834, in the beautiful valley of the Debra Dūr. To show the marvellous accuracy of these operations, it may be stated that the difference between the length of the Debra Dūr base as measured, and as computed by triangulation from the Sironj base, in the Deccan, was seven inches. Lambton's design was to cover India with a network of triangles; but Everest substituted what is known as the "gridiron system," by which a number of meridional series at certain intervals, connect and tie together the longitudinal series from sea to sea. This will be clearly seen on the map. When Colonel Everest finally retired from his labours in 1843, he had completed one of the most stupendous works in the whole history of science. No scientific man ever had a grander monument to his memory than the Great Meridional Arc of India. The whole plan of the survey, as it now exists, is the conception of his brain. He introduced the compensation bars which have measured every base in India down to the present day. He invented the plan of observing by heliotrope flashes, and the system of "ray tracing," and designed the plan for the observing towers. Sir George Everest died in 1866.

Colonel Waugh, who had served under Sir George Everest since 1832, succeeded him in 1843. His first work was to complete his predecessor's project for the triangulation of the region between the Great Arc Series and Calcutta, comprising the North-West Provinces and Bengal. It included the measurement of the North-Eastern Himalayan Series, in the execution of which it was necessary to work in the fever-haunted region of the Terai. This series was commenced in 1845, and completed in 1850; and was the longest series between measured bases in the world, being 1,690 miles from the Debra Dūr base to that of Sonakhoda in Purneah. Of the five officers who conducted it, two fell victims to the climate, two retired, and in one season alone 40 of the men died of jungle fever. The heights of the loftiest of the Himalayan peaks were fixed from stations of this series, by measurements with the great theodolite, and the highest of all—No. 15—29,002 feet above the sea, was well named by Colonel Waugh, after his old chief, Mount Everest. The acquisition of Sind and the Punjab now offered a vast field for future operations, and Colonel Waugh conceived a project for forming a gridiron of triangulation to include all the newly-acquired territory. A longitudinal series was carried across the continent to Karachi by Colonel Strange, and there a new base was measured; and another from Debra to near Altock on the Indus; which were connected by a series along the valley of that river. Sir Andrew Waugh retired in 1861, having during 17 years pushed forward the work with such ability and energy, that his successor could see his way to its completion in a specified number of years.

Hitherto the offices of Surveyor-General and Superintendent of the Great Trigonometrical Survey had been united. On the retirement of Sir Andrew Waugh they were separated. Colonel Thuillier became Surveyor-General, and Colonel Walker was appointed Superintendent of the Great Trigonometrical Survey in March 1861. Colonel Walker's opening work was the completion of Sir Andrew Waugh's north-western gridiron; and the measurement of a base line at Vizagapatam, where a longitudinal series from Bombay was eventually to touch the east coast. The Coast Series was then completed from Calcutta to Madras. It will be remembered that the Madras Observatory was the fixed point from which Colonel Lambton started with his triangulation in 1802. It was the first on which the whole fabric rested. Now, after a lapse of 62 years, the triangulation was brought back to the

old starting-point, and in 1864 the Coast Series was completed. Thence a new series was carried over Lambton's old ground at Bangalore, and in 1867 Colonel Walker gave orders for the re-measurement of the Bangalore base line. The difference between the result by measurement and that by triangulation from the Vizagapatam base was one quarter of an inch! The last base necessary for the verification of the triangles within the limits of India proper was measured near Cape Comorin in 1869. The various series necessary for the completion of the whole system have since been steadily pushed forward in the face of great difficulties, caused chiefly by the wild and pestilential regions through which it was necessary to carry the triangles. The wonderful network, as will be seen by a glance at the map, is nearly completed. In 1872-73 the Bilaspur and Mangalur Series were finished, and work was proceeding in the Assam valley, on the Brahmaputra Series, and in Rajputana. Next year the survey will be resumed in British Burma; and all the series may be completed in four or five years. Besides the triangulation, the department under Colonel Walker conducts levelling and tidal operations, pendulum and astronomical observations, and the topographical survey of the Himalayas, Kattiwar, and Gujarat. But its main object is to furnish a basis for all geographical and topographical operations within the limits of British India, by means of which errors may be eliminated from local surveys, and the exact positions of a number of fixed points on the earth's surface may be shown. Geodetic investigations have proceeded *pari-passu* with the trigonometrical and linear measurements, consisting of astronomical observations of the latitudes of principal stations, combined astronomical and telegraphic determinations of the differences of longitude, and pendulum observations. The cost of the Great Trigonometrical Survey is about 60,000*l.* a year; 11,228*l.* for the head quarters' expenditure, including drawing of maps, reductions, and computations; 21,000*l.* for the trigonometrical operations; 21,608*l.* for the topographical parties; and about 8,000*l.* for the levelling and geodetical work. The map shows the system on which the meridional and longitudinal series is planned.

The triangulation of the geodesists is the skeleton which the topographical surveyor supplies with flesh and blood. The positions of numerous places, spread over the area to be surveyed, are fixed with greatest accuracy; and they become the starting points, and form the frame work upon which the topographical surveyors proceed to fill in the detail. These fixed points also serve as checks upon the accuracy of the topographical surveys. Colin Mackenzie was the founder of topographical surveys in India, based on triangulation. He first suggested the establishment of the Madras Military Institution, which trained the officers who originally surveyed the peninsula of India, and between 1799 and 1809 he was engaged in the survey of Mysore and the Deccan. From 1810 to 1824 the maps of the different provinces of the Madras Presidency were completed, which have not yet been superseded; while Colebrooke, Hodgson, and Herbert mapped portions of the North-West Provinces and the Himalayan districts, and Monier Williams made a route survey of the northern districts of the Bombay Presidency. The first Burmese war led to valuable work being done by Wilcox and Pemberton in Assam and on the north-eastern frontier, and a large scale survey of the territory of the Nizam was commenced in 1816 and completed in about forty years. But the present system of topographical and revenue surveys dates from the appointment of Colonel Thuillier as Sir Andrew Waugh's assistant, after the first Punjab war, in 1847. Since that date they have been conducted with ever increasing efficiency and with annually improving arrangements for extending the sphere of their usefulness. In 1851 the official manual of surveying for India, by Captains Smith and Thuillier, laid down the principles on which the surveys should be conducted, and furnished full details for the guidance of the Department. There are two classes of surveys, called topographical and revenue, the one mainly intended for the delineation of natural features in wild districts yielding little revenue, and in Native States; the other, on larger scales, also defining the boundaries of villages, estates, and fields with extreme accuracy. Both should be based on the fixed points of the Great Trigonometrical Survey.

The most interesting and valuable topographical surveys executed in Sir Andrew Waugh's time were those of the highland country of the Sind Sagar Doab by Colonel Robinson, and of Kashmir and Ladak by Major Montgomerie. At the time that Colonel Thuillier took charge in 1861, there were four topographical survey parties at work in Central India, the Nizam's territory, Gaujoin, and Chota Nagpur. When their work was completed, there still remained 319,338 square miles to be surveyed

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in the Native States, and 21,134 in the wild hill tracts of eastern Bengal; exclusive of territory in the Madras and Bombay Presidencies. In 1862 a fifth party was organised, to survey Rewah. There are now seven topographical survey parties in the field and during 1872-73 the total amount of work done was 25,327 square miles, 6,136 in British territory and 19,191 in Native States, on scales of one, and four miles to an inch. In 1872-73 the first party, under Lieutenant Holdich, was at work in Central India, in the wild country near the river Chumbul. Mr. Girdlestone was surveying part of the Narbada Valley and the district of Nernar; and Colonel Saxton was in the wild and inhospitable hill tracts of the Kizagapatam Agency. Major Depree surveyed a portion of the south-west side of the Rewah State, including the Amarkantak plateau, where, within a few hundred yards of each other, rise the rivers Narbada, Son, and Mahanadi. Captain Riddell was at work in some of the Malwa Native states; and Captain Strahan delineated 2,760 square miles of Rajputana, including a portion of the ridge of the Aravalli hills. The pressing demands of the Bengal Government for the exploration and completion of the surveys in the northern Chittagong hill tracts, the Tipperah Lushai, Cachar, Garo, and Naga hills, and along the northern Manipur frontier, necessitated special arrangements. Major Godwin Austen explored a portion of the Patkoi range, and Lieutenant Woodthorpe completed the examination of the Garo hills. The cost of these topographical surveys averages £2. 4s. per square mile, and the total annual cost is £34,500 a year. An immense area remains to be surveyed on the one inch scale, the completion of which is urgently required for geographical, military, and general administrative purposes. The aggregate result of topographical and revenue surveys, from 1847 to 1873, is 743,802 square miles, at a cost of £2,002,833. The whole annual assignment for trigonometrical, topographical, and revenue surveys is now £240,000.

The revenue surveys have already been treated of in the section on land revenue. They should be good topographical and cadastral surveys, useful both for fiscal and for general administrative purposes. But as yet cadastral surveys on accurate principles have only been introduced into the Madras Presidency and four districts of the North-West Provinces. It is, however, the policy of the Government of India gradually to introduce a correct and uniform system in all parts of the country, but this will be a work of time.

The talent for organisation which distinguishes Colonel Thuillier has been most conspicuously displayed in the arrangements for rapidly reducing, compiling, and publishing the work of the surveyors. In the Surveyor's General Office at Calcutta there are engraving, lithographing, and photographing branches; and this rapid utilisation of the field work, an immense public advantage, may be said to be entirely due to Colonel Thuillier. The cost of the publishing department is about £13,000 a year. The completion of the engraving of the Indian Atlas was transferred to Calcutta in 1869, and excellent progress has been made; while Native apprentices are being trained as engravers on copper. In 1872-73 as many as 1,611 maps were photographed, of which 105,753 copies were printed from zinc, besides 2,010 silver prints, and about 3,000 photo-collotypes. In the lithographic branch 481 new maps and plans were produced, and 159,652 copies were taken. No less than 271,528 copies of maps have been struck off during the year. Thus the publishing department in India ensures the rapid utilisation of the surveys, and its operations have been attended with remarkable success.

In this country there are two important duties to be performed with reference to Indian surveys. The one is the supply of proper instruments for their execution; and the other is the preservation and dissemination of their results. The first is secured through the agency of the Inspector of Scientific Instruments, the other by the Geographical Department of the India Office.

The supply of instruments is obviously the most important duty, because, without efficient tests, inaccuracy, waste, and needless expense are inevitable. Yet it was long before any proper arrangements for the supply of good instruments were made. Colonel Lambton was in constant difficulties with his instruments because he had no means of getting repairs done, and no trusty coadjutor in England to refer to. In 1821 Colonel Hodgson declared that the instruments sent out by contract were not such as a good observer would consent to use. Sir George Everest saw these evils very plainly. He personally superintended every detail in the construction of his instruments while he was in England, watching their progress day by day, and examining them at every stage. When he returned to India in 1830 he established a



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TO THE
GEOMETRICAL SURVEY
OF
INDIA

WORK OF TRIANGULATION IN SOUTHERN INDIA,
 PRINCIPAL CHAINS OF PRINCIPAL TRIANGLES,
 AND WITH THE COLBY APPARATUS,
 SPIRIT-LEVELLING OPERATIONS,
 PENDULUM & TIDAL STATIONS,
 TRIANGULATION TO FIX THE PEAKS OF
 THE SOULIMAN RANGES
 TO 1st May 1875.

Scale 1 inch = 100 miles

REFERENCES
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mathematical instrument manufactory at Calcutta under Mr. Borrow, where much good work was done and indeed the second great theodolite was built there. Mr. Borrow was succeeded by Synd Mohsin, a native of Arcot of great mechanical talent; on whose death, in 1865, Mr. Wehlisch, a mechanician from Mr. Cooke's establishment at York, was engaged, and the factory continues to turn out plenty of useful work.

But all instruments, especially all that require nicety and accuracy in their construction, must still be made in this country; and, moreover, they must have the benefit of scientific supervision of the highest order, if they are to prove efficient in such a service as the Indian Survey. It was obvious that the Superintendent of the Great Trigonometrical Survey or the Surveyor-General could only be in England at intervals of several years, while the supervision of instruments was a constant requirement. In 1863 Colonel Strange was appointed to examine and test all instruments ordered for India, and a suitable Observatory was erected for his use, at the warehouse of the Store Department of the India Office in Lambeth. Complete and searching methods are here provided for the examination of graduated circles, for testing spirit levels and telescopes, small surveying instruments, and for every kind of mathematical and meteorological instruments. All patterns have been abolished, as obstacles to improvement, as well as competition in price. Instruments are entrusted to the best makers, and are subjected to rigorous inspection, Colonel Strange's decision on them being accepted as final. His most absorbing work has been the designing and superintendence of the construction of the grand new set of instruments for the Trigonometrical Survey, consisting of a great theodolite, with a three-foot horizontal circle; two zenith sectors, two transit instruments, two vertical circles, two galvanic chronographs, and three astronomical clocks. The zenith sectors were designed by Colonel Strange on a new plan, his endeavour being to combine maximum power with minimum weight. The first zenith sector reached India in 1870. The transit instruments, chronographs, and astronomical clocks were first used in 1873, to determine the difference of longitude on an arc of parallel, between Madras and Mangalore; and the great theodolite reached India in 1874. In 1872 there were 18,000 instruments inspected, which cost 20,845*l*. The number of different kinds of instruments ordered through Colonel Strange is 150; many have to be carefully individually examined and tested, and some require to be taken to pieces.

The duty of preserving and utilising in this country and abroad the results of the Indian surveys is performed by the Geographical Department of the India Office. From the death of Horsburgh, in 1836, to the year 1869, all geographical and kindred subjects were deprived of separate departmental supervision, and the maps, journals, and other records of the surveys were cast aside to rot and perish. Those which were not lost were frayed and dust-stained, and finally a quantity were sold as waste paper. Yet there remained a most valuable collection of maps and records, and in 1869 a Geographical Department at the India Office was constituted, in compliance with the urgent representations of the Surveyor-General. First, the valuable and, in some respects, unique collection of geographical records was arranged, catalogued, and made safe from further deterioration. Next a system was established for bringing the maps emanating from the great national surveys of India within reach of geographers and other enquirers in this country. Thus the map collection at the India Office serves two purposes; the record and preservation of original documents, and the ready supply of information for official and general purposes. Almost all official enquiries and all statistics are ultimately based on surveys. In the Public Works Department scarcely a subject can be properly understood without illustrations by means of maps and plans. In the Political and Military Departments the use of maps is equally essential. In the various branches of the Revenue Department few questions of importance are clearly intelligible without map illustration. As regards the Judicial Department, the demand for maps comes not only from the India Office, but also from that of the Privy Council; and in many appeal cases a reference to old maps forms an essential part of the evidence. In the consideration and illustration of statistical questions, accurate surveys and maps are still more important. No progress can be made without them. The locality, time, and number in which facts occur are the elements to be kept in mind in statistical reasoning; and almost all statistical facts must be treated on the basis of geographical distribution.

Statistical data are collected and published in India. They first appear in the Survey and Meteorological Reports, the Census Reports, the monographs on

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Special Products,* the Trade and Navigation Returns, the Finance and Revenue Accounts, the Irrigation and Railway Reports, the Education Reports, the Sanitary and Vaccination Reports, the Police and Judicial Returns, and others. From these are compiled, on a uniform plan,† the annual Administration Reports for Bengal, the North-West Provinces, the Punjab, Oudh, the Central Provinces, Berar, Mysore, Curg, Rajputana, Central India, Bombay, Madras, and British Burma.‡ The plan is to furnish a sort of general introduction having reference to the previous administrative history of the province; to give the details of the year's proceedings in the prescribed form—which is somewhat artificial—and to conclude with a series of statistical tables. Some of the Administration Reports are furnished with maps. But, as will have been seen from various allusions to the subject in the previous Sections, statistical data in India are still very incomplete. In the first place, the surveys are not nearly finished; and for the cartographic illustration of statistical questions a good map of India, on a convenient scale, is very urgently needed. The Census returns are also incomplete. The Census for Bengal, the North-West Provinces, the Central Provinces, Bombay, Madras and Mysore was taken early in 1872.§ But the last enumeration of the Punjab was in 1868; of Oudh, in 1869; and there is complete uncertainty as to the population of the rest of India. The attempts to obtain accurate vital statistics are as yet only attempts.|| As regards agricultural statistics, the machinery for their record exists in some parts of India, but hitherto they have not been supplied with any approach to completeness.¶ The industrial survey has not been commenced. Trade returns, especially as regards minor ports, the overland routes, and internal traffic, are very incomplete. Still there are steady efforts to organise machinery for the collection and comparison of statistical returns, and the accuracy of the information that is supplied from India is increasing year by year.

* *Coffee*.—Report on the Coffee District of Wynaad, Chinchona Blue Book.

Tea.—Report by Mr. Edgar, presented to Parliament 1874.

Tobacco.—Report by Mr. O'Connor, presented to Parliament 1874.

Silk.—Report by Mr. Geoghegan, presented to Parliament 1874.

Jute.—Report presented to Parliament 1874.

Chinchona.—Blue Books, *passim*.

Cotton.—Reports. Bengal by Mr. Medlicott; Madras by Mr. Talboys Wheeler; Bombay by Mr. Cassells; Reports by Mr. Rivett Carnac.

Lac.—Note on Lac by Mr. O'Connor.

† The form prescribed for the preparation of the Annual Administration Reports of Indian Provinces is as follows:—

<p>I. <i>Statistics of Physical, Political, and Fiscal Geography.</i></p> <p>A. Physical Geography.</p> <p>B. Relations with Native States.</p> <p>C. Population.</p> <p>D. Civil Divisions.</p> <p>E. Land Revenue.</p> <p>II. <i>Statistics of Protection.</i></p> <p>A. Legislative.</p> <p>B. Judicial.</p> <p>C. Prisons.</p> <p>D. Police.</p> <p>E. Military.</p> <p>F. Marine.</p>	<p>III. <i>Statistics of Production and Distribution.</i></p> <p>A. Finance.</p> <p>B. Public Works.</p> <p>C. Railways.</p> <p>D. Agriculture.</p> <p>E. Prices of Produce and Labour.</p> <p>F. Mines.</p> <p>G. Manufactures.</p> <p>H. Trade.</p> <p>I. Coinage and Currency.</p> <p>K. Charitable Institutions</p>	<p>IV. <i>Statistics of Instruction.</i></p> <p>A. Ecclesiastical.</p> <p>B. Education.</p> <p>C. Literary and Scientific.</p>	<p>V. <i>Statistics of Life.</i></p> <p>A. Births, Deaths, and Marriages.</p> <p>B. Hospital Returns.</p> <p>C. Vaccination Returns.</p>
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‡ The Administration Report for British Burma for 1872-73 was received too late for incorporation into this report.

§ See p. 115.

|| See p. 119.

¶ See p. 34.

STATISTICAL TABLES

COMPILED FOR THE

STATEMENT EXHIBITING THE MORAL AND MATERIAL
PROGRESS AND CONDITION

OF

INDIA

During the Year 1872-3.

GEOGRAPHICAL DEPARTMENT, }
India Office, 1874. }

C. E. D. BLACK.

No. 1.

AREA AND POPULATION OF BRITISH INDIA.

Province.	Constitution of Government.	Area.			Total area.	Population.	Date of Census.	Mileage of communications.			Density of Population per square mile.
		Cultivated.	Culturable.	Unculturable.				Water.	Roads.	Railways.	
		Square miles.	Square miles.	Square miles.	Square miles.		Miles.	Miles.	Miles.		
Bengal *	Lieutenant-Governor and Legislative Council	Not given.	Not given.	Not given.	248,231	66,856,850	Early part of 1872	Not given.	Not given.	1,208	269
Madras	Governor, Council, and Legislative Council	Not given.	Not given.	Not given.	139,608	31,597,872	November 1871	Not given.	15,759	836	226
North-West Provinces	Lieutenant-Governor	42,173	12,108	27,121	81,402	30,769,056	January 1872	Not given.	Not given.	Not given.	378
Punjab	Lieutenant-Governor	34,438	28,285	41,025	103,748	17,506,752	January 1868	2,470	20,798	410	170
Bombay and Sind	Governor, Council, and Legislative Council	Not given.	Not given.	Not given.	124,943	16,352,623	February 1872	Not given.	Not given.	2,270	131
Oodh	Chief-Commissioner	12,673	5,588	4,781	23,042	11,220,032	February 1869	1,678	4,225	235	469
Central Provinces	Chief-Commissioner	22,860	28,404	33,631	84,895	8,201,519	January 1872	1,674	2,079	466	96
British Burmah	Chief-Commissioner	3,522	36,162	48,680	88,364	2,747,148	August 1872	6,395	815	Nil.	30
Ajmir	Under Government of India	Not given.	Not given.	Not given.	2,672	426,268	January 1865	Not given.	Not given.	Not given.	159
Curg.		Not given.	Not given.	Not given.	2,000	168,312	November 1871	Not given.	Not given.	Not given.	84
Mysore	Chief-Commissioner	Not given.	Not given.	Not given.	27,077	5,055,412	November 1871	Not given.	1,817	Not given.	187
Berar	Chief-Commissioner	Not given.	Not given.	Not given.	17,334	2,231,565	November 1867	Not given.	Not given.	Not given.	128

* Including Assam, which is now (1874) under a Chief-Commissioner.

D P 2

STATISTICAL TABLES.

REVENUE and EXPENDITURE, and RECEIPTS and DISBURSEMENTS
for the Year ended

	No. of Account.	No. of Folio.	India.	England.	TOTAL
			£	£	£
Balance, 1st April, 1871	54	128	13,818,743	3,305,972	20,124,715
Revenue	1	6	49,888,552	221,663	50,110,215
Net Traffic Receipts from Guaranteed Companies :					
Net Traffic Receipts in India					£ 2,923,576
Less Amount repaid to the East Indian Rail- way Company as Surplus Profit					51,628
					<u>£2,868,948</u>
	4	8	2,868,948	—	—
DEBT :					
Permanent Debt incurred	47	123	17,465,277	* 1,413,406	18,878,683
Temporary or Floating Debt incurred	—	—	—	—	—
Treasury Notes, bearing Interest, issued to Service Funds	40	124	164,065	—	164,065
Receipts of Service Funds bearing Interest	50	124	932,628	—	932,628
Savings Bank Deposits received	51	125	759,431	—	759,431
PROVINCIAL SERVICES AND LOCAL FUNDS	52	126	9,981,605	—	9,981,605
DEPOSITS, ADVANCES, &c. :					
Deposits	53	126	5,042,651	—	5,042,651
Repayment of Advances	—	—	3,193,718	5,562	3,199,280
Repayment of Sums advanced on loan to Municipalities, Native States, &c..	61	134	46,837	—	46,837
Receipts on account of Railway Capital	57	130	28,885	3,660,096	3,717,981
Remittances between Districts	—	—	253,487	—	253,487
Miscellaneous	—	—	2,693,550	—	2,693,550
ACCOUNTS BETWEEN PRESIDENCIES :					
Amount of Bills drawn, Remittances of Treasure, Advances recovered	—	—	18,736,769	—	18,736,769
ACCOUNTS BETWEEN INDIA AND ENGLAND :					
Amount received for Bills drawn by Secretary of State on Treasuries in India	—	—	—	10,310,336	10,310,336
Other Remittance Transactions	—	—	1,104,861	100,273	1,295,134

* Sale Proceeds of £1,390,000 India 4 per Cent. Stock.

† This Total is exclusive of the sum of £2,868,948 Net Traffic Receipts of Guaranteed Companies.

2.

of the GOVERNMENT of India, in India and in England,
31st March 1872.

	No. of Account.	No. of Page.	India.	England.	TOTAL.
			£	£	£
Expenditure, Ordinary	2	7	87,282,803	7,980,017	45,262,820
Guaranteed Interest on the Capital of Railway and other } Companies	3	8	45,930	4,546,236	—
India			45,930		
England				4,546,236	
TOTAL					£4,592,166
Deduct—Net Traffic Receipts					2,868,948
					<u>£1,723,218</u>
Charge on Indian Revenues for Guaranteed Interest	—	—	—	—	1,723,218
Total Ordinary Expenditure and } Charge for Guaranteed Interest }	—	—	—	—	46,986,038
Extraordinary Expenditure	5	9	1,480,797	147,677	1,628,474
Total Expenditure	—	—	—	—	48,614,512
DEBT:					
Permanent Debt discharged	47	123	16,307,360	5,000	16,312,360
Temporary or Floating Debt paid off	—	—	—	—	—
Treasury Notes of Service Funds paid off	49	124	104,008	—	104,008
Payments out of Deposits of Service Funds bearing Interest	50	124	971,115	—	971,115
Savings Bank Deposits repaid	51	125	509,151	—	509,151
PROVINCIAL SERVICES AND LOCAL FUNDS	52	126	9,637,237	—	9,637,237
DEPOSITS, ADVANCES, &c.:					
Deposits	53	126	5,523,241	—	5,523,241
Advances repayable	—	—	3,086,150	8,434	3,094,584
Advances by way of Loan to Municipalities, Native States, &c.	61	134	464,048	—	464,048
Payments to Railway and other Guaranteed Companies out of } Capital Funds	57	130	1,126,696	2,490,011	3,625,707
Remittances between Districts	—	—	566,929	—	566,929
Miscellaneous	—	—	2,719,215	—	2,719,215
ACCOUNTS BETWEEN PRESIDENCIES:					
Amount of Bills paid, Remittances of Treasure, Advances made	—	—	18,198,093	—	18,198,093
ACCOUNTS BETWEEN INDIA AND ENGLAND:					
Amount of Secretary of State's Bills paid in India	—	—	9,560,924	—	9,560,924
Other Remittance transactions	—	—	389,558	1,038,845	1,428,443
Balance, 31st March 1872	54	128	21,997,715	2,821,091	24,818,806

Income	£ 50,110,215	Income	£ 50,110,215
Ordinary Expenditure	46,986,038	Total Expenditure	48,614,512
Excess of Income over Ordinary Expenditure	<u>£3,124,177</u>	Excess of Income over Total Expenditure	<u>£1,495,703</u>

* This Total is less than the sum of the two preceding columns by the amount of Net Traffic Receipts of Guaranteed Companies, the charge for interest being stated net.

No. 3.

REVENUES AND CHARGES FOR YEAR ENDED 31ST MARCH, 1873, COMPARED WITH THOSE OF PREVIOUS YEAR.

RECEIPTS.

CHARGES.

	Actual, 1871-72.	Actual, 1872-73.	Increase.	Decrease.		Actual, 1871-72.	Actual, 1872-73.	Increase.	Decrease.
	£	£	£	£		£	£	£	£
Land Revenue	20,520,337	21,348,669	828,332	—	Refunds and Drawbacks	285,537	323,065	37,528	—
Tributes and Contributions from Native States.	744,036	741,465	—	2,571	Land Revenue (includes Allow- ances to District and Village Officers).	2,428,319	2,440,957	21,638	—
Forest	501,924	570,337	68,413	—	Forest	350,566	388,118	37,552	—
Excise on Spirits and Drugs	2,369,109	2,323,788	—	45,321	Excise on Spirits and Drugs	135,347	130,557	—	4,790
Assessed Taxes	825,241	580,139	—	245,102	Assessed Taxes	29,566	13,244	—	16,322
Customs	2,575,990	2,653,890	77,900	—	Customs	184,921	190,375	—	4,554
Salt	5,966,695	6,165,630	199,035	—	Salt	470,178	476,646	6,468	—
Opium	9,253,859	8,684,691	—	569,168	Opium	1,595,694	1,813,976	218,282	—
Stamps	2,476,333	2,608,512	132,179	—	Stamps	83,416	83,452	—	4,000
Mint	96,128	64,250	—	41,878	Mint	77,978	80,890	2,912	—
Post Office	820,894	580,312	—	240,582	Post Office	616,115	616,412	297	—
Telegraph	206,580	229,186	22,606	—	Telegraph	366,012	362,756	—	3,256
Law and Justice	373,160	392,686	19,526	—	Allowances and Assignments under Treaties and Engage- ments.	1,705,174	1,730,554	25,380	—
Marine	194,925	207,943	13,018	—	Administration	1,234,681	1,233,709	—	1,972
Interest	327,906	439,553	111,647	—	Minor Departments	227,517	310,308	82,791	—
Receipts in aid of Superan- nation, Retired, & Com- passionate Allowances.	585,634	494,335	—	91,299	Law and Justice	2,267,444	2,215,895	—	48,549
Miscellaneous	335,067	256,408	—	78,659	Marine	376,705	360,836	—	15,869
Army	889,340	885,545	—	3,795	Ecclesiastical	155,611	150,938	—	4,673
Public Works Ordinary	87,519	64,202	—	23,317	Medical	174,807	176,262	1,455	—
„ „ Irrigation	471,580	413,535	—	58,045	Political Agencies	266,442	343,734	77,292	—
Railways, Guaranteed (Gain by Exchange).	262,629	286,645	24,016	—	Superannuation, Retired and Compassionate Allowances.	609,312	701,514	92,202	—
„ State	3,766	16,533	12,767	—	Loss by Exchange on Transac- tions with London.	305,964	765,109	369,145	—
					Miscellaneous	337,299	73,695	—	268,604
					Provincial Services	4,848,205	5,223,190	374,985	—
					Army	12,036,998	11,970,327	—	66,671
					Public Works Ordinary:— Public Works (including Supervision and Cost of Land for Guaranteed Rail- ways, and, up to 1871-72, Loss by Exchange on Rail- way Transactions).	2,481,495	2,599,136	117,641	—
					State Railways	8,227	22,004	13,777	—
					Interest on Permanent and Floating Debt	3,032,672	2,634,764	—	197,908
					Interest on Service Funds and other Accounts.	496,591	555,789	59,198	—
Total, India	49,838,552	49,998,254			Total, India	£ 37,282,803	38,205,212		
Receipts in England	221,663	221,235	—	428	Expenditure in England	6,730,977	6,991,988	261,011	—
					Ditto, for Stores transmitted to India.	1,249,040	1,146,116	—	102,924
					Guaranteed Interest on Railway Capital, less net Traffic Re- ceipts.	1,728,218	2,110,601	382,383	—
			1,509,439	1,400,165				2,188,587	721,000
			1,400,165					721,968	
TOTAL	£ 50,110,215	50,219,489	109,274		TOTAL	£ 48,986,038	48,453,317	1,487,779	

No. 4.

FOREIGN TRADE.

EXPORTS.—1. INDIAN PRODUCE AND MANUFACTURES.

Countries whither Exported.	COFFEE. Free.				COTTON GOODS (Piece Goods, Twist, &c.) 3 per cent. duty.	
	Quantities in lbs.		Value in Rupees.		Value in Rupees.	
	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.
Aden	6,300	—	1,125	—	6,86,208	9,22,499
Africa	22,903	35,220	4,307	9,738	21,944	42,434
America	—	12,056	—	32,016	35,302	50,480
Australia	—	—	—	—	—	—
Belgium	—	—	—	—	—	—
Bourbon	—	—	—	—	—	—
Ceylon	624,420	431,168	1,42,936	1,06,084	11,29,716	10,93,460
China	—	—	—	—	5,97,362	6,68,033
Denmark	—	—	—	—	—	—
France	9,688,523	10,601,515	22,13,615	26,55,463	6,800	—
Germany	648,856	2,122,242	1,22,501	5,72,246	—	—
Gibraltar	—	—	—	—	—	—
Holland	202,680	—	45,219	—	—	—
Hong Kong	—	—	—	—	—	—
Japan	—	—	—	—	—	—
Java	—	—	—	—	—	—
Junkseylon	—	—	—	—	—	—
Laccadives and Maldives	—	—	—	—	21,194	19,558
Mauritius	32,168	51,459	4,081	11,206	29,574	26,307
Mediterranean Ports	955,729	214,581	2,22,839	54,437	—	—
Nicolars	—	—	—	—	2,563	1,597
Persian Gulf	2,477,172	1,206,321	5,08,141	3,60,475	69,830	85,389
Red Sea	1,384,498	818,641	3,27,476	2,19,458	2,20,393	2,07,033
Russia	—	—	—	—	—	—
Siam	—	—	—	—	—	—
Somriyani and Mekran	—	—	—	—	47,701	47,054
Spain	—	—	—	—	—	—
Suez	83,475	22,820	22,870	6,112	1,52,646	2,09,180
Straits Settlements	—	—	—	—	3,89,724	4,56,026
Sumatra	—	—	—	—	26,973	18,950
Switzerland	—	—	—	—	—	—
Turkey	270,704	81,396	71,249	25,501	—	—
United Kingdom	40,054,715	25,862,024	100,01,968	72,31,952	2,55,368	2,73,527
West Indian Islands	—	—	—	—	—	—
Other Countries	11,795	3,262	1,161	750	6,340	7,990
Total	56,363,838	41,462,705	1,36,89,488	1,12,85,488	36,99,638	41,29,517
Share of each Presidency, &c.:						
Bengal	9,929	41,351	1,139	8,983	2,21,312	2,80,440
Bombay	4,306,591	1,637,151	9,00,498	4,32,213	16,95,173	20,04,766
British Burmah	—	—	—	—	6,625	3,129
Madras	52,047,318	39,781,819	1,27,87,851	1,08,43,562	17,45,940	18,17,408
Sind	—	2,384	—	750	30,587	23,774

No. 4.—cont.

FOREIGN TRADE.

EXPORTS.—1. INDIAN PRODUCE AND MANUFACTURES.

Countries whither Exported.	COTTON (Raw). Free.				DYES (other than Indigo and Lac). Free.		GRAIN (other than Gram, Paddy, Rice, and Wheat). 3 annas per mownd duty.	
	Quantities in lbs.		Value in Rupees.		Value in Rupees.		Value in Rupees.	
	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.
Aden	—	39,480	—	10,440	1,030	—	9,335	30,902
Africa	—	15,904	—	1,760	—	—	3,314	2,816
America	—	—	—	—	59,615	72,979	—	—
Australia	—	—	—	—	—	—	—	—
Belgium	7,818,200	—	19,22,500	—	3,530	—	—	—
Bourbon	—	—	—	—	—	—	22,705	—
Ceylon	737,479	245,688	1,09,338	56,436	1,275	2,785	2,83,933	1,27,210
China	18,181,336	19,286,035	50,53,137	52,99,006	10,179	—	8,969	2,115
Denmark	—	—	—	—	—	—	—	—
France	89,928,594	25,637,838	2,43,40,271	75,70,817	36,910	36,212	—	1,554
Germany	9,556,576	2,603,400	24,87,338	9,04,249	5,180	—	—	—
Gibraltar	—	—	—	—	—	—	—	—
Holland	12,543,560	1,137,300	31,16,625	1,72,557	—	—	—	—
Hong Kong	25,150,235	25,703,266	65,39,010	65,57,839	—	—	—	—
Japan	—	—	—	—	—	—	—	—
Java	—	—	—	—	4,286	—	—	—
Junkseylon	—	—	—	—	—	—	—	—
Laccadives and Maldives	—	—	—	—	—	—	1,794	—
Mauritius	98,745	22,846	19,078	3,352	—	—	7,06,465	3,40,498
Mediterranean Ports	54,200,368	41,764,402	1,46,57,853	1,22,80,771	1,669	22,749	—	—
Nicobars	—	—	—	—	—	—	—	—
Persian Gulf	67,760	125,269	3,186	5,944	2,602	4,755	1,67,924	4,188
Red Sea	73,528	64,120	22,760	20,580	—	—	14,962	48,129
Russia	12,637,296	4,613,392	34,03,771	14,88,541	—	—	—	—
Siam	—	—	—	—	—	—	—	—
Sonmiyani and Mekran	—	78,400	—	30,000	—	—	13,426	31,209
Spain	—	—	—	—	—	—	—	—
Suez	29,260	10,034,024	9,525	30,60,570	—	—	—	—
Straits Settlements	1,009,551	539,577	1,84,942	116,787	6,039	5,204	54,747	16,579
Sumatra	—	—	—	—	—	—	—	—
Switzerland	—	—	—	—	—	—	—	—
Turkey	—	—	—	—	—	—	—	1,769
United Kingdom	577,213,335	362,233,450	15,07,94,910	10,26,41,427	22,89,750	23,67,846	7,876	—
West Indian Islands	—	—	—	—	—	—	12,140	35,457
Other Countries	234	56	53	6	1,703	2,863	1,831	985
Total	809,216,087	494,214,447	21,27,24,297	14,02,21,082	24,23,788	25,16,623	13,09,421	6,45,711
Share of each Presidency, &c.:								
Bengal	164,476,961	79,752,618	4,03,69,555	17,791,207	13,00,206	10,89,080	7,25,240	3,95,422
Bombay	540,404,613	324,852,718	14,82,07,374	1,01,374,748	5,85,479	7,04,577	74,467	60,311
British Burmah	15,218,741	12,611,921	29,11,194	24,93,921	—	—	52,557	13,999
Madras	73,771,643	65,783,567	1,68,49,419	1,53,78,799	5,37,273	7,22,794	2,33,835	85,891
Sind	15,344,129	11,013,623	43,86,755	31,82,317	830	172	2,39,992	90,688

No. 4.—cont.

FOREIGN TRADE.

EXPORTS.—1. INDIAN PRODUCE AND MANUFACTURES.

Countries whither Exported.	GRAM. 3 annas per hundred duty.				HIDES and SKINS (Tanned). 3 per cent. duty.				HIDES and SKINS (Raw). Free.			
	Quantities in cwts.		Value in Rupees.		Numbers.		Value in Rupees.		Numbers.		Value in Rupees.	
	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.
Aden		564		2,218	—	391	—	1,116	—	71,674	—	1,75,875
Africa		628		2,937	—	—	—	—	—	—	—	—
America		—		—	570,918	980,444	2,91,703	4,90,081	3,690,322	3,218,035	42,32,623	40,56,652
Australia		—		—	—	—	—	—	—	—	—	—
Belgium		—		—	—	—	—	—	41,944	76,556	82,300	156,350
Bourbon		18,962		58,290	—	—	—	—	—	—	—	—
Ceylon		68,250		2,12,388	17,044	22,008	8,608	12,692	—	—	—	—
China		3,485		9,572	—	—	—	—	—	3,300	—	4,025
Denmark		—		—	—	—	—	—	—	—	—	—
France		—		—	—	3,325	—	2,821	475,334	707,124	8,38,265	11,78,615
Germany		—		—	—	—	—	—	34,131	8,361	99,595	14,990
Gibraltar		1,605		2,500	—	—	—	—	—	—	—	—
Holland		—		—	—	—	—	—	14,469	4,449	32,610	8,900
Hong Kong		—		—	—	—	—	—	—	—	—	—
Japan		—		—	—	—	—	—	—	—	—	—
Java		—		—	—	—	—	—	—	—	—	—
Junkscylon		—		—	—	—	—	—	—	—	—	—
Laccadives and Maldives		—		—	—	—	—	—	—	—	—	—
Mauritius		—		—	17,649	4,106	9,915	3,093	—	—	—	—
Mediterranean Ports		176,191		4,64,823	33,547	70,213	19,257	56,515	751,281	1,537,157	14,91,184	32,72,023
Nicobars		—		—	—	—	—	—	—	—	—	—
Persian Gulf		436		1,819	—	—	—	—	1,006	543	3,225	1,935
Red Sea		—		—	—	—	—	—	—	—	—	—
Russia		—		—	—	—	—	—	—	—	—	—
Siam		—		—	—	—	—	—	—	—	—	—
Sonmiani and Mokran		—		—	—	—	—	—	—	—	—	—
Spain		—		—	—	—	—	—	—	—	—	—
Suez		—		—	34,981	18,000	17,715 } & 25*}	9,000	11,121	28,622	24,820	24,193
Strait Settlements		20,604		46,980	374,960	254,232	1,90,443	1,29,325	267,779	251,698	4,68,421	4,85,669
Sumatra		—		—	—	—	—	—	—	—	—	—
Switzerland		—		—	—	—	—	—	—	—	—	—
Turkey		—		—	—	—	—	—	20,422	16,212	48,097	44,951
United Kingdom		—		—	7,492,184	9,867,794	45,54,200 } & 51,820*}	62,74,031	6,201,538	5,843,672	1,27,62,940 } & 24,191*}	1,28,09,477
West Indian Islands		—		—	—	—	—	—	—	—	—	—
Other Countries		625		1,913	1,098	669	1,571	537	2,231	1,030	4,940 } & 295*}	1,289
Total		291,400		8,03,440	8,542,381	11,221,182	50,93,312 } & 51,845*}	69,79,211	11,501,578	11,768,433	2,00,88,969 } & 24,486*}	2,22,34,944
Share of each Presidency, &c.												
Bengal		188,894		5,08,423	531,832	1,049,829	2,77,978	5,40,365	10,689,669	9,788,504	1,86,25,159	1,81,55,582
Bombay		1,142		5,932	1,089,027	2,042,735	9,71,889 } & 51,845*}	15,14,096	335,908	1,015,826	6,57,236 } & 24,486*}	23,65,575
British Burmah		25,365		50,180	1,605	3,352	2,017	10,761	262,831	367,840	5,12,855	6,84,439
Madras		75,123		2,35,847	6,927,260	8,110,222	38,40,195	49,01,628	133,512	271,071	1,59,368	3,37,825
Sind		876		3,058	1,657	6,044	1,233	11,561	59,658	325,192	1,34,311	6,91,523

* Entered at value only.

No. 4.—cont.

FOREIGN TRADE.

EXPORTS.—I. INDIAN PRODUCE AND MANUFACTURES.

Countries whither Exported.	INDIGO. 3 Rupees per maund duty.				JUTE (Raw). Free.			
	Quantities in cwts.		Value in Rupees.		Quantities in cwts.		Value in Rupees.	
	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.
Aden	14	—	1,960	100*	—	—	—	—
Africa	3	—	1,400	—	—	—	—	—
America	5,808	3,103	21,37,795	7,97,445	1,040,527	1,466,613	51,66,955	55,16,189
Australia	—	—	—	—	—	282	—	1,921
Belgium	37	—	16,000	—	—	—	—	—
Bourbon	—	—	—	—	—	—	—	—
Ceylon	455	—	1,34,419	154*	967	1,664	7,403	11,803
China	—	—	—	—	—	—	—	—
Denmark	—	—	—	—	—	—	—	—
France	15,672	18,515	49,41,142 } 100*}	58,65,830	72,243	148,376	4,19,726	8,65,513
Germany	102	68	46,650 } 90*}	17,311	19,687	—	1,39,955	—
Gibraltar	—	—	—	—	—	—	—	—
Holland	—	2,860	—	8,81,427	2,679	6,357	18,750	19,085
Hong Kong	—	—	—	—	5,906	3,398	46,272	29,577
Japan	—	—	—	—	—	—	—	—
Java	—	—	—	—	—	—	—	—
Junkseylon	—	—	—	—	—	—	—	—
Laccadives and Maldives	—	—	—	—	—	—	—	—
Mauritius	—	—	—	—	—	—	—	—
Mediterranean Ports	12,678	9,545	47,33,032	32,07,403 } 153*}	21,252	9,580	1,32,922	61,665
Nicobars	—	—	—	—	—	—	—	—
Persian Gulf	2,400	4,766	5,26,941	9,71,220	—	—	—	—
Red Sea	107	196	15,050	27,325	—	—	—	—
Russia	998	251	3,50,011 } 60*}	85,819	—	—	—	—
Siam	—	—	—	—	—	—	—	—
Sonmiyani and Mekran	34	47	3,050	4,270	—	—	—	—
Spain	—	—	—	—	—	—	—	—
Suez	468	1,457	1,25,465	3,95,873	—	—	—	—
Straits Settlements	—	—	—	—	—	452	—	3,556
Sumatra	—	—	—	—	—	—	—	—
Switzerland	—	—	—	—	—	—	—	—
Turkey	240	188	90,425	61,513	—	—	—	—
United Kingdom	76,398	74,306	2,37,53,894	2,19,62,390	4,960,748	5,444,670	3,52,40,323	3,49,24,825
West Indian Islands	—	—	—	—	—	—	—	—
Other Countries	—	—	136*	11*	104	20	770	342
Total	115,414	115,312	3,65,77,234 } & 386*}	3,42,68,244 } 418*}	6,133,813	7,080,912	4,11,73,081	4,14,25,476
Share of each Presidency, &c.:								
Bengal	66,929	85,496	2,46,51,714 } 150*}	2,69,94,163	6,123,304	7,061,951	4,11,30,498	4,12,79,429
Bombay	1,165	1,018	1,52,288 } 196*}	1,50,667	648	18,551	6,305	1,43,742
British Burmah	—	—	—	—	—	—	—	—
Madras	44,598	26,521	1,17,69,977 } 40*}	69,02,835	4,771	410	27,278	2,295
Sind	2,722	2,277	3,13,255	2,20,161	—	—	—	—

* Entered at value only.

No. 4.—cont.

FOREIGN TRADE.

EXPORTS.—1. INDIAN PRODUCE AND MANUFACTURES.

Countries whither Exported.	JUTE (Manufactured). Free.		OILS (Vegetable, but not essential, Animal, and Mineral). 3 per cent. duty.				OILS (Essential and other sorts). 3 per cent. duty. Value in Rupees.	
	Value in Rupees.		Quantities in gallons.		Value in Rupees.			
	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.
Aden	8,603	14,630	26,170	20,713	41,376	32,719	16,990	12,161
Africa	12,950	57,041	3,371	28,720	4,930	35,774	6,495	4,884
America	10,68,020	5,45,586	19,995	29,477	21,977	32,722	—	—
Australia	1,88,125	3,80,567	139,501	79,175	1,49,455	84,866	—	—
Belgium	3,200	—	—	—	—	—	—	—
Bourbon	—	—	1,664	—	1,815	—	—	—
Ceylon	1,15,884	1,77,194	67,626	53,131	81,975 } 26*)	60,728	3,666	2,709
China	—	—	41,424	57,131	44,624	61,206	3,030	8,473
Denmark	—	—	—	—	—	—	—	—
France	12,525	1,080	28,464	114,215	34,801	1,58,386	2,400	—
Germany	—	—	47,062	148,661	53,943	2,07,395	—	—
Gibraltar	—	—	—	—	—	—	—	—
Holland	—	—	14,362	—	20,035	—	—	—
Hong Kong	37,160	54,868	—	—	—	—	—	—
Japan	6,919	—	—	—	—	—	—	—
Java	22,400	9,000	—	—	—	—	—	—
Junksoylon	—	—	—	1,153	—	1,369	—	—
Laccadives and Maldives	—	1,068	1,539	844	1,077	1,111	—	—
Mauritius	—	—	124,982	78,837	1,35,631	86,770	—	7,031
Mediterranean Ports	1,142	56,952	1,771	32,279	1,940	51,360	—	—
Nicobars	—	—	—	—	—	—	—	—
Persian Gulf	1,575	5,940	81,813	115,970	1,17,897	1,82,350	2,655	—
Red Sea	—	—	4,182	4,208	6,346	6,286	33,789	32,733
Russia	—	—	5,139	5,289	8,260	8,500	—	—
Siam	—	—	—	—	—	—	—	—
Somniyani and Mekran	2,910	—	3,618	3,355	4,775	4,663	—	—
Spain	—	—	—	—	—	—	—	—
Suez	2,510	14,511	—	—	—	—	—	10,748
Straits Settlements	3,43,863	5,57,575	54,770	54,137	58,694 } 2,398*)	53,332	16,375	6,182
Sumatra	—	—	—	—	—	—	—	—
Switzerland	—	—	—	—	—	—	—	—
Turkey	—	5,324	—	—	—	—	16,593	14,018
United Kingdom	57,555	9,362	2,536,529	1,655,231	32,05,081 } 15,061*)	21,39,380	24,714	31,390
West Indian Islands	1,770	—	6,659	6,569	7,136	7,051	—	—
Other Countries	1,475	3,514	950	1,768	1,064	1,839	1,560	2,086
Total	18,88,586	18,95,412	2,212,100	2,400,863	40,03,482 } 17,465*)	32,17,798	1,28,267	1,32,415
Share of each Presidency, &c.:								
Bengal	18,76,078	18,72,179	811,380	514,491	8,71,468 } 81*)	5,59,313	5,283	7,324
Bombay	3,076	16,649	336,585	312,161	5,32,618	4,92,447	1,12,700	98,762
British Burmah	6,385	6,750	34	34,525	50 } 17,404*)	11,831	—	—
Madras	459	432	2,026,501	1,570,340	25,45,904	20,68,341	10,284	26,329
Sind	2,688	402	37,600	59,346	53,392	85,866	—	—

* Entered at value only.

No. 4.—cont.

FOREIGN TRADE.

EXPORTS.—I. INDIAN PRODUCE AND MANUFACTURES.

Countries whither Exported.	OPIUM. Free.				PADDY. 3 annas per maund duty.				RICE. 2 annas per maund duty.			
	Quantities in chests.		Value in Rupees.		Quantities in cwts.		Value in Rupees.		Quantities in cwts.		Value in Rupees.	
	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.
Aden	—	—	—	—	—	—	—	—	—	—	—	—
Africa	6	22	8,250	27,745	—	—	—	—	—	—	—	—
America	—	—	—	—	—	—	—	—	—	—	—	—
Australia	1	—	1,340	—	—	—	—	—	—	—	—	—
Belgium	—	—	—	—	—	—	—	—	—	—	—	—
Bourbon	11	—	14,645	—	—	—	—	—	—	—	—	—
Ceylon	13	35	16,785	47,020	313,549	310,437	1,17,600	5,81,291	2,360,568	2,978,551	78,13,209	94,58,163
China	44,866	42,360	6,64,38,085	5,80,79,988	—	—	—	—	325,077	402,892	9,69,789	10,30,881
Denmark	—	—	—	—	—	—	—	—	38,310	14,643	89,688	29,955
France	—	—	—	—	—	—	—	—	138,235	10,144	3,16,690	25,468
Germany	—	—	—	—	—	—	—	—	226,267	111,831	5,04,983	2,19,339
Gibraltar	—	—	—	—	—	—	—	—	—	174,206	—	3,82,675
Holland	—	—	—	—	—	—	—	—	81,134	158,842	1,65,957	3,32,893
Hong Kong	40,604	33,971	5,62,96,711	4,72,16,747	—	—	—	—	34,361	45,492	70,136	90,695
Japan	—	—	—	—	—	—	—	—	—	—	—	—
Java	10	—	12,350	—	—	—	—	—	—	239,639	—	6,53,041
Junkseylon	—	—	—	—	—	—	—	—	80,110	132,940	1,73,897	3,35,798
Laccadives and Maldives	—	—	—	—	1,318	—	1,296	—	91,131	70,294	2,24,620	1,77,236
Mauritius	4	2	5,490	2,825	—	—	—	—	1,119,719	2,435,036	31,19,562	64,65,108
Mediterranean Ports	—	—	—	—	—	—	—	—	39,337	208,461	68,199	3,92,610
Nicobars	—	—	—	—	—	—	—	—	—	—	—	—
Persian Gulf	—	—	—	—	—	—	—	—	1,352,368	904,048	48,67,554	30,30,886
Red Sea	—	—	—	—	—	—	—	—	110,606	122,468	5,23,324	5,63,507
Russia	—	—	—	—	—	—	—	—	441	26,671	2,400	49,648
Siam	—	—	—	—	—	—	—	—	43,618	—	85,937	—
Soumyani and Mekran	—	—	—	—	—	—	—	—	9,003	22,349	35,115	69,383
Spain	—	—	—	—	—	—	—	—	—	—	—	—
Suez	—	—	—	—	—	—	—	—	—	46,287	—	93,750
Straits Settlements	7,845	6,458	1,08,53,106	88,08,520	4,929	9,187	6,152	13,546	1,764,067	1,752,268	39,42,477	36,28,607
Sumatra	—	—	—	—	—	—	—	—	—	—	—	—
Switzerland	—	—	—	—	—	—	—	—	—	—	—	—
Turkey	—	—	—	—	—	—	—	—	11,760	5,621	49,301	24,447
United Kingdom	4	60	5,520	79,950	—	—	—	—	8,149,516	11,923,440	1,83,20,356	2,59,62,159
West Indian Islands	—	—	—	—	—	—	—	—	429,710	501,773	12,54,354	18,14,881
Other Countries	—	—	—	—	599	533	684	1,076	231	238	1,098	959
Total	93,364	82,908	13,36,52,282	11,42,62,795	320,395	320,159	525,732	595,913	16,900,890	22,973,797	4,44,65,879	5,70,14,388
Share of each Presidency, &c.:												
Bengal	49,455	40,507	6,85,23,802	5,51,32,057	33,415	37,982	45,016	51,960	5,091,746	7,101,977	1,41,35,547	1,95,41,461
Bombay	43,909	42,401	6,51,23,480	5,81,30,738	—	4	—	16	498,043	367,652	26,41,220	18,22,557
British Burmah	—	—	—	—	38,871	37,021	59,470	45,350	9,231,424	13,629,028	1,98,90,598	2,84,97,122
Madras	—	—	—	—	218,076	245,152	421,216	4,98,587	2,118,335	1,837,718	75,96,438	69,56,595
Sind	—	—	—	—	—	—	—	—	51,342	48,322	2,02,076	1,56,483

No. 4.—cont.

FOREIGN TRADE.

EXPORTS.—I. INDIAN TRADE AND MANUFACTURES.

Countries whither Exported.	SALTPETRE. Free.				SEEDS (including Linseed, Mustard, Rape, Poppy, Teel, and essential). 3 per cent. duty.				SEEDS (other sorts). 3 per cent. duty.	
	Quantities in cwt.		Value in Rupees.		Quantities in cwt.		Value in Rupees.		Value in Rupees.	
	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.
Aden	—	—	—	—	402	1,572	6,256	14,413 and 2*	—	2,032
Africa	—	143	—	1,228	984	840	8,586	10,261	2,314	1,867
America	67,292	115,039	6,09,673	12,00,748	1,565,033	1,156,081	78,24,299	57,81,507	33,502	—
Australia	1,063	1,107	12,347	13,265	241	—	1,203	—	—	—
Belgium	3,671	—	26,292	—	2,143	—	10,714	—	—	—
Bourbon	—	4,725	—	56,700	—	351	—	1,406	—	—
Ceylon	358	774	3,735	8,107	26,673	23,339	1,43,334	1,25,930	3,65,029	68,433
China	—	2,354	—	25,420	—	198	—	1,144	—	9,287
Denmark	—	—	—	—	—	—	—	—	—	—
France	8,095	14,790	68,210	1,64,720	859,561	429,395	46,35,400	25,75,909	5,98,836	1,62,882
Germany	—	—	—	—	—	—	—	—	—	—
Gibraltar	—	—	—	—	—	—	—	—	—	—
Holland	—	—	—	—	864	—	4,338	—	—	—
Hong Kong	32,788	58,799	3,40,289	6,62,929	—	—	—	—	—	—
Japan	—	—	—	—	—	—	—	—	—	—
Java	1,004	—	9,028	—	1,293	—	7,364	—	—	2,000
Junkscylon	—	—	—	—	—	—	—	—	—	—
Laccadives and Maldives	—	—	—	—	222	306	1,407	1,934 20*	—	—
Mauritius	1,188	4,200	10,800	38,693	4,600	1,719	27,667	9,489	3,693	4,799
Mediterranean Ports	—	4,338	—	55,404	1,100	—	6,600	125*	2,46,436	29,664
Nicobars	—	—	—	—	—	—	—	—	—	—
Persian Gulf	—	—	—	—	1,172	1,079	8,404	7,406 and 342*	6,061	9,122
Red Sea	—	—	—	—	2,215	1,557	18,483	17,147	1,119	2,873
Russia	—	—	—	—	—	—	—	—	—	—
Siam	—	—	—	—	—	—	—	—	—	—
Sonmiyani and Mokran	—	—	—	—	—	—	—	—	—	—
Spain	—	—	—	—	42,357	8,390	2,54,135	50,342	—	19,688
Suez	—	—	—	—	—	—	—	643*	—	—
Straits Settlements	5,632	6,169	55,599	65,400	18,976	13,000	1,03,863	70,986	19,075	5,649
Sumatra	—	—	—	—	—	299	—	1,200	—	—
Switzerland	—	—	—	—	—	—	—	—	—	—
Turkey	—	—	—	—	—	—	—	—	—	—
United Kingdom	311,062	301,953	27,45,738	30,15,196	2,595,673	1,139,876	1,25,43,231	56,88,427	3,90,767	3,97,167
West Indian Islands	—	4,594	—	55,125	153	142	1,296	1,191	—	—
Other Countries	87	17	803	200	1,163	1,099	5,298	5,436	3,333	1,687
Total	432,210	518,982	39,72,514	53,63,135	5,124,765	2,779,243	2,56,10,875	1,43,64,128 1,132*}	16,70,165	7,17,150
Share of each Presidency, &c.:-										
Bengal	424,638	500,201	39,06,762	51,80,121	3,998,167	2,221,772	1,95,07,947	1,11,52,351 20*}	7,65,750	48,946
Bombay	6,044	9,991	50,429	91,486	342,566	111,322	17,17,242	6,01,769 1,112*}	60,705	60,153
British Barmah	—	—	—	—	37	—	148	—	6,279	747
Madras	1,348	8,669	14,728	90,328	608,698	442,945	35,49,608	25,93,713	8,35,003	6,05,046
Sind	180	221	695	1,200	175,297	3,204	8,35,933	16,295	2,428	2,259

* Entered at value only.

No. 4.—cont.

FOREIGN TRADE.

EXPORTS.—I. INDIAN PRODUCE AND MANUFACTURES.

Countries whither Exported.	SILK (Raw). Free.				SILK (Manufactured). Free.		SUGAR, and other Saccharine matter. Free.			
	Quantities in Hs.		Value in Rupees.		Value in Rupees.		Quantities in cwts.		Value in Rupees.	
	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.
Aden	42,674	40,778	1,07,830	1,13,398	95,998	84,725	4,948	8,104	65,105	97,523
Africa	464	1,121	3,197	9,834	12,409	17,500	1,473	1,614	16,979	18,736
America	—	—	—	—	20,157	6,385	—	—	—	—
Australia	—	—	—	—	—	—	—	—	—	—
Belgium	—	—	—	—	—	—	—	—	—	—
Bourbon	—	—	—	—	14,169	1,755	—	—	—	—
Ceylon	—	—	—	—	66,296	84,897	16,449	19,575	1,77,044	2,16,474
China	—	—	—	—	3,092	3,380	—	—	—	—
Denmark	—	—	—	—	—	—	—	—	—	—
France	130,279	512,877	14,96,579	30,55,453	72,386	80,421	908	1,857	7,264	18,571
Germany	—	—	—	—	—	—	—	—	—	—
Gibraltar	—	—	—	—	—	—	—	—	—	—
Holland	—	—	—	—	—	—	—	—	—	—
Hong Kong	—	—	—	—	—	—	—	—	—	—
Japan	—	—	—	—	—	—	—	—	—	—
Java	—	—	—	—	3,000	2,250	—	—	—	—
Junkseylon	—	—	—	—	—	—	—	—	501*	912*
Laccadives and Maldives	—	—	—	—	4,829	4,495	1,890	1,361	30,720	16,979
Mauritius	—	—	—	—	26,379	35,306	—	—	—	—
Mediterranean Ports	71,895	207,210	5,15,488	13,96,415	4,656	28,203	—	—	—	—
Nicolars	—	—	—	—	—	—	—	—	—	—
Persian Gulf	6,628	8,181	31,109	42,708	96,231	1,16,602	8,338	13,918	1,18,735	1,96,119
Red Sea	1,088	1,381	3,708	5,070	90,443	75,854	7,862	8,134	85,088	85,532
Russia	—	—	—	—	—	—	—	—	—	—
Siam	—	—	—	—	—	—	—	—	—	—
Somiyani and Makran	3,028	—	11,455	—	1,698	1,532	254	431	3,729	5,745
Spain	—	—	—	—	—	—	—	—	—	—
Suez	5,676	531	12,206	2,740	24,472	32,010	1,395	212	20,972	3,456
Strait Settlements	—	—	—	—	98,588	57,516	221	—	1,726	—
Sunatra	—	—	—	—	15,707	8,428	—	—	—	—
Switzerland	—	—	—	—	—	—	—	—	—	—
Turkey	—	—	—	—	—	—	—	—	—	—
United Kingdom	1,531,507	1,458,884	86,28,802	79,36,698	8,74,419	12,15,328	329,128	575,655	23,51,378	42,66,528
West Indian Islands	—	—	—	—	—	—	—	—	—	—
Other Countries	83	615	597	1,188	1,692	2,761	31	77	186 57*	605 252*
Total	1,893,322	2,231,578	1,08,10,971	1,25,53,561	15,26,621	18,70,248	372,897	630,938	28,79,324 558*	49,26,268 1,164*
Share of each Presidency, &c.:										
Bengal	1,838,388	2,187,535	1,06,64,449	1,24,32,871	10,79,229	14,68,784	146,804	170,913	14,64,317 14*	18,27,398 219*
Bombay	54,337	43,313	1,43,378	1,27,940	3,25,840	3,08,150	13,520	10,920	1,55,735 5*	2,19,826 912*
British Burmah	—	—	—	—	—	—	—	—	539*	—
Madras	429	157	2,387	435	1,21,286	72,803	218,497	440,823	12,58,897	28,77,143
Sind	168	573	757	2,315	266	511	76	182	975	1,901 3*

* Entered at value only.

No. 4.—cont.

FOREIGN TRADE.

EXPORTS.—1. INDIAN PRODUCE AND MANUFACTURES.

Countries whither Exported.	TEA. Proc.				TEAK. Proc.			
	Quantities in lbs.		Value in Rupees.		Quantities in tons.		Value in Rupees.	
	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.
Aden	—	—	—	—	—	—	—	—
Africa	—	—	—	—	—	—	—	2,010*
America	63,819	88,761	48,227	81,000	—	—	—	—
Australia	42,866	70,658	42,367	67,193	—	—	—	—
Belgium	—	—	—	—	—	—	—	—
Bourbon	—	—	—	—	—	—	—	—
Ceylon	3,063	3,753	3,061	3,800	550	2,008	33,870	1,13,982
China	—	—	—	—	1,846	690	1,18,160	38,400
Denmark	—	—	—	—	35	—	2,450	—
France	—	—	—	—	—	—	—	—
Germany	30,100	—	30,100	—	—	84	—	5,258
Gibraltar	—	—	—	—	—	—	—	—
Holland	—	—	—	—	—	—	—	—
Hong Kong	9,672	1,333	9,625	1,432	—	—	—	—
Japan	—	—	—	—	—	—	—	—
Java	—	—	—	—	534	—	34,710	—
Junksoylon	—	—	—	—	—	25	—	1,410
Laccadives and Maldives	—	—	—	—	—	—	—	—
Mauritius	—	—	—	—	3,184	1,067	2,11,216	66,931
Mediterranean Ports	5,568	—	5,284	—	—	929	—	74,367
Nicobars	—	—	—	—	—	—	—	—
Persian Gulf	—	653	—	1,059	293	341	11,971 } 708* }	15,077 } 1,000* }
Red Sea	—	—	—	—	—	157	705*	5,161
Russia	—	—	—	—	—	—	—	—
Siam	—	—	—	—	—	—	—	—
Sonmiyani and Mokran	—	—	—	—	—	—	—	—
Spain	—	—	—	—	—	—	—	—
Suez	—	—	—	—	—	—	—	—
Straits Settlements	15,466	76,090	5,849	14,748	595	206	33,330	13,522
Sumatra	—	—	—	—	—	—	—	—
Switzerland	—	—	—	—	—	—	—	—
Turkey	16,888	21,867	14,592	17,698	—	—	—	—
United Kingdom	16,997,563	17,622,301	1,43,88,597	1,55,85,800	35,387	44,993	24,63,892	32,24,522
West Indian Islands	—	—	—	—	—	—	—	—
Other Countries	2,523	4,495	2,144	4,087	35	43	1,441 } 1,761* }	825* } 1,392 }
Total	17,187,328	17,780,911	1,45,49,846	1,57,76,907	42,459	50,443	29,11,040 } 3,174* }	35,60,022 } 3,835* }
Share of each Presidency, &c.—								
Bengal	17,124,105	17,629,156	1,44,84,084	15,63,603	—	—	6*	1,460*
Bombay	9,065	24,152	9,070	25,360	—	—	200*	1,700*
British Burmah	15,904	76,281	6,400	15,269	42,134	49,716	28,97,868	675* } 35,34,869 }
Madras	32,916	41,674	44,938	50,623	325	727	13,172 } 1,556* }	25,153
Sind	5,338	18,648	5,354	21,962	—	—	—	—

No. 4.—cont.

FOREIGN TRADE.

EXPORTS.—1. INDIAN PRODUCE AND MANUFACTURES.

Countries whither Exported.	TOBACCO, and articles used in the consumption of, Free.		WHEAT. 3 annas per maund duty till 4th January 1873, after which free.			
	Value in Rupees.		Quantities in cwts.		Value in Rupees.	
	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.
Aden	4,69,661	2,263	5,977	21,772	31,561	94,694
Africa	—	—	7,011	6,512	33,957	33,436
America	—	—	—	—	—	—
Australia	1,243	—	—	—	—	—
Belgium	—	—	—	—	—	—
Bourbon	3,223	—	20,360	16,366	56,013	49,869
Ceylon	16,971	9,662	21,001	21,755	1,03,395	1,06,001
China	1,587	1,517	—	—	—	—
Denmark	—	—	—	—	—	—
France	—	5,000	594	—	3,193	—
Germany	8,572	—	—	—	—	—
Gibraltar	4,520	—	—	—	—	—
Holland	—	—	—	—	—	—
Hong Kong	—	—	—	—	—	—
Japan	—	—	—	—	—	—
Java	—	—	4,475	735	13,125	3,060
Junkseyton	—	—	—	—	—	—
Laccadives and Maldives	14,065	4,320	—	—	—	—
Mauritius	88,106	4,177	62,503	80,278	2,50,879	3,18,707
Mediterranean Ports . .	1,077	1,258	—	1,187	—	5,073
Nicobars	—	—	—	—	—	—
Persian Gulf	4,127	4,434	209,209	8,125	9,07,993	31,390
Red Sea	92,500	—	14,232	3,695	71,608	18,541
Russia	—	—	—	—	—	—
Siam	—	—	—	—	—	—
Sonmiyani and Mekran . .	—	—	1,068	2,139	3,900	7,027
Spain	—	—	—	—	—	—
Suez	—	—	—	—	—	—
Straits Settlements . . .	63,445	18,016	47,247	32,322	1,51,544	1,13,387
Sumatra	4,225	—	—	—	—	—
Switzerland	—	—	—	—	—	—
Turkey	—	—	—	—	—	—
United Kingdom	10,953	17,990	243,093	198,771	7,28,678	8,68,611
West Indian Islands . . .	—	—	—	—	—	—
Other Countries	1,941	4,630	149	353	539	1,164
Total	7,86,221	73,267	637,099	394,010	23,56,445	16,76,900
Share of each Presidency, &c. :						
Bengal	99,433	21,766	346,979	145,005	10,22,234	4,60,631
Bombay	5,64,463	11,263	127,945	74,856	6,63,009	3,98,561
British Burmah	13,561	12,757	5,980	—	36,637	—
Madras	1,97,975	27,147	3,836	6,144	18,653	23,663
Sind	789	334	1,62,359	168,005	6,15,712	7,62,845

No. 4.—cont.

FOREIGN TRADE.

EXPORTS.—I. INDIAN PRODUCE AND MANUFACTURES.

Countries whither Exported.	WOOL (Raw). Piec.				WOOL (Manufactured). Piec.		Total value in Rupees of Indian Exports to each Country.	
	Quantities in lbs.		Value in Rupees.		Value in Rupees.		1871-2.	1872-3.
	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.
Aden	—	—	—	—	6,634	4,933	20,43,999	24,51,944
Africa	—	—	—	—	1,375	5,805	5,20,918	10,29,556
America	190,736	—	49,597	—	10,602	3,793	2,29,77,393	2,02,56,356
Australia	—	—	—	—	—	—	10,34,566	10,58,352
Belgium	—	—	—	—	—	—	20,61,636	1,91,368
Bourbon	—	—	—	—	—	—	9,47,003	6,35,580
Ceylon	—	—	—	—	42,580	33,276	1,30,26,487	1,49,24,552
China	—	—	—	—	10,655	6,635	7,36,36,917	6,57,03,911
Denmark	—	—	—	—	—	—	90,183	29,955
France	53,800	87,136	20,900	37,550	9,52,710	19,58,713	4,16,99,229	2,66,80,881
Germany	—	—	—	—	—	—	35,53,818	19,64,517
Gibraltar	—	—	—	—	—	—	See under	Spain.
Holland	—	—	—	—	—	—	34,10,944	14,18,633
Hong Kong	—	—	—	—	3,978	—	6,38,33,130	5,50,39,565
Japan	—	—	—	—	—	—	7,934	—
Java	—	—	—	—	—	—	1,44,372	6,77,609
Junkseyon	—	—	—	—	—	—	1,85,567	3,46,623
Laccadives and Maldives	—	—	—	—	—	—	3,55,800	2,80,018
Mauritius	—	—	—	—	23,970	30,035	53,18,697	91,65,407
Mediterranean Ports	3,360	46,368	1,500	21,750	4,021	3,508	2,22,41,972	2,14,81,428
Nicobars	—	—	—	—	—	—	—	2,446
Persian Gulf	—	—	—	—	2,06,341	2,69,698	79,83,601	56,31,171
Red Sea	—	—	—	—	13,631	4,914	18,73,459	17,53,730
Russia	—	—	—	—	—	—	37,68,836	15,83,422
Siam	—	—	—	—	—	—	—	50,673
Sommiyani and Mekran	—	—	—	—	—	—	1,44,865	1,94,115
Spain	—	—	—	—	—	—	2,59,825	4,82,705
Suez	—	—	—	—	72,427	1,12,475	5,56,850	40,62,641
Straits Settlements	—	—	—	—	8,124	9,635	1,89,44,844	1,68,01,881
Samatra	—	—	—	—	—	—	54,437	46,934
Switzerland	—	—	—	—	—	—	—	1,159
Turkey	—	—	—	—	—	—	2,72,522	2,04,278
United Kingdom	23,869,666	20,260,206	89,57,000	83,21,046	4,77,122	8,92,624	32,46,03,823	27,82,92,130
West Indian Islands	—	—	—	—	—	—	12,81,674	19,67,845
Other Countries	—	1,008	—	72	3,116	2,909	57,652	2,402
Total	24,122,562	20,394,718	90,28,997	83,80,418	18,37,286	33,38,953	61,69,72,252	53,44,03,833
Share of each Presidency, &c.:								
Bengal	1,173	—	393	—	11,65,579	20,72,039	27,46,01,631	24,43,47,283
Bombay	21,056,263	18,367,352	79,30,579	72,37,696	6,12,429	11,96,766	23,71,30,267	18,40,61,081
British Burmah	—	—	—	—	—	—	2,78,69,515	3,76,67,507
Mudras	—	2,724	—	272	56,663	69,498	6,92,83,934	6,18,40,874
Sind	2,166,136	2,024,612	10,98,025	11,42,450	2,615	650	79,86,905	64,87,038

FOREIGN TRADE.

INDIAN EXPORTS.—2. PRINCIPAL ARTICLES OF FOREIGN MERCHANDISE.

Countries whence Exported.	COTTON, Manufactures of.		GUMS.		IVORY and Manufactures of.		METALS.	
	Value in Rupees.		Value in Rupees.		Value in Rupees.		Value in Rupees.	
	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.
Aden	8,03,851	7,20,550	—	2,029	—	—	56,205	47,665
Africa	17,82,626	19,53,235	4,286	6,123	—	—	28,536	21,682
America	—	—	2,358	—	—	—	1,09,845	1,58,370
Australia	—	—	—	—	—	—	6,425	—
Ceylon	51,174	37,082	1,502	1,958	—	—	18,057	12,783
China	1,92,629	62,681	20,609	65,100	52,508	87,791	16,948	36,742
France	—	1,403	—	1,854	1,063	1,607	7,713	7,376
Hong Kong	16,252	5,825	2,402	—	—	—	3,722	3,753
Japan	—	—	1,912	—	—	—	—	—
Junkseylon	—	—	—	—	—	—	1,780	—
Laccadives and Maldives	21,422	29,380	—	—	—	—	2,597	2,260
Mauritius	11,375	26,871	—	—	—	—	6,815	16,709
Mediterranean Ports	—	—	1,501	1,491	—	—	—	—
Nicobars	3,936	1,677	—	—	—	—	—	—
Persian Gulf	32,41,256	48,42,039	6,839	10,328	—	—	1,03,691	1,14,770
Red Sea	4,46,187	4,46,635	4,008	—	—	—	36,539	67,189
Russia	—	—	3,217	1,858	—	—	—	—
Sommiyani and Mekran	99,186	94,667	—	—	—	—	4,416	3,960
Straits Settlements	12,89,493	16,57,537	7,463	26,423	1,628	—	54,878	52,311
Suez	1,81,978	1,07,857	—	—	—	—	—	6,859
Sumatra	42,465	41,271	—	—	—	—	—	—
Turkey	—	2,226	—	—	—	—	—	1,332
United Kingdom	80,611	10,941	2,42,711	3,19,797	5,63,619	9,58,593	2,62,258	6,90,163
West Indian Islands	—	—	—	—	—	—	2,525	12,170
Other Countries	2,838	4,222	2,744	3,354	360	602	12,401	10,895
Total	82,17,189	1,09,46,104	3,01,553	4,30,315	6,19,178	10,48,693	7,25,189	12,06,358
Share of each Presidency, &c. :								
Bengal	1,37,051	71,256	7,825	2,027	758	640	2,76,785	4,93,778
Bombay	77,26,691	95,60,308	2,92,029	4,02,764	6,18,280	10,48,044	4,10,633	7,16,475
British Burmah	6,832	6,987	—	24,250	—	—	4,888	12,293
Madras	3,11,332	4,16,662	1,698	1,274	140	—	36,186	36,649
Sind	35,283	50,891	—	—	—	—	2,697	7,163

Countries whence Exported.	SILK (Manufactured).		SILK (Raw).		SUGAR, and other Saccharine Matter.		WOOL (Manufactures of).		Total Value of Exports, In- cluding articles not mentioned.	
	Value in Rupees.		Value in Rupees.		Value in Rupees.		Value in Rupees.			
	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.		
Aden	30,831	24,738	30,424	18,832	20,713	28,157	11,900	19,697	10,57,634	9,75,104
Africa	12,430	11,913	11,575	12,735	45,238	27,563	7,976	15,231	20,51,252	22,69,757
America	—	—	—	—	—	—	—	—	1,27,523	2,02,526
Australia	—	—	—	—	—	—	—	—	9,506	8,923
Ceylon	2,877	1,550	—	—	11,800	22,180	1,080	1,985	2,49,346	2,17,506
China	15,460	9,040	—	—	—	—	2,989	4,635	5,85,373	6,56,158
France	—	—	—	—	—	—	1,258	2,000	46,680	39,915
Hong Kong	1,097	—	—	—	—	—	—	—	43,161	75,035
Japan	—	—	—	—	—	—	—	—	22,212	3,466
Junkseylon	—	—	—	—	—	—	—	—	—	5,070
Laccadives and Maldives	—	—	—	—	—	—	—	—	32,658	35,657
Mauritius	6,378	5,608	—	—	—	—	—	2,030	79,299	1,56,226
Mediterranean Ports	—	—	1,204	—	—	—	—	—	59,274	49,797
Nicobars	—	—	—	—	—	—	—	—	—	1,822
Persian Gulf	26,083	60,222	17,124	44,140	4,36,901	3,93,635	25,194	46,023	43,75,377	59,79,819
Red Sea	4,080	6,632	14,799	8,922	77,407	21,365	2,954	—	6,36,545	6,32,243
Russia	—	—	—	—	—	—	—	—	—	7,874
Sommiyani and Mekran	2,453	1,195	26,578	41,175	2,742	2,710	—	—	1,51,622	1,61,916
Straits Settlements	5,315	10,030	7,266	4,923	—	—	76,049	84,392	17,82,568	21,19,006
Suez	2,337	3,776	20,865	1,54,538	—	—	—	—	2,31,618	3,07,234
Sumatra	—	—	—	—	—	—	—	—	42,877	42,214
Turkey	—	—	4,640	4,202	—	—	—	—	8,585	16,152
United Kingdom	11,045	1,989	3,60,839	2,01,648	—	—	13,314	19,243	32,48,953	39,87,178
West Indian Islands	—	—	—	—	—	—	—	—	13,535	28,006
Other Countries	1,245	1,101	800	190	1,067	912	1,083	1,659	30,294	2,624
Total	1,21,631	1,37,794	4,96,114	4,91,305	5,96,868	4,96,522	1,43,777	1,96,895	1,48,66,222	1,78,71,117
Share of each Presidency, &c. :										
Bengal	9,303	9,325	—	—	—	—	78,484	79,162	15,76,675	18,38,008
Bombay	1,11,791	1,23,129	4,91,473	4,91,115	5,94,973	4,95,536	55,882	1,12,977	1,21,17,646	1,52,32,674
British Burmah	446	5,289	—	—	—	—	2,905	3,964	38,008	1,02,282
Madras	91	60	4,641	190	710	540	6,185	792	7,78,340	6,05,802
Sind	—	—	—	—	185	446	321	—	76,553	92,854

No. 6.

FOREIGN TRADE.

INDIAN IMPORTS.

Countries whence Imported.	APPAREL. (Including Hats, Fishery, Millinery, &c.) 7½ per cent. duty.		COAL and COKE. Free.				COTTON GOODS (Including Piece Goods, Thread, and Twist). 3½, 5, and 7½ per cent. duty, respectively.	
	Value in Rupees.		Quantities in cwts.		Value in Rupees.		Value in Rupees.	
	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.
Aden	6,050	—	3,740	2,705	2,048	2,197	13,271	15,003
Africa	—	—	—	—	—	—	3,712	1,466
America	4,200	16,228	—	8,820	—	7,243	72,963	5,859
Australia	6,211	2,857	118,333	30,220	85,017	29,494	—	1,279
Austria	—	—	—	—	—	—	—	—
Bourbon	—	—	—	—	—	—	—	—
Ceylon	33,971	36,857	27,720	4,362	17,851	4,518	31,64,826	30,89,160
China	60,672	91,148	—	—	—	—	36,589	35,810
Denmark	—	—	—	—	—	—	—	—
France	3,48,334	4,35,006	9,080	358,058	7,110	1,21,290	1,01,689	90,240
Germany	—	1,787	100,140	32,260	70,260	22,695	—	12,748
Gibraltar	—	—	—	—	—	—	—	—
Holland	—	—	2,050	—	1,025	—	—	—
Hong Kong	16,269	12,180	—	—	—	—	20,340	—
Japan	—	—	—	—	—	—	—	—
Java	—	—	—	8,000	—	8,000	—	—
Junkceylon	—	—	—	—	—	—	—	—
Laccadives and Maldives	—	—	—	—	—	—	—	—
Mauritius	—	—	—	—	—	—	—	—
Mediterranean Ports	31,511	39,653	—	—	—	—	5,37,063	4,24,709
Nicobars	—	—	—	—	—	—	—	—
Persian Gulf	7,654	11,524	—	—	—	—	15,405	39,792
Red Sea	2,714	—	—	—	—	—	31,558	1,044
Russia	—	—	—	—	—	—	—	—
Siam	—	—	—	—	—	—	—	—
Sonmiyani and Mekran	—	—	—	—	—	—	—	—
Spain	—	—	—	—	—	—	—	—
Suez	11,81,018	9,49,200	—	—	—	—	1,36,62,969	1,17,54,442
Straits Settlements	48,611	59,370	—	3,651	—	2,768	8,31,339	2,47,345
Sumatra	—	—	—	—	—	—	—	—
Switzerland	—	—	—	—	—	—	—	—
Turkey	—	4,493	—	—	—	—	—	—
United Kingdom	32,43,489	43,60,716	7,219,004	6,043,810	49,62,656	47,80,548	15,66,14,830	16,29,25,939
West Indian Islands	—	—	—	—	—	—	—	—
Other Countries	1,917	1,572	3,276	880	1,944	664	10,291	8,748
Total	49,06,711	60,12,579	7,483,343	6,492,766	61,47,041	49,70,417	17,48,33,330	17,23,42,484
Share of each Presidency, &c. :—								
Bengal	19,40,490	23,67,617	1,812,718	984,088	12,17,438	7,71,096	10,30,35,942	9,96,36,921
Bombay	17,11,498	20,15,670	4,644,615	4,414,964	31,72,275	33,47,213	4,59,04,887	4,60,80,598
British Burmah	1,58,403	1,32,768	799,620	734,270	5,50,976	4,84,456	63,97,729	72,67,899
Madras	12,47,080	13,83,594	188,140	317,858	1,67,835	3,53,897	1,80,29,202	1,81,86,555
Sind	38,180	62,930	38,250	21,586	39,417	22,755	14,65,570	11,70,611

No. 6.—cont.

FOREIGN TRADE.

INDIAN IMPORTS.

Countries whence Imported.	DRUGS and MEDICINES. 7½ per cent. duty.		DYEING and COLOURING MATERIALS. 7½ per cent. duty.		GOVERNMENT STORES. Free.		GRAIN and PULSE. Free.	
	Value in Rupees.		Value in Rupees.		Value in Rupees.		Value in Rupees.	
	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.
Adon	11,452	15,143	2,573	4,217	—	—	1,061	—
Africa	6,322	26,748	2,079	54,274	—	—	18,267	6,453
America	8,888	41,903	—	—	—	—	—	—
Australia	4,037	—	—	—	—	—	—	—
Austria	—	—	—	—	—	—	—	—
Bourbon	—	—	—	—	—	—	—	—
Ceylon	—	24,630	5,229	2,814	8,243	1,302	—	3,643
China	2,99,049	5,05,144	—	3,304	—	—	3,323	4,632
Denmark	—	—	—	—	—	—	—	—
France	26,023	35,732	48,993	17,593	—	—	—	—
Germany	—	—	—	—	—	—	—	—
Gibraltar	—	—	5,200	—	—	—	—	—
Holland	—	—	—	—	—	—	—	—
Hong Kong	96,170	95,074	—	4,002	—	72,972	—	—
Japan	—	—	—	—	—	—	—	—
Java	—	—	—	—	—	—	—	—
Junkseylon	—	—	—	—	—	—	—	—
Laccadives and Maldives	—	—	—	—	—	—	—	—
Mauritius	1,259	—	—	—	—	—	—	—
Mediterranean Ports	15,428	18,273	89,993	3,52,570	1,550	1,050	—	—
Nicolars	—	—	—	—	—	—	—	—
Persian Gulf	1,62,307	2,48,286	88,745	1,66,097	—	—	3,629	27,605
Red Sea	68,975	67,825	9,178	7,621	—	—	—	—
Russia	—	—	—	—	—	—	—	—
Siam	—	—	—	—	—	—	—	—
Sonmiyani and M-kran	—	—	—	—	—	—	19,532	3,084
Spain	—	—	—	—	—	—	—	—
Suez	88,193	42,037	5,67,917	3,37,344	22,015	—	—	—
Straits Settlements	2,63,275	2,68,469	1,04,700	1,34,351	—	—	10,644	17,782
Sumatra	—	—	—	—	—	—	—	—
Switzerland	—	—	—	—	—	—	—	—
Turkey	—	2,535	—	—	—	—	—	—
United Kingdom	13,11,640	17,57,887	3,17,333	7,89,714	26,96,791	77,96,104	—	—
West Indian Islands	—	—	—	—	—	—	—	—
Other Countries	1,225	2,804	1,416	286	939	3,492	3,397	858
Total	23,64,243	31,52,540	12,43,296	18,74,187	27,29,718	78,74,920	59,842	63,057
Share of each Presidency, &c. :—								
Bengal	10,82,057	12,35,557	1,89,876	3,11,297	4,09,080	7,79,602	640	87
Bombay	10,00,029	16,11,332	10,19,868	15,10,758	40,762	33,76,114	42,318	55,766
British Burmah	35,245	33,963	11,746	11,987	88,014	2,233	183	262
Madras	2,37,871	2,48,269	15,913	31,323	21,91,862	36,42,047	1,092	3,866
Sind	9,041	23,419	5,893	8,822	—	74,924	15,109	3,076

No. 6.—cont.

FOREIGN TRADE.

INDIAN IMPORTS.

Countries whence Imported.	MACHINES AND MACHINERY. Free.		MALT LIQUORS. 1 anna per imperial gallon duty.				METALS. From 1 to 7½ per cent. duty.	
	Value in Rupees.		Quantities in Gallons.		Value in Rupees.		Value in Rupees.	
	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.
Aden	—	—	—	—	—	—	—	—
Africa	—	—	—	—	—	—	—	—
America	4,734	—	—	—	—	—	—	—
Australia	1,191	2,619	—	1,004	—	1,738	13,12,668	1,88,709
Belgium	—	—	—	—	—	—	—	—
Bourbon	—	—	—	—	—	—	—	—
Ceylon	37,500	11,302	1,133	2,117	3,279	6,316	61,134	—
China	1,100	—	—	1,032	—	1,913	1,41,785	3,15,846
Denmark	—	—	—	—	—	—	—	—
France	10,963	3,638	—	—	—	—	—	—
Germany	72,090	1,29,526	32,974	48,446	59,160	87,556	—	—
Gibraltar	—	—	—	—	—	—	—	—
Holland	—	—	6,192	—	11,874	—	—	—
Hong Kong	1,667	—	—	—	—	—	9,56,791	1,64,463
Japan	—	—	—	—	—	—	1,09,647	2,13,546
Java	—	—	—	—	—	—	—	—
Junkeeylon	—	—	—	—	—	—	—	—
Laccadives and Maldives	—	—	—	—	—	—	—	—
Mauritius	—	—	—	—	—	—	—	—
Mediterranean Ports	2,333	19,344	864	2,801	2,066	7,619	—	1,49,333
Nicobars	—	—	—	—	—	—	—	—
Persian Gulf	—	—	—	—	—	—	—	—
Portugal	—	—	—	—	—	—	—	—
Red Sea	—	—	—	—	—	—	—	—
Russia	—	—	—	—	—	—	—	—
Siam	—	—	—	—	—	—	—	—
Somiyani and Mekran	—	—	—	—	—	—	—	—
Spain	—	—	—	—	—	—	—	—
Spec	132,433	99,301	1,883	19,677	3,781	45,144	5,76,490	1,77,325
Straits Settlements	—	—	953	612	2,229	1,301	12,45,945	8,61,424
Sumatra	—	—	—	—	—	—	—	—
Switzerland	—	—	—	—	—	—	—	—
Turkey	—	—	—	—	—	—	—	—
United Kingdom	37,93,917	49,15,109	1,279,407	1,460,695	29,69,195	34,83,085	1,88,67,596	1,53,47,549
West Indian Islands	—	—	—	—	—	—	—	—
Other Countries	417	1,419	521	112	1,602	286	3,96,714	2,31,357
Total	40,63,345	51,73,157	1,323,927	1,536,496	30,53,186	36,34,958	2,36,09,636	1,76,49,552
Share of each Presidency, &c.:—								
Bombay	14,48,155	16,26,069	658,873	681,075	14,82,735	15,81,688	1,24,81,968	88,53,876
Bombay	12,65,263	23,68,032	264,896	356,619	6,31,936	8,28,335	85,16,443	65,63,472
British Burmah	6,02,998	7,56,692	165,167	163,373	3,45,631	3,32,806	5,80,771	6,46,657
Madras	1,64,222	2,34,285	166,233	279,727	4,36,613	7,64,867	18,33,822	14,03,848
Sind	5,77,707	1,88,070	68,758	55,702	1,54,221	1,27,262	1,96,632	1,81,699

No. 6.—cont.

FOREIGN TRADE.

INDIAN IMPORTS.

Countries whence Imported.	PRECIOUS STONES AND PEARLS. Free.		RAILWAY MATERIALS. 1 and 7½ per cent. duty.		SALT. In Bengal 2 lbs. 4 as. per maund duty. " Bombay 1 " 8 " " " " " Madras 1 " 11 " " " " " Brit. Burmah 8 " " " " "				SILK (Manufactured.) 5 per cent. duty.*	
	Value in Rupees.		Value in Rupees.		Quantities in cwts.		Value in Rupees.		Value in Rupees.	
	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.
Aden	36,750	72,375	—	1,269	5,787	—	7,878	—	1,922	—
Africa	—	39,600	—	—	—	1,087	—	1,480	—	1,40,801
America	10,000	—	—	—	—	—	—	—	—	—
Australia	—	—	—	—	—	—	—	—	—	—
Belgium	—	—	—	—	—	—	—	—	—	—
Bourbon	—	—	—	—	—	946	—	1,288	—	—
Ceylon	5,270	32,250	—	3,166	3,563	—	4,850	—	1,277	4,258
China	1,01,925	1,67,975	—	—	—	—	—	—	20,59,364	16,73,719
Denmark	—	—	—	—	—	—	—	—	—	—
France	15,477	—	—	—	38,427	123,361	52,304	1,67,993	2,90,736	5,83,711
Germany	—	—	—	—	42,215	24,301	65,492	21,555	—	—
Gibraltar	—	—	—	—	—	—	—	—	—	—
Holland	—	—	—	—	—	—	—	—	—	—
Hong Kong	—	—	—	—	—	—	—	—	1,00,451	51,535
Japan	—	—	—	—	—	—	—	—	—	—
Java	—	—	—	—	—	—	—	—	—	—
Junkseylon	—	—	—	—	—	—	—	—	—	—
Laccadives and Maldives	—	—	—	—	—	—	—	—	—	—
Mauritius	—	—	—	—	—	—	—	—	—	—
Mediterranean Ports	—	4,000	—	—	40,358	137,797	54,933	1,87,558	3,05,701	3,83,710
Nicobars	—	—	—	—	—	—	—	—	—	—
Persian Gulf	14,02,350	13,49,880	—	—	49,134	205,217	67,597	279,726	12,078	15,697
Portugal	—	—	—	—	—	8,668	—	11,798	—	—
Red Sea	4,250	21,200	—	—	708,323	847,347	9,63,662	4,72,731	—	—
Russia	—	—	—	—	—	—	—	—	—	—
Siam	—	—	—	—	—	—	—	—	—	—
Sonmiyani and Mekran	—	—	—	—	—	—	—	—	—	—
Spain	—	—	—	—	—	19,087	—	25,980	—	—
Suez	12,008	12,544	3,677	—	—	—	—	—	3,53,346	4,44,048
Straits Settlements	94,459	55,083	—	—	—	—	—	—	61,319	87,162
Sumatra	—	—	—	—	—	—	—	—	—	—
Switzerland	—	—	—	—	—	—	—	—	—	—
Turkey	—	—	—	—	—	—	—	—	—	—
United Kingdom	31,607	12,346	51,28,781	32,70,123	5,248,955	4,665,879	79,02,253	71,15,826	16,20,814	22,17,963
West Indian Islands	—	—	—	—	—	—	—	—	—	—
Other Countries	300	—	—	98	13	1,246	182	1,545	1,580	3,880
Total	17,14,396	17,67,353	51,32,458	32,74,656	6,136,775	5,534,936	91,39,149	82,87,030	48,09,178	56,06,464
Share of each Presidency, &c.:—										
Bengal	1,22,950	1,18,454	21,09,678	25,38,483	5,765,169	4,955,658	87,03,794	76,84,153	10,20,703	14,12,553
Bombay	15,86,373	16,30,474	23,71,275	3,45,417	1,706	1,486	6,009	4,329	24,67,031	24,81,913
British Burmah	—	502	—	—	369,328	577,786	428,948	6,98,524	12,13,575	16,20,873
Madras	5,073	17,423	6,02,319	3,60,277	561	8	374	22	90,930	80,916
Sind	—	500	49,186	30,479	11	3	24	2	8,139	11,110

* The duty on Silk thread was raised to 7½ per cent. in 1872-3.

No. 6—cont.

FOREIGN TRADE.

INDIAN IMPORTS.

Countries whence Imported.	SILK (Raw). 7½ per cent. duty.				SPIRITS. 3 lbs. per imperial gallon duty.				SUGAR. and other saccharine produce. 7½ per cent. duty.	
	Quantities in lbs.		Value in Rupees.		Quantities in Gallons.		Value in Rupees.		Value in Rupees.	
	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.
Aden	—	—	—	—	—	—	—	—	—	—
Africa	—	—	—	—	—	—	—	—	—	1,138
America	—	—	—	—	—	—	—	—	—	—
Austria	—	—	—	—	—	—	—	—	—	—
Australia	—	—	—	—	—	—	—	—	—	—
Belgium	—	—	—	—	—	—	—	—	—	—
Bourbon	—	—	—	—	—	—	—	—	—	—
Cape of Good Hope	—	—	—	—	—	—	—	—	—	—
Ceylon	—	51,843	—	1,07,373	589	655	4,171	7,483	11,050	35,624
China	1,465,101	1,530,611	1,51,893	51,27,995	141	616	1,222	1,511	12,15,567	11,19,705
Denmark	—	—	—	—	646	—	3,640	—	—	—
France	—	—	—	—	168,948	142,697	14,18,758	11,24,830	—	—
Germany	—	—	—	—	2,345	16,955	11,159	70,185	—	—
Gibraltar	—	—	—	—	—	—	—	—	—	—
Holland	—	—	—	—	6,150	16,168	34,280	91,802	—	—
Hong Kong	13,518	41,762	23,751	71,494	—	636	—	2,895	—	—
Japan	—	—	—	—	—	—	—	—	—	—
Java	—	—	—	—	165	—	1,048	—	—	—
Junkscylon	—	—	—	—	—	—	—	—	—	—
Laccadives and Maldives	—	—	—	—	—	—	—	—	37,440	—
Mauritius	—	—	—	—	1,819	7,601	8,506	10,955	58,52,669	28,34,751
Mediterranean Ports	—	309	—	1,545	51,669	38,667	4,72,325	3,47,119	—	3,709
Nicolars	—	—	—	—	—	—	—	—	—	—
Persian Gulf	26,943	48,944	1,34,771	2,44,729	—	—	—	—	2,543	—
Red Sea	—	—	—	—	—	—	—	—	—	—
Russia	—	—	—	—	—	—	—	—	—	—
Siam	1,305	—	5,280	—	—	—	—	—	8,043	—
Somiyani and Makran	—	—	—	—	—	—	—	—	—	—
Spain	—	—	—	—	—	—	—	—	—	—
Suez	259,411	9,564	10,56,338	38,790	1,294	3,906	10,762	24,938	—	—
Straits Settlements	18,090	234,490	61,433	9,41,546	21,741	34,819	1,35,207	1,79,576	4,59,428	3,76,387
Sumatra	—	—	—	—	—	—	—	—	—	—
Switzerland	—	—	—	—	—	—	—	—	—	—
Turkey	—	—	—	—	—	—	—	—	—	—
United Kingdom	15,095	12,774	82,905	60,086	415,681	460,447	55,00,488	36,74,684	7,767	6,308
West India Islands	—	—	—	—	231	—	1,770	—	—	—
Other Countries	128	664	420	1,244	207	442	1,517	2,860	3,278	4,166
Total	1,799,591	1,950,910	66,15,946	65,94,802	671,626	723,609	66,04,853	65,38,838	70,97,785	44,01,461
Share of each Presidency, &c. :										
Bengal	13,521	41,856	23,791	71,750	256,222	285,269	22,10,738	23,67,041	3,967	1,780
Bombay	1,654,661	1,736,659	59,55,625	59,10,268	264,537	228,864	20,92,122	15,72,277	68,53,984	41,19,246
British Borneo	126,732	149,194	5,09,136	5,97,039	51,720	91,157	3,58,659	5,15,173	1,69,697	2,43,654
Madras	2,010	264	13,901	1,056	76,043	88,440	6,76,917	7,60,803	70,081	56,598
Sind	2,637	2,933	13,193	14,689	24,104	29,879	2,66,117	3,23,544	56	183

No. 6.—cont.

FOREIGN TRADE.

INDIAN IMPORTS.

Countries whence Imported.	TEA. 7½ per cent. duty.		TOBACCO, and articles used in consumption of. 10 per cent. duty (7½ per cent. on pipes.)		WINES and LIQUEURS. From 1 to 1½ Rs. per imperial gallon duty.			
	Quantities in lbs. and value in Rupees.*		Value in Rupees.		Quantities in gallons.		Value in Rupees.	
	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.
Adon	—	—	6,570	—	—	103	—	1,332
Africa	—	—	9,626	26,659	—	546	—	1,972
America	—	—	91,809	45,633	165	—	1,130	—
Austria	—	—	—	—	—	97	—	1,160
Australia	—	—	6,906	—	846	6,015	5,839	36,730
Belgium	—	—	—	—	—	—	—	—
Bourbon	—	—	—	—	—	236	—	1,533
Cape of Good Hope	—	—	—	—	183	—	1,195	—
Ceylon	71,743	1,52,649	50,467	57,196	469	661	3,442	5,838
China	11,99,330	14,44,078	24,454	20,616	—	499	—	4,842
Denmark	—	—	—	—	—	—	—	—
France	—	—	—	2,148	116,612	83,709	7,84,545	6,15,644
Germany	—	—	—	—	2,234	7,233	12,331	40,823
Gibraltar	—	—	—	—	1,312	1,939	9,996	17,816
Holland	—	—	1,745	—	3,105	1,653	14,962	10,835
Hong Kong	4,37,907	5,73,739	—	61,833	—	—	—	—
Japan	—	—	—	—	—	—	—	—
Java	—	—	—	—	—	—	—	—
Junkscylon	—	—	—	—	—	—	—	—
Laccadives and Maldives	—	—	—	—	—	—	—	—
Mauritius	—	—	—	—	1,085	785	6,066	4,184
Mediterranean Ports	—	—	4,990	3,916	20,659	26,688	1,26,275	1,55,031
Nicobars	—	—	—	—	—	—	—	—
Persian Gulf	—	2,743	—	—	—	—	—	—
Red Sea	—	—	—	—	—	—	—	—
Russia	—	—	—	—	—	—	—	—
Siam	—	—	—	—	—	—	—	—
Sonmiyani and Mekran	—	—	—	—	—	—	—	—
Spain	—	—	—	—	—	—	—	—
Suez	2,029	1,301	50,777	28,615	8,459	10,896	52,444	70,463
Straits Settlements	1,52,828	1,78,524	2,00,840	1,54,370	2,143	1,425	12,087	7,456
Sumatra	—	—	—	—	—	—	—	—
Switzerland	—	—	—	—	1,303	—	10,350	—
Turkey	—	—	—	—	—	—	—	—
United Kingdom	1,60,119	1,10,633	4,30,813	3,73,850	408,614	449,679	39,02,754 } † & 10,895 }	41,14,037
West Indian Islands	—	—	—	—	—	—	—	—
Other Countries	1,123	2,094	4,785	5,918	54	667	3,473 } † and 45 }	3,114
Total	20,25,129	24,65,761	9,60,434	7,80,754	567,731	592,831	49,46,880 } & 10,940† }	50,92,850
Share of each Presidency, &c.:								
Bengal	5,25,594	6,62,895	5,92,251	4,55,801	2,52,737	258,566	22,89,958†	23,51,662
Bombay	12,37,655	15,90,822	2,45,827	1,90,320	1,82,388	190,718	14,30,827†	14,28,363
British Burmah	77,610	91,051	36,865	39,928	22,160	26,227	1,70,538†	2,08,332
Madras	1,83,020	1,20,867	81,618	65,328	95,171	102,807	8,72,947†	9,42,619
Sind	1,250	126	3,873	9,377	15,281	14,513	1,82,619†	1,61,874

* The value in Rupees of the tea imported in 1871-2 and 1872-3 was exactly the same as the quantity in lbs.; each lot being valued at one Rupee per lb.

† Quantity not stated.

‡ Exclusive of quantity of which value is not stated.

No. 6.—cont.

FOREIGN TRADE.

INDIAN IMPORTS.

Countries whence Imported.	WOOLLEN GOODS. 6 and 7½ per cent. duty.		WOOL (Raw). Free.				Total value in Rupees of Indian Imports from each country.	
	Value in Rupees.		Quantities in lbs.		Value in Rupees.			
	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.
Aden	—	—	—	—	—	—	7,26,871	6,78,409
Africa	—	4,100	—	—	—	—	18,13,830	10,85,158
America	—	—	—	—	—	—	7,31,771	6,25,319
Austria	—	—	—	—	—	—	—	13,101
Australia	4,000	—	—	—	—	—	26,54,527	8,91,375
Belgium	—	—	—	—	—	—	—	—
Bourbon	—	—	—	—	—	—	—	12,438
Cape of Good Hope	—	—	—	—	—	—	—	—
Ceylon	1,881	—	—	—	—	—	47,29,784	48,24,536
China	2,269	—	—	—	—	—	1,12,69,686	1,17,88,397
Denmark	—	—	—	—	—	—	—	1,936
France	12,797	4,934	—	—	—	—	34,14,973	35,94,426
Germany	—	—	—	—	—	—	3,35,010	4,74,940
Gibraltar	—	—	—	—	—	—	—	18,033
Holland	—	—	—	—	—	—	1,12,522	1,16,369
Hong Kong	—	—	—	—	—	—	23,16,444	17,63,320
Japan	—	—	—	—	—	—	1,10,481	2,14,355
Java	—	—	—	—	—	—	—	8,000
Junkseylon	—	—	—	—	—	—	56,025	27,687
Laccadives and Maldives	—	—	—	—	—	—	6,82,217	5,07,112
Mauritius	—	—	—	—	—	—	54,05,321	28,88,668
Mediterranean Ports	87,970	56,958	—	—	—	—	28,42,576	29,78,931
Nicobars	—	—	—	—	—	—	—	3,950
Persian Gulf	14,533	22,523	891,162	1,123,228	2,69,340	3,58,347	52,21,092	65,13,875
Red Sea	—	—	55,160	61,904	9,690	17,176	17,71,916	13,16,396
Russia	—	—	—	—	—	—	—	1,355
Siam	—	—	—	—	—	—	—	4,859
Somaliyai and Mckout	—	—	564,130	507,484	1,43,780	1,32,830	4,01,236	2,59,107
Spain	—	—	—	—	—	—	—	27,230
Suez	7,13,394	7,11,101	—	14,616	—	6,570	1,94,90,060	1,64,87,811
Straits Settlements	99,179	69,245	—	—	—	—	75,17,954	66,28,151
Sumatra	—	—	—	—	—	—	2,78,910	2,37,908
Switzerland	—	—	—	—	—	—	—	11,549
Turkey	—	—	—	—	—	—	73,019	33,343
United Kingdom	42,07,411	63,20,260	—	21,641	—	11,632	23,87,99,409	24,76,56,931
West Indian Islands	—	—	—	—	—	—	—	1,155
Other Countries	5,511	6,178	953	2,011	609	498	81,801	9,784
Total	61,41,936	71,95,299	1,511,411	1,733,884	4,23,419	5,27,053	31,08,37,474	31,26,05,614
Share of each Presidency, &c. :—								
Bengal	26,97,514	44,72,166	—	—	—	—	14,95,53,921	15,39,61,897
Bombay	17,53,537	20,82,833	1,175,228	1,441,777	5,35,838	4,53,216	10,43,20,582	10,56,32,957
British Burmah	4,51,930	4,03,491	20	—	50	—	1,39,12,171	1,68,04,250
Madras	2,37,759	2,13,371	296	535	429	168	3,12,95,784	3,29,64,013
Sind	21,225	18,438	535,872	291,572	87,102	71,371	39,10,787	32,42,497

No. 7.

FOREIGN TRADE.

IMPORTS AND EXPORTS OF GOLD AND SILVER BULLION AND SPECIE FOR 1871-2 AND 1872-3.

Countries whence Imported.	IMPORTS.					
	GOLD.		SILVER.		TOTAL OF GOLD AND SILVER.	
	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Aden	2,68,744	2,95,375	6,18,678	4,63,248	8,87,422	7,58,623
African Coast	72,675	4,87,050	1,93,730	1,60,965	2,66,405	6,48,015
Arabia	18,480	—	21,500	—	40,455	—
Australia	30,81,074	36,64,728	—	—	30,81,250	36,64,728
Bourbon	3,77,387	7,00,000	—	—	3,77,387	7,00,000
Ceylon	34,91,903	23,56,650	26,54,923	18,44,765	61,46,826	42,01,415
China (including Hong Kong) .	1,33,17,463	86,09,688	1,32,41,409	16,12,730	2,65,58,872	1,02,22,413
France	1,33,332	77,057	20,03,709	1,11,513	21,37,041	1,88,570
Japan	—	—	57,000	45,700	57,000	45,700
Mauritius	1,57,569	1,13,581	63,153	—	2,20,722	1,13,581
Penang and Malacca	21,150	10,580	66,865	5,625	88,015	16,205
Persian Gulf	2,78,916	4,31,441	30,35,393	18,05,608	33,14,309	22,37,049
Red Sea	9,06,028	14,79,855	12,24,071	14,67,565	21,30,999	29,17,420
Siam	—	—	1,24,678	1,01,390	1,24,678	1,01,390
Singapore	2,02,162	4,29,708	10,33,039	5,93,041	12,35,141	10,22,749
United Kingdom (including Suez).	1,34,06,956	75,18,174	5,56,08,153	1,10,73,288	6,90,15,109	1,85,91,462
Other Countries	4,000	49,830	52,498	56,700	56,498	1,06,530
TOTAL	3,57,37,779	2,62,23,712	8,00,00,350	1,93,42,138	11,57,38,129	4,55,85,850

Countries whither Exported.	EXPORTS.					
	GOLD.		SILVER.		TOTAL OF GOLD AND SILVER.	
	1871-2.	1872-3.	1871-2.	1872-3.	1871-2.	1872-3.
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Aden	2,450	—	7,89,625	51,000	7,89,075	51,000
Africa	—	—	—	—	—	—
Arabia	—	—	—	—	—	—
Australia	—	—	—	—	—	—
Bourbon	—	—	—	—	—	—
Ceylon	6,000	5,02,000	75,96,240	74,95,000	76,02,240	79,97,000
China	—	20,066	13,43,350	11,97,320	13,43,350	12,17,385
France	—	5,500	6,425	3,700	6,425	9,200
Japan	—	—	—	—	—	—
Mauritius	—	—	10,33,000	1,00,000	10,33,000	1,00,000
Penang and Malacca	—	3,100	37,675	1,10,403	37,675	1,13,503
Persian Gulf	73,250	1,02,025	11,31,030	17,75,391	15,04,280	18,77,416
Red Sea	—	2,650	90,950	1,59,485	90,950	1,62,135
Siam	—	—	—	3,000	—	3,000
Singapore	1,000	1,01,350	7,80,208	12,56,665	7,81,208	13,57,415
United Kingdom (including Suez).	340	1,220	15,63,632	17,780	15,63,972	19,000
Other countries	1,300	52,175	8,350	21,560	9,650	73,735
TOTAL	84,340	7,90,086	1,46,76,585	1,21,90,704	1,47,60,925	1,29,50,799

No. 8.

FOREIGN TRADE.

NUMBER AND TONNAGE OF VESSELS.

ENTERED.

Whence Arrived.	1871-2.						1872-3.					
	With Cargoes.		In Ballast.		TOTAL.		With Cargoes.		In Ballast.		TOTAL.	
	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.
Adan	14	12,834	56	63,222	70	76,056	16	11,440	63	65,119	79	76,559
Australia	37	34,085	9	9,395	46	44,380	31	33,556	12	12,450	43	46,006
Capo of Good Hope	3	995	5	3,404	8	4,399	8	5,382	18	8,006	26	13,388
Ceylon	1,198	130,715	2,002	224,548	3,200	355,263	1,220	131,273	1,938	215,278	3,158	346,551
Hong Kong	28	29,449	11	8,558	39	38,007	28	30,998	10	8,296	38	39,294
Mauritius	46	30,968	46	30,621	92	61,589	34	21,004	78	66,940	112	87,944
Nicebars	—	—	—	—	—	—	1	160	—	—	1	160
Straits Settlements	297	113,164	95	50,542	392	163,696	275	107,044	79	52,212	354	159,256
United Kingdom	925	1,014,173	21	17,747	946	1,031,920	841	968,052	33	25,495	874	993,547
Other Possessions	2	2,267	5	3,387	7	5,654	—	—	3	1,872	3	1,872
TOTAL OF BRITISH POSSESSIONS	2,550	1,369,540	2,250	411,424	4,800	1,780,964	2,454	1,308,909	2,234	455,668	4,688	1,764,577
African Coast	60	8,119	1	400	61	8,519	47	8,491	5	2,372	52	10,863
America, South & Central	7	5,036	60	44,028	67	49,064	8	6,560	160	122,011	168	128,571
Bourbon	3	720	11	5,435	14	6,155	2	723	29	14,566	31	15,279
China	30	37,430	4	1,408	34	38,838	32	44,430	3	1,583	35	46,013
Franco	23	12,737	3	1,895	26	14,632	31	19,669	5	2,533	36	22,202
Germany	9	7,084	23	15,725	32	22,809	12	6,955	18	12,329	30	19,284
Holland	2	1,002	1	698	3	1,600	1	399	8	5,309	9	5,708
Java	—	—	4	2,640	4	2,640	1	795	2	1,222	3	2,017
Red Sea & Persian Gulf	505	131,026	45	12,521	550	143,547	519	133,873	13	6,875	532	140,748
Siam	14	935	13	959	27	1,897	6	389	31	2,285	37	2,674
Spain	—	—	—	—	—	—	1	954	—	—	1	954
Suez	85	125,946	2	1,633	87	127,579	74	113,194	12	9,029	86	132,223
Sumatra	19	4,215	—	—	19	4,215	19	4,610	—	—	19	4,610
United States	25	24,203	6	6,851	31	31,154	15	16,445	7	8,319	22	24,764
Other Countries	536	54,248	47	14,872	383	49,120	287	41,943	59	19,099	346	61,042
TOTAL OF FOREIGN COUNTRIES	1,118	392,824	220	103,965	1,338	501,789	1,055	399,430	352	207,522	1,407	606,952
GRAND TOTAL	3,668	1,762,364	2,470	520,389	6,138	2,282,753	3,509	1,708,339	2,586	663,190	6,095	2,371,529

NATIONALITY OF ABOVE.

American	48	51,323	24	26,169	72	77,552	39	41,629	25	28,551	64	70,180
Arab	377	37,903	9	1,052	386	38,955	273	35,573	6	530	279	36,103
Austrian	11	9,442	1	640	12	10,082	19	17,253	8	6,555	27	23,818
Belgian	2	1,662	1	1,047	3	2,709	1	1,047	—	—	1	1,047
British	1,400	1,370,808	447	249,954	1,847	1,620,762	1,276	1,303,184	518	333,878	1,789	1,636,562
British Indian	1,714	185,199	1,804	152,086	3,518	337,285	1,611	192,059	1,725	132,219	3,336	324,278
Danish	—	—	2	863	2	863	1	1,095	2	1,390	3	2,485
Dutch	6	2,850	5	2,780	13	5,586	4	1,715	7	5,293	11	7,008
French	74	45,076	83	14,056	107	69,132	83	49,685	67	33,787	150	83,472
German	24	17,370	44	25,979	68	43,342	16	8,058	46	27,165	62	35,218
Italian	31	22,231	26	16,586	57	38,837	39	27,319	97	58,160	136	85,479
Norwegian	9	6,085	19	12,093	28	18,178	10	8,427	31	19,396	41	27,823
Portuguese	13	1,481	—	—	13	1,481	14	2,997	—	—	14	2,997
Russian	6	5,193	10	7,220	16	12,413	6	5,508	10	6,857	16	12,365
Spanish	—	—	7	482	1	482	4	2,090	3	1,609	7	3,699
Swedish	2	1,057	13	7,347	15	8,404	2	1,866	14	6,848	16	8,214
Siamese	8	1,408	5	1,418	13	2,826	13	1,912	—	—	13	1,912
Other Nationalities	41	3,190	28	684	67	3,874	98	7,427	32	1,242	180	8,669

FOREIGN TRADE.

NUMBER AND TONNAGE OF VESSELS.
CLEARED.

Whence Arrived.	1871-2.						1873-8.					
	With Cargoes.		In Ballast.		TOTAL.		With Cargoes.		In Ballast.		TOTAL.	
	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.
Aden	29	6,103	1	189	30	6,297	44	9,035	—	—	44	9,035
Australia	19	10,413	1	1,232	20	11,645	20	20,258	1	1,232	21	21,490
British West Indies	—	—	—	—	—	—	2	1,582	—	—	2	1,582
Ceylon	2,421	2,553,48	860	81,914	3,281	3,37,262	2,650	2,49,907	687	69,518	3,337	3,19,455
Cape of Good Hope	3	1,002	—	—	3	1,002	12	4,841	—	—	12	4,841
Hong Kong	55	36,051	2	83	57	36,134	43	41,685	—	—	43	41,685
Mauritius	111	71,116	2	1,656	113	72,772	176	1,19,043	1	734	177	1,20,677
Nicobars	5	1,310	—	—	5	1,310	5	1,360	—	—	5	1,360
Straits Settlements	381	1,29,846	4	4,899	385	1,34,745	338	1,25,126	3	1,383	341	1,26,509
United Kingdom	1,081	10,83,339	3	3,413	1,084	10,86,752	1,093	10,92,094	12	15,623	1,105	11,07,717
Other British Settlements	8	6,841	—	—	8	6,841	17	13,175	—	—	17	13,175
TOTAL OF BRITISH POSSESSIONS }	4,113	16,01,374	873	93,386	4,986	16,04,760	4,400	16,82,006	704	89,520	5,104	17,70,526
African Coast	61	8,721	1	335	62	9,056	59	8,716	—	—	59	8,716
America, United States	104	1,17,956	4	4,591	108	1,22,547	103	1,21,189	—	—	103	1,21,189
America, South & Central	28	23,690	—	—	28	23,690	39	37,003	1	1,042	40	28,045
Bourbon	23	10,421	—	—	23	10,421	18	8,899	—	—	18	8,899
China	43	59,139	1	379	44	59,498	36	48,793	—	—	36	48,793
Denmark	2	1,414	—	—	2	1,414	1	457	—	—	1	457
France	153	95,648	1	397	154	96,045	194	58,565	—	—	194	58,565
Germany	21	14,657	—	—	21	14,657	17	11,724	—	—	17	11,724
Holland	11	9,294	—	—	11	9,294	8	4,164	—	—	8	4,164
Java	5	3,450	2	1,896	7	5,346	9	7,348	4	3,625	13	10,873
Red Sea & Persian Gulf	556	1,43,189	7	1,580	563	1,44,769	425	1,22,162	23	3,817	448	1,26,009
Siam	17	1,172	—	—	17	1,172	32	6,597	—	—	32	6,597
Spain	7	4,015	—	—	7	4,015	3	2,387	—	—	3	2,387
Suez	89	1,23,050	—	—	89	1,23,050	80	1,20,995	—	—	80	1,20,995
Sumatra	7	1,409	—	—	7	1,409	7	1,307	—	—	7	1,307
Other Countries	239	49,415	51	1,686	291	51,101	287	45,511	11	3,754	298	49,265
TOTAL OF FOREIGN COUNTRIES }	1,318	6,57,640	67	10,844	1,415	6,68,484	1,228	6,95,757	39	12,168	1,267	6,17,926
GRAND TOTAL	5,461	22,59,014	940	1,04,230	6,401	23,63,244	5,628	22,87,763	743	1,00,688	6,371	23,88,451

NATIONALITY OF ABOVE.

American	59	62,643	2	3,047	61	65,690	62	68,692	3	3,159	65	71,851
Arab	209	44,616	2	258	301	44,874	286	42,851	3	273	289	43,124
Austrian	13	9,866	—	—	13	9,866	24	21,785	—	—	24	21,785
Belgian	4	3,207	—	—	4	3,207	1	1,047	—	—	1	1,047
British	1,859	1,627,882	538	68,399	2,197	1,696,281	1,667	1,570,379	144	59,939	1,811	1,630,318
British Indian	2,780	296,304	581	31,624	3,364	327,928	2,989	259,819	643	34,551	3,632	314,370
Danish	1	498	—	—	1	498	2	1,399	—	—	2	1,399
Dutch	10	4,883	—	—	10	4,883	12	8,268	—	—	12	8,268
French	194	93,661	1	387	195	94,048	227	118,912	1	838	228	119,750
German	62	38,466	—	—	62	38,466	61	35,522	—	—	61	35,522
Italian	48	32,378	—	—	48	32,378	128	79,752	1	881	129	80,633
Norwegian	25	15,829	—	—	25	15,829	32	19,106	1	528	33	19,634
Portuguese	11	1,827	—	—	11	1,827	12	2,684	1	20	13	2,704
Russian	13	10,772	—	—	13	10,772	18	14,419	—	—	18	14,419
Spanish	2	950	—	—	2	950	7	3,910	—	—	7	3,910
Swedish	10	5,829	1	371	11	6,200	13	7,797	—	—	13	7,797
Siamese	9	1,678	—	—	9	1,678	14	1,956	—	—	14	1,956
Other Nationalities	62	7,725	12	144	74	7,869	73	8,564	46	499	119	9,063

Note.—The average tonnage of each vessel engaged in the Foreign Trade of India was, during the year 1871-2, 370 tons, and during the year 1872-3, 381 tons.

No. 9.

COASTING TRADE.

EXPORTS.

Whither Exported.	APPAREL.		COCOANUTS, Shells, Kernels, and Copra.		COFFEE.		COIR and Manufactures of.	
	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.
Bengal	41,150	27,748	3,15,618	3,53,996	73,441	62,087	1,09,747	1,08,406
Bombay	83,295	1,12,684	27,05,862	24,61,174	8,96,196	3,60,026	3,83,554	5,80,373
British Burmah	4,36,301	6,01,647	18,628	—	5,802	14,603	30,614	43,001
Daman	—	—	—	—	—	—	—	—
Diu	—	—	—	—	—	—	—	—
Gujrat	—	—	—	—	38	—	—	—
Goa	13,291	20,989	1,539	9,193	52	1,060	25,554	19,603
Kach	2	50	1,03,294	1,31,134	266	4,009	29,422	52,732
Karikal	—	—	—	—	140	—	—	—
Madras	3,93,626	3,68,473	1,338	1,354	6,690	5,121	875	4,958
Maha	—	—	18	—	—	—	—	—
Pondicherry	4,926	5,455	—	—	254	56	879	6,211
Sind	1,75,898	1,66,062	4,16,997	3,30,665	15,728	19,978	19,197	28,725
Traivancore	118	—	—	—	—	—	3,120	6,141
TOTAL	11,48,608	13,03,108	35,63,294	32,97,214	9,98,407	4,66,940	6,02,962	8,59,150

Whither Exported.	COTTON, Manufactures of.		COTTON, Raw.		FRUIT and VEGETABLES.		GRAIN and PULSE	
	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.
Bengal	8,68,488	10,52,603	3,58,209	5,97,129	75,455	60,967	25,140	41,148
Bombay	9,11,545	7,51,735	21,78,100	13,56,019	7,58,733	2,05,541	1,24,45,211	1,10,05,349
British Burmah	42,91,584	51,81,876	—	27,633	1,72,928	1,41,750	1,10,878	1,51,009
Daman	—	—	—	—	—	—	—	—
Diu	—	—	—	—	—	—	—	—
Gujrat	—	—	—	—	43	—	2,219	—
Goa	2,56,789	2,14,931	—	154	9,309	6,027	5,18,602	5,54,870
Kach	—	—	—	—	192	514	1,09,599	1,01,454
Karikal	—	—	—	—	135	420	—	—
Madras	1,01,35,177	95,45,607	1,425	2,774	1,43,907	1,57,006	25,39,629	34,16,930
Maha	—	—	—	—	—	—	—	—
Pondicherry	5,54,614	6,01,115	50,000	1,32,578	55	102	1,29,368	1,03,132
Sind	70,05,496	68,82,324	100	—	33,716	30,286	1,32,127	1,39,995
Traivancore	2,631	828	—	—	3,663	208	34,344	91,069
TOTAL	2,42,26,324	2,42,30,919	25,87,834	21,16,287	11,98,136	6,02,821	1,60,43,117	1,56,05,860

Whither Exported.	HIDES and SKINS.		INDIGO.		JUTE and Manufactures of.		METALS and Manufactures of.	
	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.
Bengal	6,82,456	14,10,629	1,30,501	2,788	49,737	44,032	2,78,842	5,09,061
Bombay	6,38,082	6,47,852	10,98,714	8,33,640	25,57,149	31,33,076	2,25,290	3,21,565
British Burmah	70,492	75,774	280	473	21,37,486	33,58,540	12,81,721	14,36,589
Daman	—	—	—	—	—	—	—	—
Diu	—	—	—	—	—	—	—	—
Gujrat	—	—	—	—	—	—	—	—
Goa	—	96	803	538	3,971	4,797	44,054	35,445
Kach	—	—	—	—	—	25	69	—
Karikal	—	—	—	—	60	—	85	1,484
Madras	16,776	1,35,273	445	317	10,13,243	8,27,008	17,86,650	18,15,542
Maha	—	400	—	—	—	—	—	—
Pondicherry	250	2,073	1,223	2,704	25,836	28,500	12,798	2,936
Sind	5,182	1,39,178	—	850	1,46,186	2,63,305	6,99,827	7,80,212
Traivancore	—	—	—	—	210	600	1,390	264
TOTAL	14,13,188	24,11,275	12,31,066	8,41,310	59,33,878	78,59,892	43,30,725	49,12,098

No. 9—cont.

COASTING TRADE.

EXPORTS.

Whither Exported.	OILS, Vegetable and Mineral.		PROVISIONS and OILMAN'S STORES.		SALT.		SEEDS.	
	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.
Bengal	133,890	4,48,446	46,953	26,816	5,44,545	16,02,437	12,10,754	10,14,378
Bombay	2,856,698	30,87,665	511,571	6,20,392	—	534	7,92,546	6,35,120
British Burmah	333,955	3,66,257	593,990	6,76,317	483	2,448	51,900	72,554
Damaun	352	—	—	—	—	—	—	—
Diu	—	—	—	—	—	—	—	—
Gujrat	—	—	—	—	—	—	48	—
Goa	18,130	5,352	6,678	16,235	—	—	10,363	7,347
Kach	18,696	26,171	893	7,960	—	—	39,876	11,191
Karikal	—	—	—	—	—	—	—	—
Madras	26,808	38,246	62,716	71,769	21,11,063	27,61,085	2,59,276	2,89,572
Mahé	—	—	2,422	3,076	—	—	—	621
Pondicherry	18,196	22,489	5,801	1,267	—	—	12,036	10,103
Sind	75,191	69,892	78,996	65,891	—	—	49,958	26,731
Travancore	26,783	28,314	374	924	—	—	2,920	—
TOTAL	3,508,698	40,92,832	13,10,394	14,90,677	26,56,091	43,66,504	24,29,157	21,18,120

Whither Exported.	SILK, Raw and Manufactured.		SPICES.		SUGAR, { and other Saccharine Matter.		TEA.	
	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.
Bengal	—	16,963	4,58,062	8,91,328	8,349	8,133	2,480	1,18,855
Bombay	3,83,661	1,25,949	13,55,670	11,27,608	41,06,416	45,75,418	46,311	16,840
British Burmah	18,38,905	16,76,220	9,46,911	13,36,814	1,20,963	3,04,545	5,549	7,147
Damaun	—	—	—	—	—	—	—	—
Diu	—	—	—	—	70	—	—	—
Gujrat	—	—	7,779	—	—	—	—	—
Goa	12,807	7,055	10,497	4,231	45,471	44,512	4,663	7,658
Kashe	—	—	1,16,788	1,77,773	38,326	21,656	—	—
Karikal	—	—	2,798	—	4,503	1,045	—	—
Madras	—	31,91,910	1,73,426	2,12,421	2,06,465	2,15,420	80,631	96,440
Mahé	28,48,925	—	10,500	12,581	—	—	—	—
Pondicherry	1,814	3,672	23,862	22,856	56,093	74,838	370	702
Sind	3,59,835	2,48,588	487,584	4,96,276	11,84,027	10,35,936	2,37,398	1,94,201
Travancore	—	—	234	5,417	8	—	28	56
TOTAL	54,38,932	62,69,457	35,94,109	42,87,355	57,70,601	63,68,663	3,77,340	3,81,870

Whither Exported.	TEAK TIMBER.		TOBACCO and Articles used in Con- sumption of.		WOOD and Manufactures of.		WOOL and Manufactures of.		Total value of all Articles exported coastwise.	
	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.
Bengal	9,27,022	15,50,168	87,524	84,762	62,067	71,928	60,343	77,311	80,69,243	1,20,61,919
Bombay	13,89,359	15,08,299	1,26,462	92,938	6,16,790	6,67,244	53,81,975	52,22,013	4,39,90,968	4,06,81,725
British Burmah	—	—	13,03,442	9,11,900	19,287	20,488	2,88,814	6,67,297	1,52,78,980	1,91,45,653
Damaun	—	—	—	—	—	—	—	—	3,087	—
Diu	—	—	—	—	—	—	—	—	2,448	—
Gujrat	—	—	—	—	—	—	—	—	10,197	1,500
Goa	230	1,306	13,191	20,154	8,648	3,533	21,862	25,718	11,20,437	11,97,022
Kach	23,890	43,459	356	2,377	51,987	1,05,569	—	—	6,46,193	7,26,586
Karikal	—	—	—	—	248	1,593	—	—	8,297	5,602
Madras	2,95,411	5,44,596	11,807	18,459	2,08,582	2,65,121	2,66,082	2,29,142	2,45,51,743	2,61,79,359
Mahé	—	—	—	—	5,314	6,913	—	—	19,441	24,350
Pondicherry	2,900	5,100	1,068	1,980	31,967	74,775	2,592	1,219	12,77,555	11,19,935
Sind	23,224	75,733	41,269	35,328	60,710	47,471	1,31,846	1,23,689	1,21,90,480	1,21,59,652
Travancore	—	—	18	7,327	2,818	15	—	—	81,833	1,46,137
TOTAL	26,61,917	37,32,661	15,88,777	11,75,431	10,68,478	11,64,651	61,53,514	63,46,389	10,71,52,822	11,32,69,931

No. 10.

COASTING TRADE.

IMPORTS.

Whence Imported.	APPAREL.		COCOANUTS, Kernels and Shells.		COFFEE.		COTTON (Raw).	
	1872. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.
Bengal	5,68,057	5,57,282	58,511	1,09,020	3,324	5,006	8,526	20,992
Bombay	4,49,874	3,89,974	5,64,709	6,11,496	42,240	56,418	23,403	31,137
British Burmah	18,815	14,417	10,462	9,134	125	1,320	1,77,112	2,53,944
Daman	—	—	—	—	—	—	—	—
Diu	—	—	—	—	—	—	—	—
Goa	62	18	4,90,257	6,40,965	624	952	47,030	15,200
Gujrat.	—	—	—	—	—	—	—	—
Kach	—	8	9	—	—	—	—	125
Karikal	1	—	388	—	—	—	—	—
Madras	81,104	54,677	48,02,171	42,37,117	3,29,258	3,85,142	3,05,848	3,93,795
Mahe	—	200	1,253	1,034	2,688	—	—	—
Pondicherry	6,984	2,206	449	2,314	—	—	40,629	15,000
Sind	10,103	35,925	—	26,090	820	150	15,10,676	7,71,460
Travancore	—	—	9,437	—	49,559	330	—	608
TOTAL	11,35,092	10,51,707	59,37,616	56,47,802	9,28,638	4,29,318	21,13,219	15,02,261

Whence Imported.	COTTON, Manufactures of.		GRAIN and PULSE.		HIDES and SKINS.		INDIGO.	
	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.
Bengal	49,20,600	40,15,079	1,08,94,167	1,14,46,012	9,763	1,21,923	3,140	20,000
Bombay	1,17,75,112	1,34,38,944	3,31,249	3,91,681	7,315	1,56,608	—	150
British Burmah	2,26,176	2,68,262	7,15,190	13,04,208	63,855	65,862	440	525
Daman	—	—	—	—	—	—	—	—
Diu	—	—	—	—	—	—	—	—
Goa	16,124	—	4,560	945	—	435	—	—
Gujrat.	—	—	—	—	—	—	—	—
Kach	—	392	1,103	1,165	—	—	—	—
Karikal	1,386	—	81,974	2,333	—	—	—	—
Madras	7,34,774	7,47,705	7,27,242	5,76,350	4,87,884	17,04,805	8,02,191	3,847
Mahe	—	—	—	—	—	—	—	—
Pondicherry	55,242	65,775	50	5,633	18,077	17,883	—	—
Sind	36,762	33,026	8,96,955	12,55,043	3,98,514	4,39,206	11,16,400	2,25,650
Travancore	—	—	800	255	—	—	—	—
TOTAL	1,78,16,176	1,86,64,283	1,36,53,290	1,49,83,225	9,85,408	25,06,721	19,22,171	2,50,182

Whence Imported.	JUTE and Manufactures of.		METALS and Manufactures of.		OILS (Animal, Vegetable, and Mineral).		OPIUM.	
	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.
Bengal	38,38,271	56,75,286	10,84,559	11,15,055	3,07,554	1,91,762	*3,26,070	2,11,020
Bombay	2,19,294	2,69,333	18,93,573	20,77,194	1,18,437	1,36,238	—	†20,000
British Burmah	12,450	1,102	2,21,862	1,34,736	2,22,040	3,12,753	—	—
Daman	—	—	—	—	—	—	—	—
Diu	—	—	—	—	—	—	—	—
Goa	1,019	496	4,043	65,826	8,293	2,946	—	—
Gujrat.	40	—	—	—	—	—	—	—
Kach	75	214	—	—	—	—	—	—
Karikal	—	2,275	227	95	—	—	—	—
Madras	46,900	31,365	38,562	1,65,852	26,71,204	30,78,196	—	—
Mahe	—	—	—	564	—	216	—	—
Pondicherry	—	608	845	1,155	141	21,253	—	—
Sind	25,532	25,937	68,998	23,316	8,870	5,475	—	—
Travancore	—	602	317	820	42,390	—	—	—
TOTAL	41,43,680	60,06,918	33,09,486	35,84,613	32,27,137	37,48,389	3,26,070	2,31,020

* All imported into British Burmah.

† All imported into Sind.

STATISTICAL TABLES.

No. 10.—cont

COASTING TRADE.

IMPORTS.

Whence Imported.	PROVISIONS and OILMAN'S STORES.		SALT.		SEEDS.		SILK and Manufactures of.	
	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.
Bengal	1,47,679	1,76,685	567	15,009	68,651	1,05,298	28,19,001	51,02,972
Bombay	1,31,526	1,61,280	7,25,383	9,93,401	1,51,419	1,35,459	4,61,886	3,36,251
British Burmah	21,263	10,445	—	—	41,441	1,42,123	11,155	14,981
Damaun	—	—	7,876	—	—	—	—	—
Diu	—	—	2,094	7,914	—	—	—	—
Goa	2,03,217	2,44,479	1,65,708	1,22,155	60	7	—	—
Gujrat	—	—	—	—	—	—	—	—
Kach	130	—	7,435	9,033	100	158	—	—
Karikal	15	10	—	—	17	3	43	—
Madras	2,93,184	3,78,872	2,48,612	2,18,879	14,57,745	8,02,210	1,23,518	14,706
Mabe	3,943	6,817	—	—	—	—	—	—
Pondicherry	1,297	4,653	—	—	8,089	259	20	—
Sind	3,34,523	2,06,145	105,394	—	1,68,216	1,13,127	8,906	30,385
Travancore	361	356	—	—	117	—	—	—
TOTAL	11,39,138	11,89,742	12,63,069	13,66,391	18,93,853	13,08,584	34,25,233	34,97,985

Whence Imported.	SPICES.		SUGAR and other saccharine Matter.		TEA.		TOBACCO and Articles used in the Consumption of	
	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.
Bengal	11,36,490	13,49,880	21,53,942	17,53,870	73,446	93,243	10,51,323	6,93,927
Bombay	9,76,951	8,59,079	12,76,948	11,66,196	2,04,142	1,34,779	75,746	56,307
British Burmah	60,293	41,109	473	633	1,86,360	3,40,513	17,381	18,666
Damaun	—	—	—	—	—	—	—	—
Diu	—	—	—	—	—	—	—	—
Goa	1,14,745	1,07,197	418	147	14	—	1	31
Gujrat	—	—	—	—	—	—	—	—
Kach	—	—	—	—	—	—	—	—
Karikal	223	1,936	49	39	—	—	—	5
Madras	13,41,456	17,67,529	4,96,057	41,217	40,832	1,634	4,25,523	1,44,522
Mabe	—	—	40	—	—	—	—	—
Pondicherry	—	1,786	108	73	—	—	167	312
Sind	3,798	1,14,311	1,129	2,934	—	—	69	1,203
Travancore	13,294	1,640	731	131	—	—	—	—
TOTAL	36,47,229	42,44,467	39,29,895	23,65,240	5,04,794	5,70,169	15,70,592	11,24,973

Whence Imported.	WOOD and Manufactures of.		WOOL and Manufactures of.		Total value of all Articles Imported Coastwise.	
	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.
Bengal	28,605	36,325	4,50,858	7,88,339	3,19,68,267	3,30,67,909
Bombay	2,53,860	3,49,079	2,80,012	2,63,161	2,25,24,161	2,48,66,914
British Burmah	27,19,735	38,59,449	36,754	12,123	58,40,381	79,75,818
Damaun	—	—	—	—	7,876	—
Diu	—	—	—	—	2,094	7,914
Goa	18,716	25,646	153	765	18,59,919	21,06,372
Gujrat	—	—	—	—	49	—
Kach	331	3,738	—	255	—	—
Karikal	4,501	156	5	—	55,521	21,022
Madras	6,46,431	6,20,784	22,890	86,801	90,962	15,196
Mabe	56	51	—	—	1,84,18,050	1,72,49,057
Pondicherry	2,418	856	30	—	10,117	20,721
Sind	19,791	37,285	48,72,533	40,35,892	4,66,529	3,10,691
Travancore	69,908	51,276	—	—	1,03,77,553	95,71,978
TOTAL	37,61,352	49,81,645	56,72,255	60,87,336	9,18,69,467	9,66,15,477

No. 11.

COASTING TRADE.

BULLION AND SPECIE.

IMPORTS.

GOLD.

	From British-Indian Ports.		From Indian Ports not British.		Total from all Ports.	
	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.
Bengal	2,50,300	5,100	—	—	2,50,300	5,100
Bombay	11,066	1,925	1,300	—	12,366	1,925
British Burmah	10,09,248	5,66,075	—	—	10,09,248	5,66,075
Madras	11,44,381	8,19,461	20,118	23,711	11,64,499	8,43,172
Sind	37,075	15,710	—	—	37,075	15,710
Total	24,52,570	14,08,271	21,418	23,711	24,73,988	14,31,682

SILVER.

Bengal	74,01,678	42,43,960	—	—	74,01,678	42,43,960
Bombay	26,34,720	60,487	10,093	10,005	26,44,813	70,492
British Burmah	69,87,254	1,28,36,146	—	—	69,87,254	1,28,36,146
Madras	26,61,379	50,75,282	39,826	21,650	26,91,196	50,96,941
Sind	1,51,619	2,66,178	—	—	1,51,619	2,66,178
Total	1,99,16,541	2,24,82,053	49,919	31,664	1,99,66,460	2,25,13,717

EXPORTS.

GOLD.

	To British-Indian Ports.		To Indian Ports not British.		Total to all Ports.	
	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.
Bengal	15,78,326	11,22,971	700	—	15,79,026	11,22,971
Bombay	9,99,696	5,73,465	—	5,000	9,99,696	5,83,465
British Burmah	49,245	4,000	—	—	49,245	4,000
Madras	4,55,376	61,500	—	—	4,55,376	61,500
Sind	—	—	—	—	—	—
Total	50,82,643	17,66,936	700	5,000	30,83,343	17,71,936

SILVER.

Bengal	86,83,760	68,49,550	—	—	86,83,760	68,49,550
Bombay	42,41,647	61,32,779	41,000	9,900	42,82,647	61,42,679
British Burmah	23,55,351	7,59,612	—	—	23,55,351	7,59,612
Madras	34,54,733	47,67,680	46,750	4,000	35,01,483	47,71,680
Sind	25,66,340	30,202	—	—	25,66,340	30,202
Total	2,13,01,840	1,85,39,823	87,750	13,900	2,13,89,990	1,85,53,723

TOTAL GOLD AND SILVER.

	IMPORTED.		EXPORTED.	
	1871-2. Rs.	1872-3. Rs.	1871-2. Rs.	1872-3. Rs.
Bengal	77,41,878	42,49,060	1,02,62,795	79,72,521
Bombay	26,57,179	72,417	52,82,343	67,26,144
British Burmah	70,06,502	1,31,02,221	24,04,596	7,63,612
Madras	38,55,695	59,40,113	39,56,859	48,33,180
Sind	1,89,194	2,81,888	25,66,340	30,202
Total	2,24,40,448	2,39,15,699	2,44,72,033	2,03,25,659

STATISTICAL TABLES

No. 13.

NUMBER OF EDUCATIONAL INSTITUTIONS AND OF SCHOLARS.

	UNIVERSITIES.			COLLEGES.		HIGH SCHOOLS.		MIDDLE-CLASS SCHOOLS.		LOWER-CLASS SCHOOLS.	
	Number.	Number of Candidates.	Number passed.	Number.	Average daily attendance.	Number.	Average daily attendance.	Number.	Average daily attendance.	Number.	Average daily attendance.
BENGAL:											
Government	—	—	—	27	1,841	57	Not given	198	Not given	29	Not given
Private { Aided	1	2,787	1,223	5	244	78	Not given	989	Not given	8,801	Not given
Private { Unaided											
MADRAS:											
Government	1	1,530	611	13	—	52	—	562	—	6,046	—
Private { Aided	—	—	—	—	—	—	—	—	—	—	—
Private { Unaided											
NORTH-WEST PROVINCES:											
Government	—	—	—	7	675	12	2,298	583	26,182	3,288	87,356
Private { Aided	—	—	—	3	31	—	—	23	4,131	1,452	22,158
Private { Unaided											
BOMBAY AND SIND:											
Government	—	—	—	6	614	19	2,365	124	9,702	3,463	132,680†
Private { Aided	—	1,134	468	2	30	21	2,967	28	2,105	94	4,563
Private { Unaided											
PUNJAB:											
Government	—	—	—	3*	204	6	202	122	9,574	1,073	39,171
Private { Aided	—	—	—	—	—	—	—	—	—	—	—
Private { Unaided											
ODISH:											
Government	—	—	—	—	—	9	2,322	77	7,695	781	25,038
Private { Aided	—	—	—	—	—	1	600	1	161	12	1,841
Private { Unaided											
CENTRAL PROVINCES:											
Government	—	—	—	—	—	1	66	48	1,500	751	26,000
Private { Aided	—	—	—	—	—	—	—	3	70	17	1,069
Private { Unaided											
BRITISH BURMAH:											
Government	—	—	—	—	—	—	—	6	362	—	—
Private { Aided	—	—	—	—	—	—	—	13	1,268	—	—
Private { Unaided											
CHHATTISGARH:											
Government	—	—	—	—	—	2	Not given	4	Not given	29	1,376
Private { Aided	—	—	—	—	—	—	—	—	—	4	119
Private { Unaided											
MYSORE:											
Government	—	—	—	—	—	7	1,209	6	186	628	12,392
Private { Aided	—	—	—	—	—	5	682	11	542	1,536	20,287
Private { Unaided											
BEHAR:											
Government	—	—	—	—	—	2	122	50	3,268	326	7,233
Private { Aided	—	—	—	—	—	—	—	—	—	—	—
Private { Unaided											

	GIRLS' SCHOOLS.		NORMAL SCHOOLS.		SPECIAL SCHOOLS.		Total number of Scholars on the rolls.	Proportion of Scholars to Population.	Proportion of average daily attendance to Population.
	Number.	Average daily attendance.	Number.	Average daily attendance.	Number.	Average daily attendance.			
BENGAL:									
Government	1	64	26	Not given	1‡	55	27,533 } 285,649 } 91,764 }	1 to 163	No information
Private { Aided	244	Not given	17	Not given	—	—			
Private { Unaided									
MADRAS:									
Government	—	—	—	—	—	—	—	—	—
Private { Aided	186	—	17	—	—	—	160,178 } 20,136 } 15,441 }	1 to 157	No information
Private { Unaided									
NORTH-WEST PROVINCES:									
Government	420	6,327	7	254	—	—	193,033 } 14,648 } 10,725 }	1 to 117	1 to 154
Private { Aided	378	4,730	3	66	3	Not given			
Private { Unaided									
BOMBAY AND SIND:									
Government	Incl. 111	Boys' Schools	10	486	1**	14	193,033 } 14,648 } 10,725 }	1 to 117	1 to 154
Private { Aided	26	1,333	—	—	2	189			
Private { Unaided	40	750	1	6	4	44			
PUNJAB:									
Government	91	2,958	3	167	—	—	—	—	—
Private { Aided	—	—	—	—	—	—	48,911	—	1 to 26
Private { Unaided									
ODISH:									
Government	61	1,604	4	178	—	—	48,911	—	1 to 26
Private { Aided	17	438	758	4,236††	—	—			
Private { Unaided									
CENTRAL PROVINCES:									
Government	91	1,722	7	191	—	—	47,757 } 35,173 }	1 to 111	1 to 111
Private { Aided	27	420	—	—	—	—			
Private { Unaided									
BRITISH BURMAH:									
Government	—	—	1	59	—	—	514 } 2,164 } Not known	—	—
Private { Aided	6	462	3	194	—	—			
Private { Unaided									
CHHATTISGARH:									
Government	—	—	1	12	—	—	1,901 } 119 } 526 }	1 to 66	Not known
Private { Aided	—	—	—	—	—	—			
Private { Unaided									
MYSORE:									
Government	8	192	4	57	6	718	19,497 } 24,975 }	1 to 113	1 to 113
Private { Aided	33	1,759	—	—	1	72			
Private { Unaided									
BEHAR:									
Government	25	457	1	29	—	—	Not given	—	—
Private { Aided	—	—	—	—	—	—	Not given	Not given	—
Private { Unaided									

† Medical School, Lucknow. †† Including Pupils attending Night Schools. † School of Arts, Lucknow.
‡ Female School. ** Sind Engineering School, Karachi. †† Indigenious Schools.

No. 14.

TABLE showing the DISTRIBUTION of the BENGAL, MADRAS, and BOMBAY ARMIES according to DIVISIONS and DISTRICTS.—(From the Returns of the Quarter-master Generals' Offices for March 1873.)

DIVISIONS.	INFANTRY.		CAVALRY.		Support and Minors.	ARTILLERY.	TOTAL.		British Officers.	GRAND TOTAL.
	Native.	British.	Native.	British.			Native.	British.		
BENGAL.										
Army Head Quarters' Staff	—	—	—	—	—	—	—	—	23	23
Presidency District	4,662	2,611	144	—	—	449	4,806	3,060	177	8,043
Eastern Frontier District	4,836	—	—	—	—	—	4,836	—	62	4,898
Allahabad Division	2,820	2,813	1,140	—	—	796	3,900	3,009	206	7,776
Oudh Division	2,079	3,164	987	417	—	653	3,066	4,234	204	7,504
Sagar District	2,475	1,039	742	—	—	270	3,217	1,338	107	4,662
Gwalior District	2,194	1,568	598	—	—	496	2,702	2,064	105	4,874
Rohilkhand District	2,082	1,826	458	—	—	148	2,540	1,973	112	4,623
Mirat (Meerut) Division	3,511	3,722	389	993	—	717	3,900	5,462	273	9,635
Sirhind Division	1,499	2,516	87	504	—	560	1,496	3,550	160	5,236
Lahor Division	4,078	3,132	1,354	—	—	848	6,362	3,080	226	10,688
Rawal Pindi Division	4,290	3,897	1,346	960	—	818	5,636	4,675	288	11,599
Peshawar District	3,639	2,497	1,361	—	—	427	5,000	2,924	188	8,112
Not in Division	—	111	323	—	—	—	323	111	11	445
TOTALS	38,885	28,916	8,929	2,874	—	6,221	47,814	36,911	2,145	87,970
Civil Force not under the orders of His Excellency the Commander-in-Chief.										
Viceroy's Body-guard	—	—	87	—	—	—	—	—	4	91
Rajputana	2,919	—	1,472	—	—	—	4,391	—	42	4,433
Punjab Frontier Force	8,795	111	2,800	—	—	618	12,213	111	162	12,486
Resident's Escort, Nepal	95	—	—	—	—	—	95	—	—	95
TOTALS	11,809	111	4,359	—	—	618	16,786	111	208	17,105
MADRAS.										
Centre District	2,960	769	—	—	—	619	2,980	1,388	101	4,469
Northern District	2,707	31	—	—	—	—	2,707	54	39	2,780
Southern District	3,140	171	—	—	—	152	3,140	329	55	3,518
Mysoor Division	3,310	1,014	—	486	822	307	4,132	1,807	112	6,081
Malabar and Canara	2,105	874	—	—	—	78	2,105	952	65	3,123
Ceded Districts	1,416	928	837	—	—	164	1,753	1,092	75	2,920
Haidarabad Subsidiary Force	2,858	1,691	288	483	346	468	3,402	2,592	186	6,270
Nagpur Force	3,443	882	306	—	—	310	3,755	1,192	101	5,048
British Burmah Division	3,043	1,809	—	—	109	423	3,157	2,332	128	5,517
TOTALS	25,013	8,172	931	919	1,277	2,521	27,221	11,613	892	39,725
BOMBAY.										
Presidency District	1,835	298	30	—	—	255	1,868	523	35	2,426
Poona Division	4,664	2,365	885	168	395	643	5,962	3,188	198	9,313
Mau Division	3,347	1,867	481	326	—	535	3,826	2,728	110	6,806
Northern Division	5,332	903	484	—	—	352	5,816	1,255	115	7,184
Sind District	2,029	945	1,458	—	—	801	3,487	1,216	80	4,813
Belgaum District	2,718	972	76	—	—	156	2,794	1,128	70	3,992
Aden Force	791	633	100	—	96	178	987	811	45	1,843
TOTALS	20,719	7,953	3,514	494	491	2,420	24,712	10,579	681	36,273
MISCELLANEOUS FORCES OF OTHER GOVERNMENTS.										
Haidarabad Contingent	5,498	—	2,302	—	—	520	8,320	—	66	8,386
Mysoor Sillahdar Horse	—	—	2,145	—	—	—	2,145	—	—	2,145
Nair Brigade	1,418	—	—	—	—	30	1,448	—	4	1,452
TOTALS	6,916	—	4,447	—	—	550	11,913	—	70	11,983
GRAND TOTALS	103,343	45,152	22,172	4,285	1,768	12,280	128,446	60,613	3,996	193,005

END OF STATISTICAL TABLES.

LONDON :

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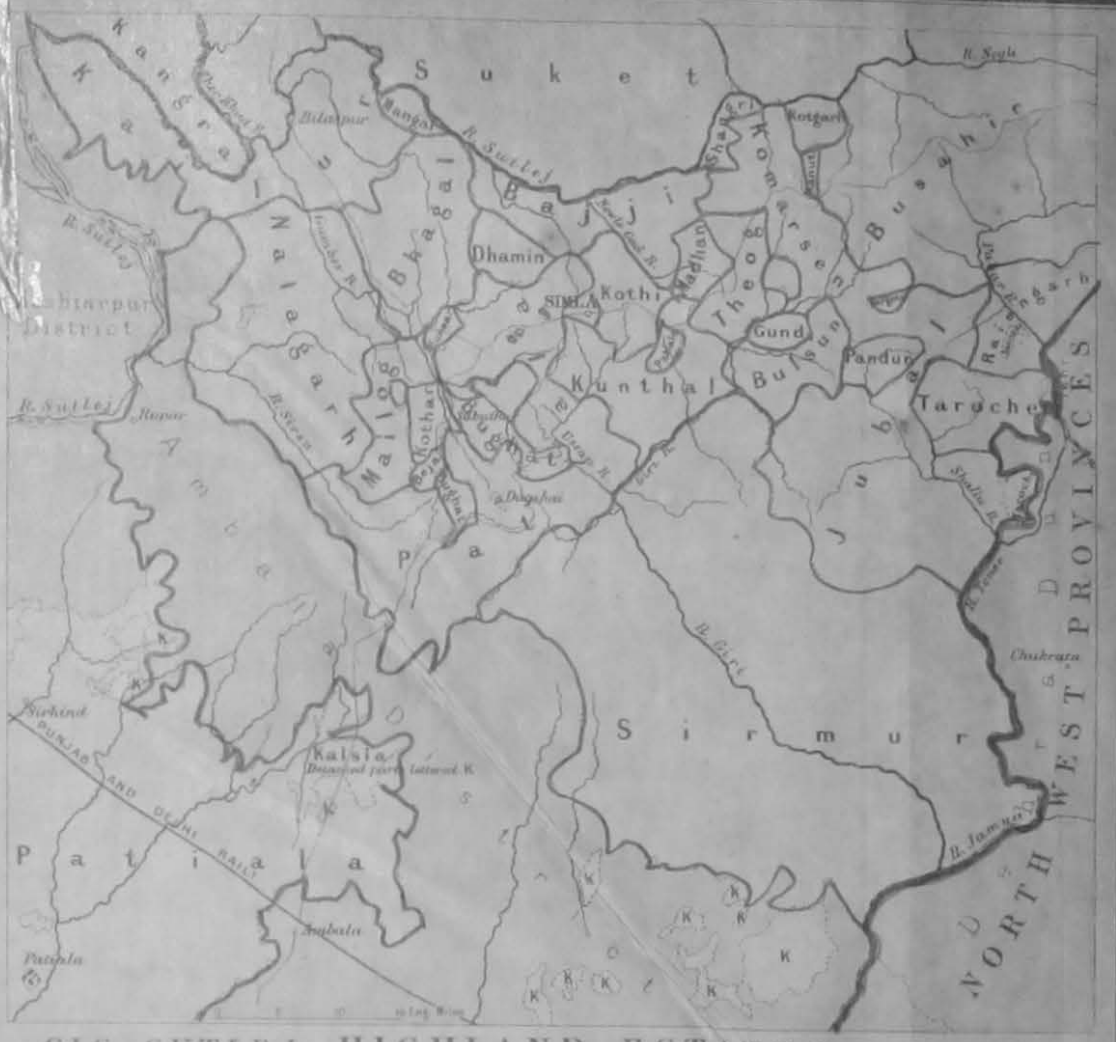


A MAP OF
THE
CIVIL DIVISIONS
OF
INDIA
INCLUDING
GOVERNMENTS, DIVISIONS, & DISTRICTS,
POLITICAL AGENCIES, & NATIVE TERRITORIES.

Scale of Statute Miles.
100 50 0 50 100 200

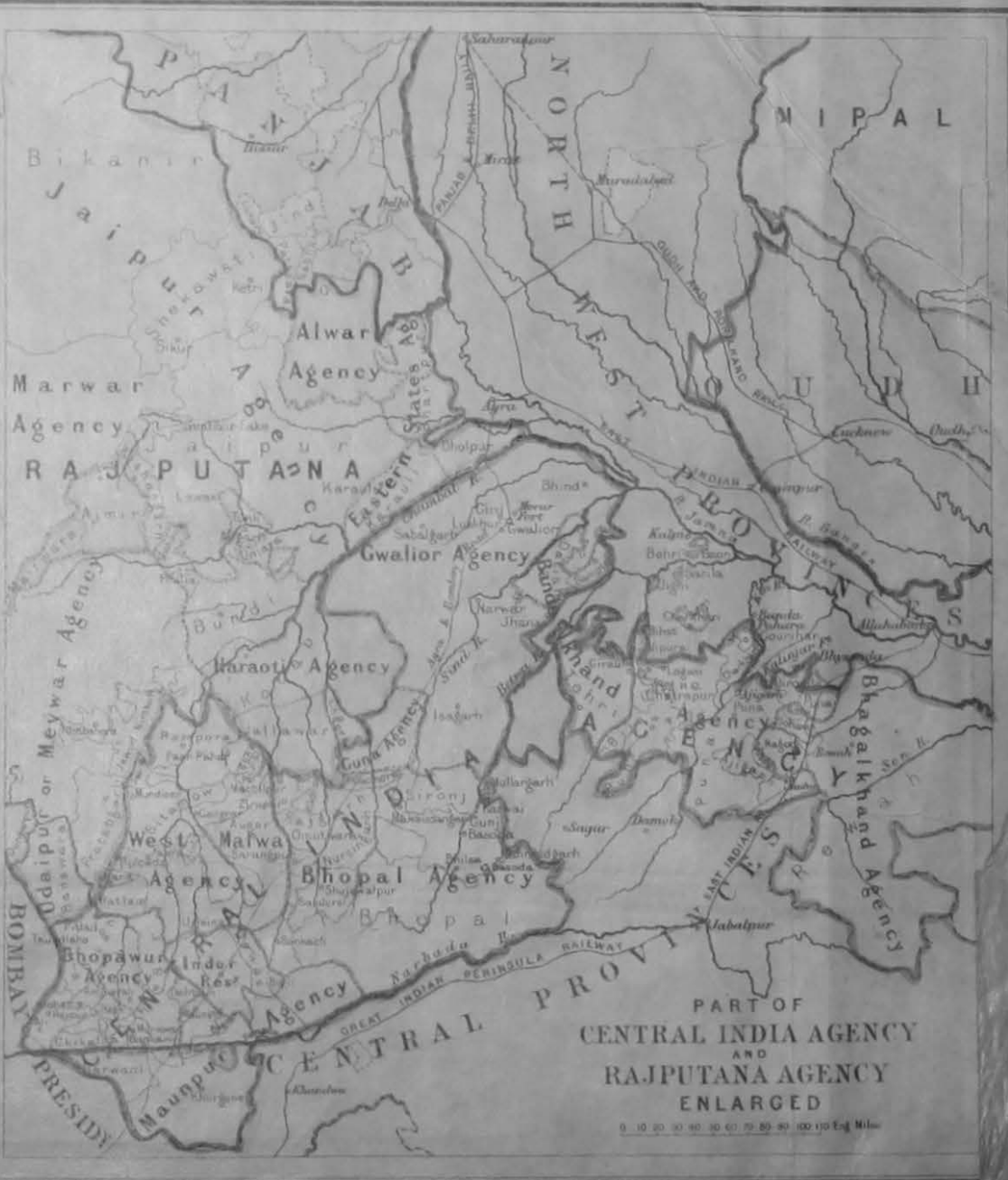
NOTE. The British Districts are tinted.

Hudna.
Sanganli. Galka.
Kotwaria.
Dewani. Kotra Nayaji.
Ina in four taluks:—
Sarda. Sarda Wari.
Sarda Deri. Ugrapur.
Bajput Bhayari thana, in their
teen taluks:—
Apura. Ishwaria. Bhadwa.
Kakali. Soadpur. Buldhol.
Sikka. Mawa. Khirwa. The
Bajput Khayari thana. Vin-
dhi. Sisax Chandli. Mengi
ana. Kampur. Rajkot, special
staunt. Virwa.
iv. *Golkhar Division.*
nder a Political Assistant.
wagar. Chank. Pattana
sa. Waleh. Chaudardi. Lathi
ad. Sonpuri.
See also Baroda Residency,
adabai District, and the Por-
ese Territories, for the rest of
ywar.
3. *Palampur Agency.*
der a Political Superintendent.
apur. Suligam. Badhanpur.
bar. Thasad and Morwara.
sarej. Deodar. Wao. Ter-
a. Warya. Districts not named:
alpur and Charout.
4. *Malkanta Agency.*
Boson.
ni Marwar, except three taluks
ad Eder.
arkanta.
Political Assistant.
ar.
Political Assistant.
trak Kanta. Renwar Kanta.
Gwasi Zillah.
ree taluks in Nami Marwar.
5. *Resawakanta Agency.*
Jppla. Sonth. Chota Jopur.
dana. Baria. Sareji. Lona-
ra. Bhadarwa. Balasur. Umia.
kbera Mewas, in twenty-eight
Estates.
nda Mewas.
ven Civil Stations, under Agency
Superintendence. viz:—
Baria. Rampur. Lunawara. Wadia.
Pandu. Dorka. Wasawa.
6. *Punch Melani Agency.*
arkhot (chief town Jamba-
ghora).
7. *Baroda Residency.*
e Galkwar's territories in Gu-
jarat, Kattywar, and Khandesh:—
Gujarat:—
Baroda. Futton. Wusavi.
Kattywar:—
Amreli. Korinar. Dbari. Dam-
nagar. Danturwa. Okamandi.
Khandesh:—
Wajpur taraf.
8. *Kambay Agency.*
ambay.
9. *Surat Agency.*
vlin. Banola. Duanampur.
10. *Khandesh Agency.*
ang Bhil tribes:—
warvi. Ptopri. Wasarashib.
Awachal. Anali. Chinchli. Dber-
banti.
argana taluks.
Ishwad tribes:—
Chikali. Singpur. Ganli. Nai.
Kathi. Nawapur.
11. *Nasik Agency.*
12. *Thana Agency.*
13. *Sinjira Agency.*
14. *Sattara Agency.*
The Pant Pratinidhi:—Atpadi, Sc
the Pant Sacho:—Bor.
The Nimbalkar:—Phaltan.
The Dalkar:—Jat.
15. *Akalot Agency.*
kalkot.
16. *Kolhapur and the Southern
Mahratta Agency.*
Kolhapur. Bangli. Jamkhadi.
Hira. scolar. Miraj, junior. Ku-
andwar, senior. Kurandwar, ju-
ior. Mudhol. Ramdurg.
17. *Savantwari Agency.*
awantwari.
18. *Dharwar Agency.*
avamar.
SIXTH DIVISION.
19. *Kharipur.*



CIS-SUTLEJ HIGHLAND ESTATES. ENLARGED

20. *Baroda Residency.*
e Galkwar's territories in Gu-
jarat, Kattywar, and Khandesh:—
Gujarat:—
Baroda. Futton. Wusavi.
Kattywar:—
Amreli. Korinar. Dbari. Dam-
nagar. Danturwa. Okamandi.
Khandesh:—
Wajpur taraf.
8. *Kambay Agency.*
ambay.
9. *Surat Agency.*
vlin. Banola. Duanampur.
10. *Khandesh Agency.*
ang Bhil tribes:—
warvi. Ptopri. Wasarashib.
Awachal. Anali. Chinchli. Dber-
banti.
argana taluks.
Ishwad tribes:—
Chikali. Singpur. Ganli. Nai.
Kathi. Nawapur.
11. *Nasik Agency.*
12. *Thana Agency.*
13. *Sinjira Agency.*
14. *Sattara Agency.*
The Pant Pratinidhi:—Atpadi, Sc
the Pant Sacho:—Bor.
The Nimbalkar:—Phaltan.
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Kolhapur. Bangli. Jamkhadi.
Hira. scolar. Miraj, junior. Ku-
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17. *Savantwari Agency.*
awantwari.
18. *Dharwar Agency.*
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SIXTH DIVISION.
19. *Kharipur.*

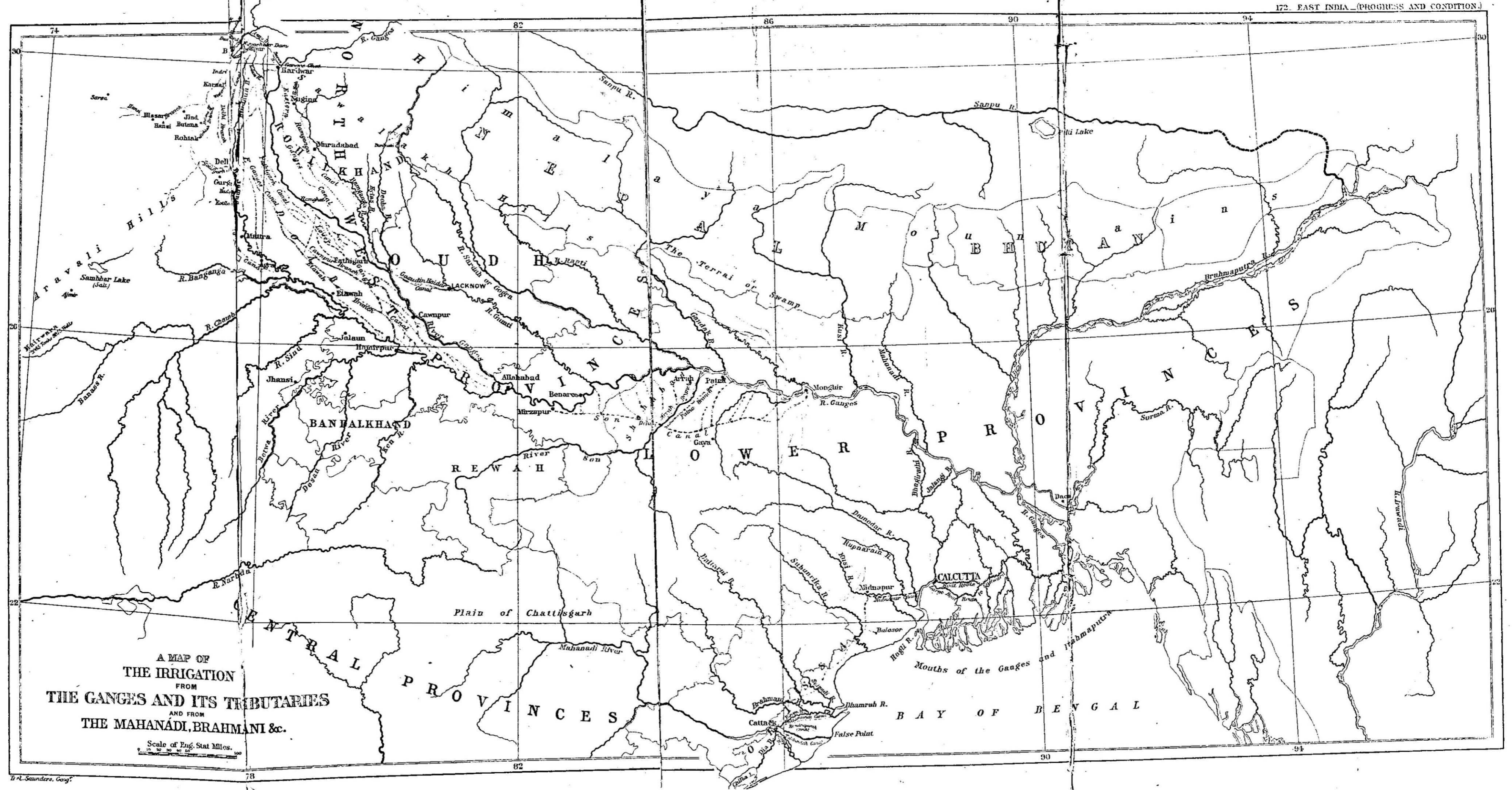


PART OF
CENTRAL INDIA AGENCY
AND
RAJPUTANA AGENCY
ENLARGED

0 10 20 30 40 50 60 70 80 90 100 110 Miles

IV. FRENCH TERRITORIES.
In Bengal.
Chandernagore.
In Madras.
Karikal, in the Caveri delta.
Mahé, in Malabar.
Pondicherry, in South Arcot, the
seat of Government.
Yanaon, in the Godavari delta.

V. PORTUGUESE TERRITORIES.
In Bombay.
1. Daman, near Surat.
2. Diu, in Kattywar.
3. Goa, adjoining Canara, the seat
of Government.



A MAP OF
 THE IRRIGATION
 FROM
THE GANGES AND ITS TRIBUTARIES
 AND FROM
THE MAHANADI, BRAHMANI &c.

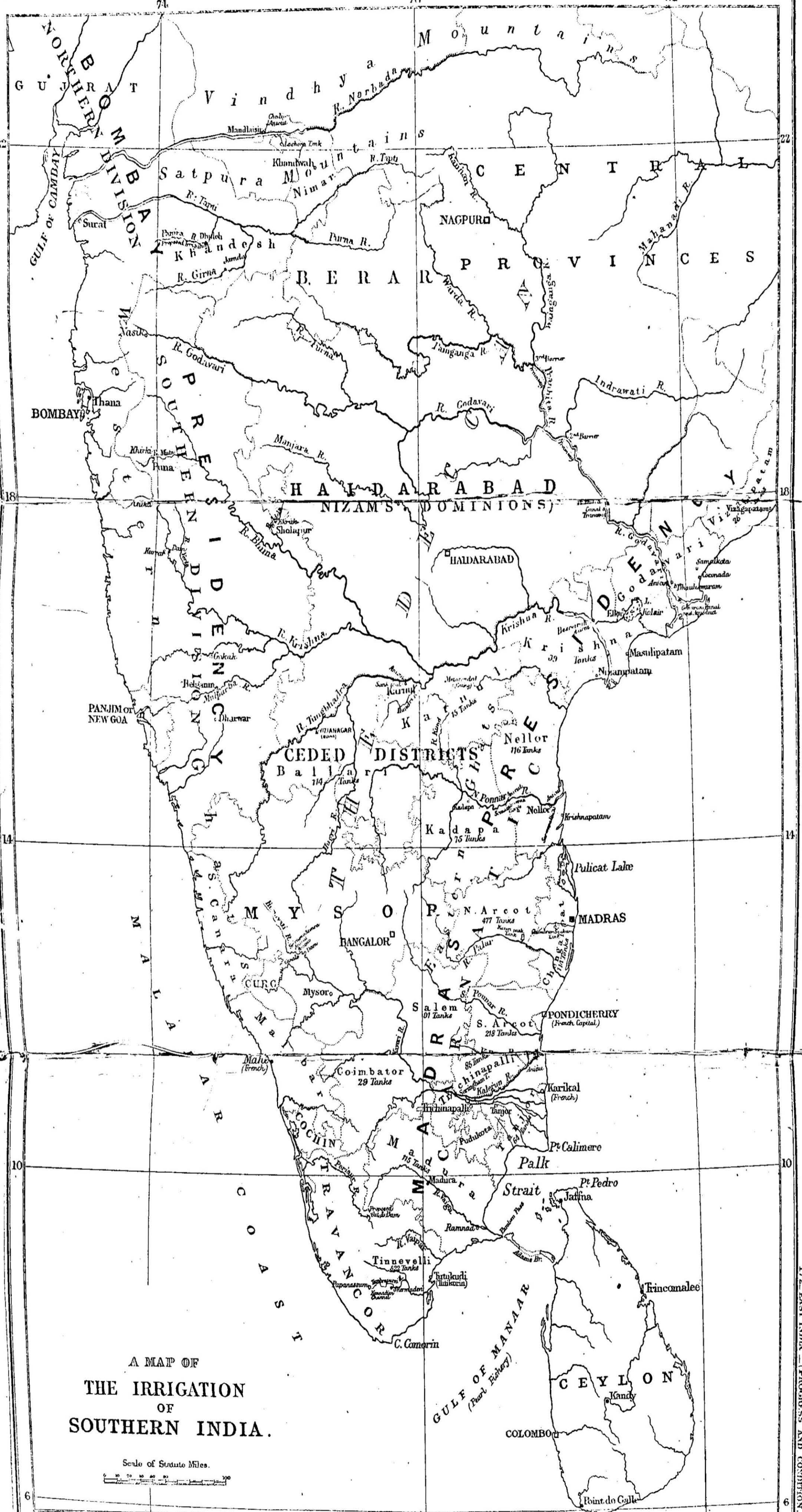
Scale of Eng. Stat. Miles.
 0 20 40 60 80 100



A MAP OF
BRITISH INDIA
 with its
 DEPENDENCIES AND POLITICAL AGENCIES
 including
 ADEN, BAGHDAD, BUSHIRE,
 MUSCAT AND ZANZIBAR.
 also
 THE SURROUNDING STATES
 with reference to the
 PERSIAN, AFGHAN, BELOOCH,
 TURKISH AND RUSSIAN
 BOUNDARIES, ETC.

Geographical Miles 60-1 Lat. 400
 Eng. Stat. Miles 69-1 Lat. 400





A MAP OF
THE IRRIGATION
OF
SOUTHERN INDIA.

Scale of Statute Miles.
0 10 20 30 40 50

L. Z. EAST INDIA - PROGRESS AND CONDITION.