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THE
INDUSTRIAL DEVELOPMENT OF INDIA

BY

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PREFACE.

The purpose of this work is to give a descriptive and critical account of the industrial or economic development of India. The first three Books represent an attempt at an analytic treatment of the subject or a detail presentation of the processes of the development of the industries, while in Books IV and V an attempt has been made to present and interpret the factors of production, the principles of organisation and the synthetic laws. tries.

In a sense industrial or economic development overlaps a large portion of Economic Science. It is not possible to treat the subject adequately, in a country like India, from a merely economic point of view. It is a note-worthy fact that there exists a marked controversy as to what properly constitutes science of Economics proper. So far as the science of economic is positive, the interpretation of economic phenomena should be limited strictly to the exposition or description of the working of the positive laws. But if it is assumed, as is often done, that the economic phenomena are controlled and controllable by social factors, by a government or by a state, then economics is no more a positive science pure and simple, but a combination of both positive and regulative sciences. If this is true, then any attempt to neglect or to ignore the effects of the influence of any of the factors—physical, social or governmental, is to distort the truth. In the present work an attempt is made in Book V to show the relation which our social institutions and traditions bear to the modern industrial system introduced into India.

Now, I should like to add a few remarks of a personal character. No claim is made to special "inspiration", "discovery" or originality, but simply to usefulness. The book is adapted to the needs of the students of Economics and Commerce and also of the business men. Throughout has been the intention not only to make the treatment complete in itself, but to render the presentation so clear that the book may at once be intelligible to the thoughtful general reader.

Nalini Mohan Pal.

Calcutta. 1929.

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INTRODUCTORY.

It appears that India attained to a very high degree of industrial development in ancient times. Regarding the industrial conditions of the country during the early Buddhist period Professor Rhys Davids observed :

“The enormous traffic of to-day in the carriage of passengers, foodstuffs, and fuel was non-existent. Silks, muslins, the finer sorts of cloth and cutlery and armour, brocades, embroideries and rugs and perfumes and drugs, ivory and ivory works, jewellery and gold (seldom silver) these were the main articles in which the merchant dealt” (Buddhist India, pp 98-99).

Most of the articles, mentioned by Professor Rhys Davids, which used to be manufactured in ancient India, are still produced largely in modern India. However, in the absence of sufficient data it is not possible to trace the industrial history of India from the earliest times to the comparatively modern time. In fact the industrial history of India begins with the occupation of the country by the British, and the industrial development in modern India, with which we are mainly concerned in this work, owes its origin to the European influence.

BOOK I,
DEVELOPMENT
OF THE
Manufacturing and Mining
Industries.

CHAPTER I,

THE HISTORY OF THE INDIGENOUS COTTON INDUSTRY,

1. The Nature of the Indian Muslin Fabrics.

From time immemorial the peoples of India have spun cotton yarns and threads and woven cotton fabrics. It is superfluous to state that the art of cotton manufacture was known to India long before it spread to the west. However, very little is known of the ancient industry. Systematic knowledge of the industry begins with the establishment of the British rule in India. From the records kept by the French and the British and from the reports published by them we have come to know that India, during the early days of the East India Company, used to manufacture all kinds of cotton fabrics—fine, middling or common and coarse, specimens of which are still found in the Indian bazars. During the days of the Company the chief

commodities exported from India to Europe were "spices, pepper, drugs, sugar, coffee, raw silk, salt-petre, indigo, raw cotton and above all cotton manufactures of singular beauty and in endless variety." (Supplement To The Fourth Report on The Affairs of The E. I. Coy. Appendix 47).

Among the piece-goods turned out by the hand-weavers of India the muslins occupied the foremost rank in point of fineness of texture. They were produced in many parts of India. The art of spinning and weaving involved in the production of the finer muslin fabrics required a very high degree of skill and a great deal of labour and patience. And the industry was by no means confined to the manufacture of finer assortments but to the production of muslins of varied grades and shades of fineness. But the most exquisitely fine variety used to be produced at Dacca out of a kind of silky cotton grown in Bengal.

It is said that various criterions were employed during the days of the Mogal rule to test the fineness of texture of muslins. "One way of testing their fineness was to pass a whole piece of muslin, twenty yards long by one yard wide through the small aperture of an ordinary sized finger ring. Another test was the compass within which a piece could be squeezed.....The best test was the weight of the cloth proportioned to its size and number of the threads. It is said that two hundred years ago a piece of muslin, fifteen yards long by one yard wide, could be manufactured so fine as to weigh only 900 grains. Its price was £40." (Monograph on The Cotton Fabrics of Bengal by N. N. Banerji, 1998, p. 28).

About the fineness of the Dacca muslin Sir George Birdwood in his *Industrial Arts of India* (P. 259) says, "Among piece goods the best place is given to Dacca muslin, abrawan or "running water", bathawa, "woven air", subbanam, "evening dew", are plain white webs, the poetic names of which convey to the reader a true idea of their exquisite fineness and delicacy, and of the estimation in which they are held, than whole pages of literal description".

There are notable instances of fabrics which are believed to be so fine as to be almost impalpable to the touch

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and weighed 1,680 grains (three and half ounces) each.' (Vide pp 249-50).

Although the art of the manufacture of super-fine muslin fabrics is dead, in all probability the knowledge of the art of their manufacture is not yet extinct. Thus, writing in 1898, Mr. N. N. Banerji says: "It is generally believed that the artists of the present time have lost that manipulative skill and the delicate touch of hand of which such gossamer was formerly produced.....It has also been stated that the long-stapled cotton, which alone could produce the thread of which Dacca muslins were made, has also disappeared. It may all be true: but there is no doubt if a demand arises the finest fabric ever made at Dacca can still be made there. There is no doubt, that it is very difficult now to procure the finest Dacca muslins, but there are still a few families at Nawabpur who can produce these exquisite fine fabrics, if specially ordered to do so." (Monograph on The Cotton Fabrics of Bengal, p. 28.)

A brief reference may now be made to the causes which led to the wearing down of the muslin and other artistic industries. Many causes combined to bring about the result, but the most potent of them all is the disappearance of the countless royal courts which existed in India under the Mogul rule. As the number of the super-potentates, potentates and semi-potentates—about a lakh or lakhs in number who formerly ruled over this great continental country known now under the British rule, under the single denomination of "India"—declined, the demand for these superb fabrics fell off and the industry became virtually extinct by the middle of the 19th century. The change of fashion which came over India as a result of the British occupation of the country must also have produced some baleful effect upon the muslin trade.

It is a well-known fact that the muslin and other fine textile industries were patronised by kings and feudal chieftains. With the disappearance or reduction in number of these potentates under the British rule of law, who were their chief patrons and customers, the arts fell into a state of decadence. Thus, Mr. H. F. Sammon in his Monograph on The Cotton Fabrics of Assam observes "days

gone by, the Rannis of Darrang in Mauzah Hanlimohanpur and some ladies in Mauzah Bangorah were famed for the manufacture of very fine Khania Kapar, but now-a-days it is very difficult to procure such fine khania. So too, the Ahom Rajas kept skilled weavers to supply royal ward-robe with cloths and it is related how, in the reign of Punandar Rajah, one Madhuram Tanti excelled all other weavers of the day and was, for his services to the Royal Family, granted land rent-free by the king". (p 6).

Instances may be multiplied to illustrate the same principle and the same tale of decadence of finer fabrics in other parts of India. For fuller details reference may be made to the provincial monographs and to the books and reports mentioned in this chapter. The manufacture of fabrics of exquisite fineness and of artistic beauty declined in Surat, Broach, Oudh, Sind and in the Bombay and Madras Presidencies.

2. The Condition of the Cotton Industry in general during the earlier days of the East India Company

It may be noticed that both agriculture and hand manufacture made great process, for a while at least, under the fostering care of the East India Company. Towards the close of the 18th century the manufactures of Bengal were more numerous and were in a more flourishing condition than they had ever been before owing chiefly to the development of trade relation between India and England by the Company. The following extract from East India Company Affairs (VII Report on The Private Trade between Europe, America and Bengal from 1st June, 1796 to 31st May, 1803) is illuminating:

"Prior to the year 1799-1800, the import into Calcutta, by the native merchants, of piece-goods and raw silk, which are produced in the interior parts of the provinces, did not amount to forty lakhs of sicca rupees, or five hundred thousand pounds sterling per annum; whereas in 1801-2, the import value of these two articles of merchandise, by native merchants, has actually exceeded one crore and twenty lakhs, or one million five hundred thousand pounds sterling."

The same report adds that "Previous to the year 1798, a ship arriving in the Bengal river with funds to the extent of only twenty thousand pounds sterling.....was compelled to remain until they could be manufactured at the different aurangs, whereas at the present period, there are seldom less than one million sterling in value of cloths belonging to the native merchants deposited in Calcutta for sale, and of every other species of merchandise in an equal proportion." (East India Company Affairs. VII. Extract of Mr. Brown's Report on The Commerce of British India in 1802-3; Dec. 28th, 1804).

Mr. Larkin writing in 1805 observes. "So extensive was the export of piece-goods in the year 1802-3, that it far exceeded the demand there was for them in London market....." (East India Affairs. Report on The External Commerce of Bengal, for the year 1803-4; dated the 18th Sept. 1805).

3. The Causes of the Decline of the Cotton Industry in general.

However, the favourable trade relations between Bengal and Europe did not endure very long. In fact forces were at work which tended to depress the trade since the beginning of the 18th century. Various trade restrictions were imposed upon India by England from 1700 down to the present time. Meredith in his *Economic History of England* somewhere observed that the English woolen industry "early recognised" in the Asiatic cotton fabrics "its most dangerous competitors." It was feared that the consumption of cotton goods might interfere with the sale of woolen fabrics. Some of the products of wool might be easily substituted by cotton goods. Such a substitution was sure to lead to a decline in the consumption of woolen cloths. In the reign of queen Anne (continues Meredith), the trade in imported calicoes expanded rapidly at the expense of woolen hangings and dress fabrics. This situation alarmed the English manufacturers, and in order to save them from "ruin" the statesmen hastened to formulate restrictive or prohibitive legislation against the importation of cotton and silk fabrics into England.

In this connection the Report of Mr. Brown on The Commerce Of British India in 1802-3 (East India Company Affairs) is worth quoting: "To the most extraordinary order that perhaps was ever promulgated by our Sovereign of prohibiting the manufacture of piece-goods by the Honourable Company's native subjects, whose ancestors for many centuries had carried on a commerce most particularly advantageous to the country at large, may be attributed, in a great measure the decrease of the exports to Great Britain, and also of the general decline of manufactures....."

With a view to encourage the newly organised British cotton industry restrictive measures were not infrequently adopted to shut out foreign competition, particularly Indian competition. The opinion of Lord Ellenborough on this point may here be quoted. In a letter addressed by Lord Ellenborough in July 1834 to the Chairman and Deputy Chairman of the East India Company (Correspondence between The Government of India and The Court of Directors and The India Board, 1840) he remarks:

"While the cotton manufactures of England are imported into India on payment of a duty of two and half per cent., the cotton manufactures of India are subjected to a duty on the raw material of five per cent., to a further duty on yarn of seven and a half per cent., to an additional duty upon the manufactured article of two and a half per cent., and finally, to another duty of two and a half per cent., if the cotton should be dyed....."

"Thus, altogether the cotton goods of India may pay seventeen and a half per cent."

Import duties higher than these, and sometimes prohibitive duties were imposed upon the cotton manufactures during the earlier period. We reserve our discussion of the subsequent trade restrictions imposed upon Indian products to another chapter.

Turning now to the subject under discussion we notice that under the protection of high tariff England developed a cotton industry of her own during the second half of the 19th century. Although the English cotton industry was set up in about 1641 it did not attain any commercial import-

ance till the first quarter of the 19th century. Until then the Indian cotton fabrics had a practical monopoly of the British market. It may be noted that until the invention of the spinning machines: "Spinning Jenny" by Hargreaves in 1770, "Water-power" by Arkwright in 1771, and the "Mule" by Crompton in 1779, and the "Power-loom" by Cartwright in 1785, no European artisans could compete successfully with the pliers of hand tools of India. Even with the help of the newly invented machines they could not produce the finer yarns produced by the Indian spinners:

"At the period, when the manufacturers of this country were successful in imitating the calicoes and ordinary muslins of India, and were about to attempt the middling and the finer assortments they found that they could not by the aid of their machinery produce a fine thread giving it so much twisting as to render it harsh and wiry." (Supplement To The Fourth Report.....Memoir on The Trade To and From India, 1795-1802).

However, the fear from foreign competition gradually disappeared with the perfection of the art of spinning and weaving as well as with the discovery of the source of supply of the finer cottons required for the production of finer yarns and fabrics. Thus, writing in 1806, Mr. Larkin observes "numerous and extensive cotton manufactures have been recently established in the interior of France, and there as well as in England, the weavers have succeeded in imitating with so much exactness the fabrics of Bengal (particularly our coarse and middling assortments of muslins) that there is very reason to believe, our trade in muslins of this description, whether for the home and foreign markets must inevitably dwindle to nothing. Our finer assortments of muslins the manufacturers in Europe can never attempt to imitate with any probability of success, so long as proper degree of attention is paid to the manufacture here, and care is taken that the fabrics are perfect." (East India Affairs, X Extract from Mr. Larkin's Report on The External Commerce Of British India.....in the year 1804-5, dated the 10th Jan. 1806).

Gradually the machine cotton industry of Great Britain developed to such a state of perfection that it could easily

turn out yarns and fabrics of varied grades and shades of fineness and texture. Even the finest muslins and silk fabrics could now be produced by machinery. "It may, however, be safely affirmed that there is nothing either too fine in texture or too complicated in pattern for the power-loom manufacturers to produce, and that his advent on the field is only restricted by the possibilities of profit. The finest Dacca muslins and the most intricate Kashmere shawls can be, and have been, produced, by machinery. But there are still markets, eminently suited to the hand-weaver, such as the production of special saris and lungis (woman's clothes and turbans) of a particular shape and size, which the power-loom producer does not successfully contest, because the demand is too small or too local (Imperial Gazetteer of India, Vol. III. p. 198).

Before proceeding to the next stage in the history of the cotton industry it may be remarked that the Indian cotton industry began to lose ground before Lancashire partly in consequence of the operation of the protective duties, and partly or greatly from the effect of the superior machine competition. Under the free trade policy pursued by Great Britain towards India cheap machine-made fabrics of all textures and assortments began to pour into the Indian markets and to displace the Indian hand-made fabrics. Consequently the course of the trade between India and England or rather Europe reversed since the middle of the 19th century.

4. The Effect of Foreign Competition upon the Hand Cotton Industry.

It will, perhaps, not be out of place to make a few references to some authoritative opinions on the effect of foreign competition upon the indigenous cotton industry. Writing in 1897 Mr. Edger Thurston in his excellent Monograph on The Cotton Fabric Industry of The Madras Presidency (p. 3) remarks "exactly a century ago (1796-97) the value of the piece-goods from India imported into England was £2,776,682, or one third of the whole value of the imports from India, while the closing years of the present century find the indigenous cotton fabric industry of South India strangled by the octopus-like grasp of the

enterprising and far-reaching British capitalist, whose influence is manifest even in remote up-country bazars. The exports have sunk into trifling insignificance, while the imports of piece-goods (cotton and linen) to the ports of Madras have.....assumed vast proportions."

The struggle between the indigenous hand industry and the machine industry appears to have been decided by the comparative cost of production or comparative cheapness. The economic law, *viz.*, "man buys in the cheapest market and sells in the dearest market" has been in operation in India as it does always operate every where. The following statement made by an expert on the subject is illustrative of the point raised:

"Indigenous manufactures are far more costly than European or machine-made manufactures. The latter have placed within reach of the mass of the population the means of putting on the appearance of respectability by being decently clad at a small cost. The lowest price of a native-manufactured dhoti or sari is not less than Rs. 2 to Rs. 3, and that of an urani or plaid is not less than Re. 1-8 to Rs. 2; whilst a European or machine-manufactured dhoti or sari costs annas 6 to annas 12, and an urani annas 6 to annas 8. The struggle for existence has been so keen, and frequently so imperatively necessary, that it is natural that machine-manufactured textile should be preferred to indigenous manufactures."

The law of comparative cost operated every where in India— even in the most conservative province of Assam. Assam which has been the least affected by foreign influence and foreign competition or by "the wake of industrial activity that is passing over India" has not been free from the operation of the law of comparative cost or comparative cheapness. Mr. H. F. Sammon in his Monograph on The Cotton Fabrics of Assam (p. 3) observes:

"Weaving among the Assamese forms part of a girl's education and part of woman's ordinary household duties. The women of the family are expected to make their own clothes and those of the men as well. In former days they certainly did so, but nowadays a change is coming over the country. Cotton fabrics imported from Europe and India

can be purchased ready-made for a moderate sum, and these though less lasting, are much finer in texture than those usually made by Assamese."

The Same Writer Adds:

"The women of the middle and richer classes have ceased to make the clothes they and their husbands and brothers originally used to wear. Their love for the home-made goods has given away to a preference for the finer though less durable fabrics from the West, and these classes now look with disfavour on the coarser clothes of Assam. This feeling is most marked among the progressive party of the middle classes" (pp. 7-8).

5. The Effect of the influence of Fashion upon the Hand Cotton Industry.

Beside comparative cost or comparative cheapness there was another factor which tended to depress the indigenous textile industry. It is the influence of western fashion and of western ideas. The influx of new things and new ideas like coats, shirts, genji, sweater, socks, chemises, petty coats, blouses, &c., has gone a great way to create new demands and so to displace old things and ideas like kurta, piron, etc..

I can do no better than transcribe Mr. Edgar Thurston's words to indicate the influence of western fashion upon the Indian costumes and fashions. Mr. Thurston observes:

As in England, so in Southern India, fashion plays an important role in connection with native dress, both male and female. The assumption of the turband by the Autochthonous Todas of the Nilgiris, the replacement of the tribal turband of the Badagas by knitted night cap of bright red or orange blue, the pork-pie cap, beloved of native student, and oft-times ornamented with enormous knitted flower pattern; the unstarched white shirt, patent leather boots, and white socks of the Bengali Babu clerk, the adoption by native cricketeers of machine-made-coloured blazers, as evil in colour contrast as those of many a house eleven at an English public school, are but a few examples of modern change in native male attire for the worse."

With regard to the influence of fashion among the women folks of South India the same writer remarks: "Three primary factors are mainly responsible for guiding fashion so far as native female dress in Southern India is concerned, viz., novelty, the quaint or grotesque and artistic beauty." That is to say, plain beauty or beauty in simplicity and in colour harmony is not properly understood.

Fashion and 'eccentricity' of demand has played a great role in modifying the costumes and dresses of all classes of people—from the hillmen down to the most civilised inhabitants of the valleys. But its influence has been more remarkable among the bourgeoisie and the "enlightened" than among the poorer classes. The reason for this is the comparative poverty and ignorance of the peasants and workers, and comparative opulence and "enlightenment" of the bourgeoisie. In spite of the pretended or professed abhorrence of western things, western ideas and western luxury the consumption of, and the crave for, these very things have been growing rather too fast among the very "patriotic" and "enlightened" communities. Within comparatively recent times the standard of living of the bourgeoisie has grown out of all proportions. The modern enlightened bourgeoisie seems to defy competition in luxurious living many a old-fashioned petty Raja.

6. The Present Condition of the Hand Cotton Industry.

From what has been stated in the preceding discussion about the effect of foreign competition upon the indigenous cotton industry the conclusion which would inevitably follow is that the hand-cotton industry has been defunct long ago. But this is far from the truth. Two things which should be taken into consideration in this connection are the home market and the foreign market. It is a fact that before the close of the 19th century the demand for Indian hand-made fabrics in the European market has practically ceased, but there still remains a large demand for them in the Indian markets. In fact the displacement of the indigenous goods by the foreign goods and by the Indian machine-made goods have only been partial and not complete. With the exception of the rare specimens of the exquisitely fine muslins

and shawls, fabrics of fine and middling and coarse assortments or textures which cannot be produced cheaper by machinery—are still produced and consumed in large quantities within the country.

Statistics of production of hand-made fabrics are naturally not available to show exactly on what scale the indigenous industry exists. But there is evidence to show that even in its decadent state the hand-pliers turn out cotton fabrics of all assortments and texture. Plain and brocaded clothes, gold-wrought cotton tissues, embroidered apparels, chaddars, dhotis, saris, dupatta, khes, turband and other articles of finer and coarser textures; chintzes, towels, quilts and other articles of handicraft origin—still hold their own against foreign competition.

The hand-woven fabrics of coarser and rougher sorts used by the poorer classes still hold their ground to a certain extent against the competition of machine-made fabrics of cheaper and finer assortments. Although machine-made goods are more neatly and evenly done they are less durable than the hand-spun and hand-woven goods. Even when the hand-made fabrics are produced with machine-spun yarns which are being increasingly used by the hand-weaving industries, they are more durable than the machine-woven fabrics. In fact the hand-weaving industry is getting more and more dependent upon machine-made yarns. Now the point to be noted is that the poorer classes prefer the hand-woven fabrics to the machine-made fabrics owing to their comparative durability.

Moreover, it is worthy of note that within comparatively recent times strenuous efforts have been made to revive the hand spinning and weaving industries and the cottage industries in general. With a view to improve them or rather to revive them a number of co-operative societies have been established in different parts of the country. It is well-known to all that the Mahatma Gandhi made vigorous efforts to revive the hand-spinning and hand-weaving industry and the self-sufficient family economy. The fundamental principle of the "charka economy" was to reinstitute the old industrial regime in supersession of the modern economic system. It is doubtful, whether a "charka

economy" or cottage economy or family economy can satisfy the needs of modern economic life.

Side by side with the 'charka-khadder' economy there has also developed a strong feeling to revive the old textiles of finer assortments. The growth of patriotism appears to have given a great impetus to the increased consumption of indigenous fabrics of delicate texture. Moreover, the use of these fabrics is somehow bound up with the customs of the people. It is a well-known fact that customs or long-established habits or the effects of climatic influence cannot be eradicated by artificial means or substitutes unless the substitutes themselves are better and cheaper.

Nevertheless, long-established habits or customs do often undergo changes under the influences of new and better ideas. How far customs will be able to combat the inroad of machine-made substitutes is not very difficult to guess. The history of the Indian patriotic movement which preached to discard the vile and unholy foreign things in favour of the old ideas has not been able to produce any lasting effects upon the minds of the people. In spite of the gospel of contempt for western things and ideas preached since the last 25 or thirty years the demand for foreign things has grown out of all proportions. And this applies to all kinds of foreign goods and ideas. And the way machinery is specialising in manufacturing cheap and delicate fabrics, it does not seem that patriotism or appeal to the old customs and traditions will be able to re-establish the old economic order *i.e.* family economy. In fact the gap caused by the decay of the hand-spinning and weaving industry and the new demand created by the influx of new ideas is being filled up by the machine-cotton industry introduced into India some times in the middle of the last century

CHAPTER 2

THE DEVELOPMENT OF THE MACHINE COTTON INDUSTRY.

1. The History of the Indian Machine Cotton Industry.

Sir George Birdwood in his *Industrial Arts of India* (p. 244) sums up the condition of the Indian cotton industry towards the close of the 19th century, in the following terms: "The great export trade in Indian cotton manufactures has long fallen off before the competition of Manchester. Still, however, an immense cotton manufacture, for domestic purposes, continues to exist in India, equal probably to the whole export trade of Manchester; and now that cotton mills are long established in Bombay and other cities, they may even expect to see the tide of competition at last turned against Manchester." This statement of Sir George Birdwood needs no corroboration. The fact that the fear of Indian competition haunted Manchester throughout the history of the Indian cotton industry is known to all students of Indian economics.

Since the middle of the 19th century a change—a favourable one has been taking place in the Indian cotton industry founded upon the factory system. With the introduction of cotton mills into India the industry took a new turn. The first cotton mill was erected in 1818 near Calcutta, and the first of the Bombay series in 1851. The progress of the industry was at first slow and many difficulties had to be overcome but by the end of 1880 no less than fifty-eight, mills had been erected with a loom power of a little less than 13,000 looms, and a spindle power of about 1.5 million spindles. And from that time onward the number of mills, looms and spindles, especially the latter went on increasing by leaps and bounds. The statement

below indicates the enormous expansion of the machine-cotton industry during the last sixty years.

	No. of Mills (In units)	No. of Looms (In units)	No. of Spindles (In millions)
1879-80	58	12,983	1.4
1900-01	194	40,542	4.94
1918-19	235	108,059	6.17
1926-27	258	142,734	7.62

In fact, the progress of the Indian cotton industry dates from 1860, the date of the American Civil War which cutting short the American supply of cotton for the European cotton mills gave a great spurt to the cultivation of cotton in India and also to the new machine cotton industry. It was a period of cotton "boom" in India which led to a rapid multiplication of spindles. In the earlier stages of development the mills were primarily engaged in the production of yarns for the hand-loomers of China and of India. It may be added, however, that the expansion in production during the earlier years had been practically confined to the spinning side of the industry.

Before the close of the 19th. century the spinning industry was beset with new difficulties. Its progress was checked by two circumstances, *viz.*, the imposition of the Cotton Excise Duty (1894), and the growth of Japanese competition in the China market, and the adoption of the Gold Exchange Standard by India in 1893. Handicapped by the cotton excise duty, India found it difficult to make headway against the competition of Japanese goods in the China market. The Japanese yarns were for the first time shipped to China in 1890 where they succeeded ultimately in displacing Indian yarns. Moreover, the adoption of the Gold Exchange Standard and the closing of the mints rendered it difficult for India to trade with the fluctuating silver standard of China. Another point worthy of note in this connection is the development of an enormous indigenous cotton industry in China itself. These circumstances tended to depress the Indian cotton trade and a period of gloom spread over the Indian cotton mills.

However, with the advent of this new century, a new situation developed in the political horizon of India. The

development of nationalism with its gospel of boycott of foreign clothes and of other things, which made its appearance in India about 1906 brought with it, new forces which tended to give a stimulus to machine cotton industry not only on its spinning side but also on its weaving side. From this time onward, the progress of the cotton industry may be said to have continued practically uninterrupted till the outbreak of the War in 1914. Although temporary depression was caused by the declaration of hostilities in 1914, the War gave a great impetus to the indigenous mill industry. The dislocation of the European industries caused by the war conditions offered a great opportunity to the Indian mill-owners to extend their cotton trade. During the War the prices of cotton fabrics rose to a higher level than in any previous period in the history of the trade, resulting in record profits to mill concerns.

Turning now to the nature and quality of the out-put by the Indian mills, we notice the following facts. Although the number of looms and spindles in use in India is much smaller than that in Great Britain the ratios being set at 1:8 (spindles) and 1:6 (looms), the quantity of cotton consumed per spindle in India is much greater than that consumed by per British spindle. This is because Indian spindle is mainly used in the production of lower counts of yarns. Since the introduction of cotton mills in India she has been producing yarns in yearly increasing quantities, especially of lower counts, and of coarse fabrics. And it has been declared to be a fact that in the production of coarse yarns and fabrics Indian mills have successfully held their own, without any State aid, against the competition of Manchester. Thus, the Moral and Material Progress of India for 1878-79 remarks: "The local mills have annihilated the English trade in low class cotton goods, grey shirting and T clothes and yarn" (p. 110).

It should, however, be noted that although the bulk of the cotton goods turned out by the Indian mills had always been, and is even now, of coarse quality, the manufacture in small proportion of yarns of higher counts than 24s was started sometimes before 1894 by a group of mills known as the "Petit Group." The failure of cotton crop in the year 1900 led to a rapid rise in the prices of Indian cotton. Indian

mills, some of them at least, were compelled to import American cotton and Egyptian cotton. "The prescient of the mill owners arrived at the conclusion that it would be expedient not to depend too exclusively for support upon the China yarn market and that there was an opening in the Indian market for profitable enterprise in the manufacture of goods hitherto supplied exclusively from England. Under the impulse of these two considerations the importations of non-Asiatic cotton amounted to 161, 151 cwts., a quantity more than four times and six times more than the average". (Review of The Trade of India for 1899-1900, p. 10).

From this time onward the importation of long staple cotton increased and the production of finer yarns and fabrics continued to make steady progress. The importation of long staple foreign cotton rose from 481, 264 cwts., in 1914-15 to 2,260,496 cwts. in 1924-25. The development of the cotton manufactures in general is shown in the following table.

Statistics Of Yarns And Piece-Goods.

YARNS.			PIECE-GOODS.	
Counts.	In million lbs		In million lbs.	
1897-8	counts 1 to 20	4,00.00	Grey	83.13
	counts above 20	62.54	Others	8.15
1903-4	counts 1 to 20	474.50	Grey	113.49
	counts above 20	104.25	Others	26.55
1909-10	counts 1 to 20	469.69	Grey	167.34
	counts above 20	131.73	Others	48.12
1913-14	counts 1 to 20	465.68	Grey	188.45
	counts above 20	179.17	Others	67.95
1923-24	counts 1 to 20	379.18	Grey & bleached	257.19
	counts 21 to 30	168.21	Coloured	104.59
	counts 31 to 40	19.14		
	counts above 40	3.25		
1926-27	counts 1 to 20	468.61	Grey & bleached	338.90
	counts 21 to 30	224.89	Coloured	148.29
	counts 31 to 40	25.73	Coloured	1,263,064 doz.
	counts above 40	11.33		

The percentage shares of the different counts of yarns for the year 1926-27 are indicated in the following statements:

Counts from 1 to 20	63%
Counts from 21 to 30	30%
Counts from 31 to 40	3.5%
Above 40	3.5%

The manufacture of cotton yarns and fabrics is, the most important of all the modern industries of India. The statement below shows the out-put, the import and the export of cotton goods for 1926-27.

	YARNS		PIECE-GOODS	
	Quantity in million lbs.	Value in crores of Rs.	Quantity in million lbs. or doz.	Value in crores of Rs.
Production	734.2	.	487.19 lbs. 1.2 doz.	44.21
Import	49.4	6.62	415.8 lbs.	58.42
Export	41.5	3.08	45.9 lbs.	7.66

The above statement discloses some very interesting facts. It shows that although the Indian imports of cotton manufactures which fluctuate in value between 65 and 70 crores of rupees, are very large, the out-put by the Indian mills is also immense. In fact India now turns out about 55 per cent. of the piece-goods and over 90 per cent. of the yarns annually consumed within the country. Moreover India now exports a moderate amount of textiles to the neighbouring countries, especially to the British dependencies. The export value fluctuates between 10 and 12 crores of rupees. The prospects of the cotton industry of India appear to be more satisfactory than they have ever been before.

2. A Short History of Trade Restrictions and Protection in respect of the Cotton Industry.

Before proceeding to the question of trade restriction a brief reference may here be made to the comparative

advantages possessed by the Indian cotton industry. It is evident that most of the cotton mills are situated in the Bombay Presidency in order to take the advantages of its moist climate and of the abundant raw material produced there and thereby save the cost of transporting the raw material to the source of power. The only disadvantage, an unavoidable one, which the Bombay mills have to contend against, is that of the high cost of coal. It costs more to obtain a ton of coal from Raniganj coal field than to import or to buy South African coal at its very door. Leaving aside the subject of imported coal which is of minor importance, we notice that without any protection or favour other than is afforded by the abundant and cheap raw material and cheap labour, an important cotton industry has grown up in India.

The extraordinary development of the industry has been achieved without any protection or State aid. However the organisation of the industry would not have been possible without European assistance and supervision in its earlier stages of development. European experts imported from Europe taught the Indians how to manipulate the cotton machines and to organise markets. A great deal of the capital invested in the industry in the earlier days came from Europe. But so far as direct State aid in the shape of protective tariffs or bounties is concerned there has been little forthcoming till very recently. On the contrary the Indian mills have, since their inception, been subjected to discriminative tariff legislation.

It may be interesting to give a succinct but systematic account of the history of the tariff legislation in regard to the cotton industry. It should be advisable to begin with the tariff legislation of 1859 which imposed an import duty of $3\frac{1}{2}$ per cent. *ad valorem* upon cotton twist and yarn. In 1860 the duty on cotton twist and yarns was raised to 10 per cent owing to financial embarrassment. In the following year (1861) the duty was, however, reduced to 5 per cent, and it underwent a further reduction to $3\frac{1}{2}$ per cent. in 1862, but the duty on cotton manufactures was raised to 5 per cent. in the same year.

The rate of 5 per cent levied upon the import of cotton manufactures was regarded by the British cotton manufac-

turers as protective, that is, affording protection to the interests of the Indian mills and prohibitive or detrimental to those of the British mills. Alarmed at the increase of cotton mills in India and the probability that India might under the "protection" afforded succeed in producing finer cotton goods by importing Egyptian and American cottons, the Manchester Chamber of Commerce appealed to the Government of India to abolish the import duty upon cotton. In reply to this appeal the Government observed that the duty though affording minute protection could not be said to be protective and that the probability of producing finer yarns and cloths by the Indian mills was remote:

"The Indian mills can make twist up to 32s., and water twist up to 20s., as also long cloths, T cloths, drills, domestics, jeans and sheeting. The prospect of the finer kinds of yarns and cloths being made with profit or success is notoriously so remote, and the enterprise so doubtful, that it is quite unnecessary to take it into present calculation." (East India Customs Tariff. Further Correspondence Relating To The Indian Tariff Act of 1875).

However, by the tariff Act of 1875 an import duty of 5 per cent. on long staple raw cotton was imposed in order to satisfy the interests of Manchester. Obviously the object of this duty was to protect the British industry against the possible competition of the Indian mills in the production of finer cottons. Moreover, to remove the protection supposed to be afforded by the 5 per cent duty the Marquis of Salisbury, Secretary of State for India, "in July 1875 drew the attention of the Government of India to the desirability of abolishing the duty on cotton goods as soon as the conditions of Indian finances permitted such a course". (Papers Relating To The Tariff Act of The Cotton Duties, 1894, p 3).

In fact in 1878 the Government of India "exempted from import duty certain kinds of cotton manufactures which were found to be specially subject to competition from similar goods manufactured in India. In March 1879 the exemption was carried further and was made applicable to all cotton goods containing no yarn of a higher number than thirties". (Vide p 4). In March 1882 the import duty

on cotton manufactures was abolished. A little over a decade after, however, owing to financial difficulties the import duties on cotton yarns and fabrics were re-imposed in 1894. But to counter-act the effect of the import duty a new measure, an excise duty, was imposed in the same year on all cotton yarns of 20s and above produced by the Indian mills.

In the same year (1894) the Secretary of State for India raised objections against the cotton excise duty imposed upon the products of Indian mills. The sum and substance of his contention was that there was no competition between the Manchester cotton mills and the Bombay cotton mills. The British industry was adapted to the production of finer goods, while the Indian industry was adapted to the manufacture of coarser goods. It was also pointed out by the Secretary of State for India that it would be difficult on the part of the Indian mills to turn out finer yarns at competitive cost with the cotton imported from Egypt and America. As Egypt lies between India and England the freight charges of cotton for either country might be practically the same. But England possesses various advantages over India in the production of finer yarns and fabrics. Cheap machinery, cheap coal, efficient labour and an ideal climate for cotton manufactures are among the superior advantages possessed by Great Britain. India has to labour under the disadvantages of the comparatively high cost of the imported raw material required for the production of finer fabrics, the high cost of coal, inefficient labour, heavy depreciation of machinery, and an unfavourable climate in which the mills have to be kept cool artificially.

Under such circumstances the probability that India might produce finer cotton manufactures by importing long staple cotton is very remote. There can, therefore, be no competition between the Indian mills turning out coarser products and the British Mills turning out finer products. The relative position of the two industrial systems is summed up by the Secretary of State for India in the following words:

“(1) Of the manufactures of India, quite 94 per cent. is absolutely out-side the range of any competition with

Manchester, leaving the coarser quality of goods (24s and under) which Manchester cannot pretend to supply so cheaply as India".

"(2) Manchester has an absolute monopoly of the finer qualities of goods, but the bulk of its trade consists in piece-goods of about 30s, and in yarn somewhat finer".

"(3) Of goods of the counts 26 and over India can produce them under difficulties and in small quantities".

"Six per cent of this amount may be considered as a possible competition in the field of trade that is occupied by Manchester..." (Despatch From The Secretary of State To The Government of India. No 65 (Revenue) May, 31st, 1894)".

However, the Act of 1894 brought some practical difficulties. So it was abolished and in its place a new law was enacted in 1896, known as the Indian Cotton Duties Act. It imposed an equal duty of $3\frac{1}{2}$ per cent. upon all woven goods whether imported or of Indian origin. The "protection" provided by the import duty of $3\frac{1}{2}$ per cent was simultaneously neutralised by the excise duty of the same amount. The cotton excise duty handicapped the Indian mills against competition from Japan and China. During this period India's export of cotton manufactures consisted of yarns shipped chiefly to China. The cotton excise duty is held to be primarily responsible for India's loss of the yarn market in that country.

The cotton legislation brought into existence in the years 1894 and in 1896 remained unaltered till 1917. In that year embarrassed by financial difficulties the Government of India raised the import duty on cotton goods from $3\frac{1}{2}$ per cent. to $7\frac{1}{2}$ per cent., but the cotton excise duty remained in force at the previous rate of $3\frac{1}{2}$ per cent. The higher import duty imposed in 1917 gave a slight protection to the Indian industry to the extent of 4 per cent. Further protection was, however, granted in 1921, when the import duty on piece-goods was raised to 11 per cent., and in the following year (1922) an import duty of five per cent. was imposed upon the imports of cotton twist and yarns. The excise duty on cotton manufactures was suspended from the 1st. December, 1925, and was subsequently abolished by the repeal of the Cotton Duties Act

of 1896. In the same year (1926) the import duty on cotton yarns was raised to 15 per cent. to the great advantage of the Indian mills. The cotton industry of India has since been enjoying a marginal protection to the full amount of 11 per cent. and 15 per cent.

It may be noted that the chief reason for the abolition of the cotton excise duty was to give protection to the Indian cotton industry against the competition of Japan. The influx of cheap Japanese goods into India seriously affected the Indian mills within comparatively recent times. Since the Great War Japan obtained a strong hold of the Indian market. Cheap labour, long hours of work, double shifts, chief freights, bounties and falling exchange were among the advantages which enabled Japan to sell her cotton goods in the Indian markets at prices less than the Indian mills could produce. In fact the Bombay mills have been forced to cut down their prices. Handicapped by these circumstances the Indian mill-owning interests were forced to seek for protection from Government against the unfair competition of Japan. As a consequence the cotton excise duty was abolished.

However, the Indian mill-owning interests regarded the present tariff rates as affording inadequate protection against Japanese competition. In order to safeguard their interests against foreign competition, the Indian mills proposed two rates of duties one, a differential duty with higher rates upon coarse Japanese fabrics and yarns of low counts and the other, a general tariff on all other foreign goods. This proposal was received by Japan with a rather threatening attitude. She threatened to retaliate any discriminative duty by raising the import duty upon Indian pig-iron, of which article Japan is the principal customer.

However, the bill based on the principles suggested by the Indian mills was introduced into the Assembly in 1927. The interest of the Indian hand-loom industry brought a huge protestation against the differential duty. It was feared that the differential duty or the high tariffs on yarns of low counts would ruin the hand-loom weavers. However, the bill as it became a law, retained its differential character, although certain changes in the rates of duties were made in favour of the hand industry.

CHAPTER 3.

THE SILK INDUSTRY.

1. The Early History of the Silk Industry.

Like the Indian cotton industry the Indian silk industry is very old. It dates back to the fourth or fifth century B.C. The foreign trade of ancient India with western Europe from the first century down to the fall of the Roman Empire consisted mainly in the exportation of precious articles of small bulk such as spices, precious stones, muslins and silks. Indian silks fabrics were sold in Rome in equivalent weight in gold. The demand for Indian cotton and silk fabrics was so great in the markets of Europe that they naturally sold for exorbitant prices. The continuous outflow of specie from Rome for the purchase of Indian merchandise is supposed to have led to the financial bankruptcy and to the ultimate downfall of the Roman Empire.

The subsequent history of the industry down to the seventeenth century is relatively obscure. The only valuable information available is that of the records left by Tavernier, the celebrated French traveller, who visited India in the 17th century. During his travels in this country he appears to have observed carefully the various kinds of silk manufactures turned out at Kashimbazar and at other places. A few excerpts may with advantage be given here to indicate what he says of the Indian silk industry:

“In the first place they make satins with streaks of gold and silver; others plain, with tafetas after the same fashion.

“In the third place they make Patoles, which are a sort of silk-stuff very thin, but pointed with all sorts of flowers, the manufacture whereof is at Amadabat. They cost from eight rupees to forty the piece. This is a commodity wherein the Dutch will not suffer any one of the

Hollanders to trade in particular: for they transport it to the Philippine Islands, to the Islands of Borneo, Java, Sumatra, and other neighbouring islands."

He also speaks of the "deceit in silk wires" practised by the merchant in connection with gold and silver threads, which were frequently not genuine.

Sir George Birdwood in his *Industrial Arts of India* observes that a large and important silk industry flourished in India long before the establishment of the British rule. He says:

"Before the beginning of the 16th century the silks, brocades (kincobs), and dyed cotton cloths of Ahmedabad which generally bear the name of Cambay, the port of their shipment, were in demand in every eastern market from Cairo to Peking. The wild tribesman of the Malayan Archipelago did not consider his freedom earned until he had stored up a pile of them equal in weight to himself. On the coast of Africa these were exchanged for four times their weight in gold. The Portuguese on first going to India found the merchants of Cambay their keenest rivals, and their ships their richest prizes....." (pp 276-77).

Instances may be multiplied to prove that a very large and flourishing silk industry existed in India during the Mogul period. At that time the cotton and silk industries occupied the foremost rank among the indigenous trades. And, as in the manufacture of cotton, so in the manufacture of silk, the Indian artisans possessed the highest skill attainable by mortals. Fineness in texture and complicated artistic designs combined with the cheapness of cost of production were the characteristic features of the Indian silk manufactures.

The importation of cheap and at the same time excellent Indian silk fabrics into the European markets, defied all competition. In fact the Indian silk industry remained unchallenged for a considerable period of time by the outside world, especially by Europe. However, the day was not far distant when Europe was to compete successfully not only in silk manufacture but also in sericulture. Europe saw

the vision of modern industrialism. It saw the infinite possibilities in science which revolutionised the economic life of the west.

It may be noted that the original home of silk is China from which country it travelled to Europe in the middle of the 16th century. The silk manufacturing industry was introduced into England from the Continent by the Flemish artisans in 1585. "The industry received a further impetus from the revocation of the edict of Nantes a century later, when a large body of French weavers crossed the Channel and settled at Spitafield" (Geoghegan: *Silk In India*, Introductory, p. VI). But the industry did not assume importance till the middle of the 19th century. In France, however, both sericulture and silk manufacture attained a greater amount of success than in England where there is no sericultural industry.

However, none of the European countries could compete successfully with India in artistic beauty and in cheapness in the production of silk until the middle of the 19th century. As the delicate fabrics could not be made cheaper in Europe a brisk trade between India and Europe developed in these articles. Under the care of the East India Company the silk trade is stated to have attained to a great success and prosperity. It is also stated that in order to foster the trade in Indian silks the Company established three silk weaving factories in Bengal—one at Cossimbazar, one at Malda, and the third at Shantipur.

2. The Decline of the Silk Industry.

However, the Indian foreign trade in silk fluctuated considerably on account of the trade restrictions imposed upon Indian silks by England. The importation of silk fabrics into England aroused considerable opposition from the British woollen, and, later, from the silk manufacturers. As early as 1700 an Act was passed by the British Legislature prohibiting the importation of cottons and silks from India, Persia, China and other Asiatic countries into England.

Numerous restrictions were imposed from time to time by England upon the Indian silks with a view to protect

the Spitafield silk industry. During the first half of the 19th century the tariff was so manipulated as to encourage the importation of British silks into India and to discourage the exportation of Indian silk to England. Even as late as 1840 when the East India Company urged the Home Government to equalise the British and Indian duties with the ostensible object of protecting the Indian industry against the then existing unfair competition of England the proposal for the equalisation of duty was rejected on the ground that free competition on such basis would ruin the English industry. Indian silk fabrics were so cheap that one could buy a "piece of korah" much cheaper than a pound of silk to make it.

Besides trade restriction there were other causes which brought about the decline of the Indian silk trade. Of these two are of out-standing importance, *viz.*, the marked diminution in the number of ruling princes and chieftains and the change of fashion which gradually came over India after the occupation of the country by the British, resulting in a much reduced demand for sumptuous silk fabrics; and the development of a new silk industry in Europe, especially in France and Italy. For various reasons Indian silk found it difficult to make headway against the competition of European silks. With the new silk a new silk industry was organised in Europe. Being superior in quality the European silk effectually expelled Indian silk from European markets.

It will not be out of place in this connection to consider in greater detail the effect of the competition of the European cotton and silk textiles upon the Indian silk industry. The condition of the silk industry towards the close of the 19th century was deplorable. Thus, writing in 1899, Edgar Thurston in his excellent Monograph on The Silk Fabric Industry of The Madras Presidency (p 3) remarks:

"Two centuries exactly have elapsed since the passing of this law and the dawn of a new century finds the Indian weaver, without capital, and using primitive handloom, being ousted from his hereditary craft by the "prodigious importation and tempting cheapness of piece-goods (many with debased Indian or Persian design) turned out in Europe with all the advantages of skilled knowledge of the manu-

ufacture and manipulation of mineral dyes, and quick out-turn in power-looms in their favour."

Sir George Birdwood, a prominent writer on the subject states that "In Bengal the manufacture of silk was at one time an important industry in the Burdwan and Rajshahi divisions. Now the growing complaint from year to year is that the Bengal silks can no longer be produced at remunerative prices." He adds that the manufacture of the world-famous gold brocades or kincobs of Murshidabad, Benares and Ahmedabad has greatly declined during the last fifty years. The decline has been due particularly to the development of this particular industry in Europe, especially in France.

A somewhat similar tale is told by Mr. H. C. Cockson (in his Monograph on The Silk Industry of The Punjab 1886-87, p 1) about the decay of the industry in the Punjab. "The silk industry of the Province has undoubtedly declined since the establishment of the British rule. Silk fabrics are much less worn by the well-to-do classes than they were in Sikh times; European broad cloth and cotton goods having to a large extent taken their place."

The silk industry of the Hyderabad Assigned Districts have likewise suffered from the extraneous influences. "The silk industry of the province is yearly on the decline and is being supplanted by the trade in cotton fabrics, which is annually increasing. 'Silk piece-goods and highly coloured cotton goods of European manufacture, as well as cheap silk cloths of Yeola in the Nasik district of the Bombay Presidency and the turbands, dhupatas, and saris from Burhanpur in the Nemur district of the Central Provinces are already but surely displacing the locally produced silken garments which are dearer in comparison'" (Monograph on The Silk Fabrics of The Hyderabad Assigned Districts, 1898, pp 2-3).

Investigation carried on in the year 1899 in the six districts of the Madras Presidency, viz., Vizagapatam, Cuddapah, Tinnevely, Malabar, South Canara and Nilgiri—showed that no silk manufacturing industry was carried on there. Except the City in which the industry was in a

flourishing condition the silk weaving industry in almost all parts of the Madras Presidency was in a declining condition. The cause of the decline is attributed to the competition of cheap silks from other parts of India—Bengal and Bombay, and also from Europe and Japan.

The Bombay Presidency has to repeat the same tale of decadence of the indigenous silk industry. "The hand weaving silk fabrics in the town and islands of Bombay is not a prosperous industry. From France, from China, from Japan machine-made fabrics pour into the market and force the hand-woven fabric from its place" (A Monograph upon The Silk Fabrics of The Bombay Presidency by S. M. Edwards, 1900, p 40).

Assam, the home of 'deshi' or indigenous silk industry has also been more or less affected by the influx of European textiles. Thus, Mr. B. C. Allen, the writer of the Monograph on the Silk Cloth of Assam observes that "indigenous silk cloth has been largely superseded as an article of male attire by cottons, and even the large increase in population which has taken place during the past fifteen years will not entirely account for the increase of nearly thirty-nine lakhs in the value of the European cotton piece-goods imported into the Province."

"Fashion and idiosyncracies of demand" for European silk and cotton fabrics have, to a large extent, affected the indigenous silk industry. Dr. Watt in his Dictionary of The Economic Products, (Vol. VI, p. 194), remarks that the fancy cotton textiles of Europe have largely displaced from India, as a whole, the once extensive market for silken garments and have ruined the home manufactures. The demand for silk fabrics may be viewed as having survived in Burma, alone..."

3. The Present Condition of the Silk Industry.

In the last section an attempt has been made to indicate the general causes which have led to the decline of the Indian silk trade. In this section an endeavour will be made to note what still remains of the decaying industry. It is evident that inspite of the destructive foreign competi-

tion silk fabrics of various kinds are still consumed largely by the peoples of India. It will obviously be inconsistent to assume that the indigenous silk industry has become moribund with the decay or extinction of the foreign trade in Indian silks. The two points—the decline of the Indian foreign trade in silks and the decline in the consumption of indigenous silk manufactures within the country, must be kept separate—for the loss of the foreign market does not necessarily mean the ruin of the Indian silk industry. The greatness of the Indian silk industry depended not upon the foreign market but largely upon the home market. Nor can it be logically maintained that the Indian silk industry died or decayed as a result of the disappearance of the Indian Royal courts—for such an assumption could not but lead to the inevitable but fallacious conclusions that the great Indian silk industry depended entirely upon the royal demand, thus excluding the demand of the vast majority of the common people.

In spite of the foreign competition and the consequent diminution of production the Indian silk industry still lives. Writing in 1872 Baden Powell in his *Manufactures And Arts of The Punjab* notes that "Although the large demand for fine silk has passed away with the Sikh Durbar, yet there is still a large quantity consumed by the people, and the progressive wealth of the community of late years has increased the general use of silk.....", (p 57). Mr. W. M. Hailey in his *Monograph on The Silk Industry of The Punjab*, 1899, p. 14) observes that "it is obvious that the quantity of raw silk used in the Province has shown in recent years a tendency to increase rather than decrease, and it is not possible to endorse the opinion expressed in the majority of the District Reports that the manufacturing industry is rapidly declining owing to the European competition." Latifi in his *Industrial Punjab* in (1911) notes that "the silk industry is important and flourishing in the Punjab".

In the Bombay Presidency the industry is not extinct nor extinguishable. In the cities of Poona, Nasik, and Ahmedabad the weaving industry is prosperous. "The brocade of Surat and Ahmedabad, the pitsambar and sari

of Yeola, have gained a reputation which cannot lightly pass into oblivion" (Monograph on The Silk Fabrics of The Bombay Presidency, 1900, by S. M. Edwards). In Assam "silk is still very largely worn, and there are few Assamese so poor as to have no silk clothes in the houses, but though amongst women it is still the common form of dress, men have largely abandoned it as an article of daily dress in favour of cotton".

In the opinion of Mr. N. G. Mukerji the silk industry of Bengal is in a much better position than it has ever been before. "Much has been said" he says, "of the decay of the Bengal silk, it is doubtful if it has ever enjoyed such a healthy vitality in times past as it is now enjoying. We are now on the threshold of the Pasteur system of sericulture being accepted by the peasantry of Bengal as the solution of their chief difficulty. "We have traders from all the provinces of India coming to Bengal in increasing numbers both for silk piece-goods and for raw silk and this raw silk is utilised in the other provinces for manufacture of silk fabrics". (Monograph On The Silk Fabrics of Bengal, 1903, pp 61-63).

It is needless to multiply quotations and illustrations. A large variety of silk fabrics and silk threads, viz., gulbadan or striped silks, lungi (scarfs), khes or chaddar, charkhana or checkered silks, figured or damasked silks, silk muslins (malmal) silk broaches, silk dhutis and silk saris, are manufactured in Bengal, the Punjab, the Bombay Presidency, United Provinces, Assam, and elsewhere.

In British India Bengal leads all other provinces both in sericulture and in silk manufacture. In the Bombay and Madras Presidencies, in the Central Provinces, Hyderabad and the Punjab the industry depends largely for its supply of raw material upon Bengal and upon imported Chinese, Japanese and European silks. The Punjab obtains a portion of its supply of the raw material from Afganistan and Central Asia.

In the absence of statistical information regarding the production of silk in India it is impossible to know accurately the exact position of the industry. It appears that both

the production of silks within the country and the importation of foreign silks have largely increased in the course of the last sixty years. The fact that an immense silk manufacture for domestic consumption still continues to exist in the country is undeniable, but considering the rate at which foreign silks are being imported into India the future of the indigenous industry seems to be precarious. The bulk of the imports come from Japan, China, Germany, Italy, and the United Kingdom. It may be noted that Japan tops the list of exporters. Moreover, the development of the artificial silk industry which is growing fast may ultimately threaten the natural industry with ruin. Some idea of the magnitude of the trade can be gained when it is realised that artificial silks, including yarns and mixed fabrics, valued at a little over 4.21 crores of rupees were imported in the year 1926-27, inspite of the barrier recently erected by our import duty of 30 per cent.

Statistics of Trade in Silk Manufactures.

	EXPORT	IMPORT
	(In lakhs of Rs.)	
1865	10.66	44.39
1875	25.54	71.04
1885-6	36.61	1,10.90
1895-6	18.33	1,70.43
1905-6	6.14	1,90.15
1913-14	5.68	3,10.13
1918-19	5.62	3,70.91
1926-27	2.68	3,45.10

CHAPTER 4

THE JUTE INDUSTRY

1. The Decay of the Hand-loom Industry and the Establishment of the Machine Industry.

The jute industry of Bengal may claim a remote antiquity. However, nothing is known of the history of the ancient industry beyond the fact that it is ancient. Writing in 1874 Mr. Hem Chandra Karr, who made a special study of the subject, stated that in none of the publications did there occur any mention of the word jute until 1796. (Report On Jute And Other Fibres In Bengal, 1874). During the days of the East India Company the manufacture of jute used to be carried on on an extensive scale, and "the poorer people," says Dr. Watt, "little more than half a century ago, were largely clad in jute cloth of home manufacture, such as at the present day, is used by the aboriginal tribes" (Dictionary Of The Econ. Prods., Vol. II, p 546). Machine-made cotton fabrics imported from Europe and manufactured in India being comparatively cheap, strong and durable and decent, effectually expelled jute cloth from the market. The mass of the poor people discarded jute clothing in favour of cotton clothing, and the use of jute cloth disappeared from the country.

However, in those days the spinning and weaving of jute cloths and sacks by hand-tools occupied a very important place among the indigenous industries of Bengal. Bengal had an absolute monopoly of the industry, and she used to export her hand-made jute manufactures to all parts of the world. The monopoly of the jute trade by Bengal continued unchallenged for a considerable period of time.

A new situation, however, developed sometimes in 1838. In that year, the increasing exports of jute cloths and bags from Bengal to England and to other parts of the world drew the attention of the linen manufacturers of Dundee to the

possibility of utilising jute as a commercial fibre. Investigation followed experiment which proved beyond doubt that jute fibre could be used to a certain extent as a substitute for hemp. Encouraged by the successful experiments the Dundee linen manufacturers began to import raw jute in larger quantities and to manufacture it in yearly increasing quantities into bags and cloths for home use as well as for export. Thus, a rival to the Bengal hand-jute industry developed abroad.

The establishment of a jute industry at Dundee did not immediately produce any serious effect upon the hand-jute industry of Bengal. It should be noted that Dundee was primarily concerned with the linen manufacture. Moreover, the Bengal industry possessed such a skill that for a long time it successfully competed with this foreign rival. Even as late as 1850 the exports of jute manufacture from Bengal were valued at £215,978, as compared with only £197,071 of raw jute.

Nevertheless, Bengal's supreme position in the jute trade was not to endure long. Political disturbances in Europe and the development of the scientific method of manufacture by machinery was soon to deal a fatal blow to the jute trade of Bengal. Two circumstances hastened this result. The effect of the Crimean War (1854-56) which cut off the supply of Russian flax had been to impart a great impetus to the newly established Dundee jute industry. The curtailment of the supply of flax naturally inflated its prices and forced Dundee to depend more and more upon jute, and to concentrate her attention upon that industry. However, the great success subsequently achieved by the jute industry is plainly not attributable to the Crimean War, although it cannot be denied that it gave a great spur to the new industry.

Turning to the second cause, it is clear that the great development given to the machine jute industry has been due to the transference of the industry from Dundee to the source of the raw material, that is near Calcutta. The rapid development of the industry at Dundee soon drew the attention of the Dundee manufacturers to the possibility of

transferring the manufacturing center from Dundee to the banks of the Hugli. It was suggested by Mr. George Acland, the originator of the idea, that great economies would result from the transference. Cheap and abundant raw material, cheap labour supply and the possibility of saving the cost of transporting the raw material by the transference of the industry—were among the chief advantages considered. Mr. Acland's suggestion met with approval, and in 1854 two mills—one owned by Mr. Acland himself and the other by the Borneo Jute Company, were erected on the banks of the Hugli. They were soon followed by other companies, and the quiet banks of the Hugli were transformed into a busy manufacturing center.

The great risks undertaken by the enterprising pioneer companies were well recompensed. Except the one started by the originator of the scheme, Mr. Acland, which met with reverses owing to financial difficulties, the rest of the pioneer industries made considerable profits. Between 1868 and 1875 the majority of the mills paid dividends ranging from 25 per cent. to 10 per cent.

Thus, established on a secure footing the industry began to make rather rapid progress. The subsequent history of the industry may be said to have been one of continued progress. Of course, temporary set-backs caused by the unfavourable monsoons, famines and too rapid erection of mills and speculation affected the industry from time to time during the course of its progressive journey.

Turning now to the indigenous hand-jute industry of Bengal we notice that it began to decline rather too rapidly as a result of the superior competition of the machine industry established near Calcutta. In the year 1880-81 the total value of exports of both hand-made and machine-made jute manufactures amounted to Rs. 1,13,06,716. Of this total the export of hand-manufactures was valued at Rs. 2,69,553 or a little over 2 per cent. of the total trade. And by the close of the century the hand-jute industry became extinct. The only relics of the industry which still remains is the spinning of jute twine which is carried on as a cottage industry in and around the jute-growing regions of Bengal.

It is superfluous to state that the machine-jute industry continued to grow by leaps and bounds. Even the jute

crisis caused by the declaration of the Great War of 1914 and by the cessation of commercial intercourse with Central Europe was only a temporary one. The new method of trench warfare which made an enormous demand for sand-bags and tarpaulins, averted the sudden depression which prevailed over the jute trade at the out-break of the war. After the end of the war the jute trade somewhat slackened, but with the rehabilitation of Europe and with the revival of industrial activity the trade conditions improved and expanded.

Before concluding this section it seems advisable to make a brief reference to the dimension of the jute industry. The power-driven jute industry situated on the banks of the Hugli is now the largest jute manufacturing concern in the world. The gigantic expansion of the industry is reflected in the enormous increase in the number of mills and in the vast increase in the export of jute manufactures. In the year 1883-84 the number of mills was 20; the number rose to 39 in 1905-6, 64 in 1913-14, 76 in 1918-19, and to 93 in 1926-27. The enormous expansion of the trade is indicated in the following table.

JUTE EXPORT.

Kind of fabrics		In millions of units or yards.
1865	Bags and cloth	5.60
1875	Bags	8.01
	cloth	.005
1885-6	Bags	63.76
	Yards of cloth	20.15
1895-6	Bags	168.24
	Yards of cloth	114.18
1905-6	Bags	233.32
	Yards of cloth	658.67
1913-14	Bags	368.75
	Yards of cloth	1,061.15
1918-19	Bags	583.09
	Yards of cloth	1,103.21
1926-27	Bags	449.08
	Yards of cloth	1,503.12

2. The Development of Foreign Competition.

Since 1895 mills for jute manufacture have been established in Europe and in America. Import duties imposed by these countries upon foreign jute manufactures enabled them to hold their own against the competition of the Bengal products. The three great jute manufacturing countries other than Bengal are to-day, Germany, the United States of America, and Czechoslovakia. Recently new mills have also been erected in Java to meet the packing requirements of the local sugar industry.

The development of foreign competition, however, produced little effect upon the progress of the Bengal industry. Concurrently with the increased exports of raw jute the export of Bengal jute manufactures has been on the increase. And Bengal still enjoys an immense superiority over all other jute manufacturing countries of the world and in all probability it will continue to hold this position for an indefinite period of time, that is, as long as the Bengal jute fibre retains its monopoly.

3. The Future Prospect of the Jute Industry.

With the increasing needs of the growing population, of trade and commerce for jute manufactures, it may reasonably be expected that there is still ample room for the extension of the jute industry. The needs for bags and cloths for packing food-grains, sugar, cottons, &c., will undoubtedly increase in future. But in recent years the difficulty of obtaining an increased supply of raw jute has been keenly felt. The demand for raw jute by the jute manufacturing world has rather been increasing faster than the supply of raw jute. This situation has led to an enormous increase in jute prices. The prices of jute have more than doubled in the course of the last 25 years.

It is evident, therefore, that the possibility of any further extension of the industry will depend upon the extension of jute cultivation in Bengal or upon the discovery of some suitable jute substitutes. All the experiments so far carried on go to show that none of the jute substitutes so far discovered can compete successfully with jute.

The jute industry of the world is entirely dependent upon the Bengal supply of jute. Any further extension of jute manufacture is, therefore, conditioned by the increased production of the fibre in this province. It seems that there is plenty of land available for the extension of jute cultivation in Bengal

CHAPTER 5.

THE WOOLEN INDUSTRY

1. The Nature of the Woollen Industry.

The use of woollen fabrics in India is limited by the climatic conditions of the country. Cotton and silk textiles constitute congenial or agreeable coverings for the peoples of the tropics. The needs for warm clothings are few and are confined chiefly to the northern parts and mountainous regions of the country. Only lighter woollen coverings are required for the short-lived winter season in the greater part of India. These considerations limit the extension of the woollen industry in India. In the case of wool the figures employed are pounds, while in the case of cotton, the figures are tons. Nevertheless, India produced some very fine and artistic woollen fabrics till the last quarter of the 19th century.

The term "woollen" industry needs some definition and explanation. "The woollen industry", says Mr. A. W. Pim, "in the wider acceptance of the term, includes the manufacture of articles not only from true wool, but also from a large number of the animal downs, such as mohair and camel's hair.

"Generally speaking the line of demarcation between wool and hair is distinctly defined, and for the purpose of the present monograph it will be sufficient to define wool as characterised by the power of felting; a process due to the interlocking of the numerous serratures with which the surface of wool is covered" (A Monograph On Woollen Fabrics in The North Western Provinces And Oudh, 1898). Wool proper, that is, sheep's wool, possesses the property of felting, while goat's hair does not possess that property.

From the above definition the woollen industry of India resolves itself into two main divisions, viz., (1) the

pashmina industry or the shawl industry and, (2) the woollen industry proper—the carpets, blankets, rugs, etc. For our present purpose the industry may be divided into three divisions: (1) the shawl industry, (2) the carpet industry, and, (3) the miscellaneous woollen industry.

2. The History of the Shawl Industry.

The valley of Kashmere is the original home of the world-famous shawl industry. The industry existed there from antiquity. The fine and artistic Kashmere shawl is made of Tibetan shawl-goat wool or hair which possesses a fine lustre. "The costly Ibex shawl of Tibet and China are made" of the very fine Ibex wool. This "wool is not found in the Punjab, probably rarely seen even in Kashmere." (Baden Powell: *Manufactures and Arts of The Punjab*, 1872, Vol. II, p 33).

The Indian shawl industry owes its origin to the migration of a number of Kashmeri weavers into the Punjab during the reign of the Maharaja Ranjit Singh. During his reign a terrible famine raged in Kashmere and a large number of Kashmeris migrated to the Punjab. They settled in Amritsar, Ludiana, Jalandar, Nurpur, Tilaknath and elsewhere and developed their art in these places. This is how the Punjab came to be the center of the modern Indian shawl industry. From the Punjab it spread to the North Western Provinces or the United Provinces of which Mirzapur is the main center. But at present the industry in the latter place is virtually extinct. "The shawl industry which used to exist in the principal cities of North Western Provinces has been completely crushed by the manufactures of Kashmere, with which shawls manufactured in these provinces cannot compete either in price or in quality." (A Monograph on *Woollen Fabrics in The North Western Provinces and Oudh* by A. W. Pim, 1898).

The shawls produced in the Punjab towns are inferior in quality to those manufactured in Kashmere, and that is for three reasons, viz., inferior skill of the emigrated Kashmeris, adulteration of inferior wool, and the inferior

quality of water used for washing purposes. "The shawls of Nurpur and Tilaknath are not much prized; the work is inferior, but the great cause of inferiority is the hardness of water, which communicates a roughness to the shawls, greatly detracting from their marketable value. The Kashmeris themselves say that there is no water like the river Jhelam, and that the superiority of the shawls of the valley is mainly ascribable to the virtue of the water. The weavers of Kashmere possess also greater artistic qualifications." (From Mr. Barne's Report on Kangra quoted by Baden Powell in his *Manufactures and Arts of The Punjab*, p 42).

The best shawl is made of the Tibetan shawl goat wool. Adulteration of inferior wool, especially of sheep's wool is also responsible for the inferior quality of the Punjab shawls. The superiority of the Kashmere shawls lies in the silky lustre of the wool used and in the excellent workmanship of the native Kashmeris. The sheep's wool, though very fine, does not possess that silky lustre of the Tibetan shawl-goat wool. Yet the Amritsar shawl was nearest in excellence to the Kashmere shawls. But it could not stand competition in texture and in brilliancy of colour with the latter. This is because Amritsar shawl was adulterated with a soft wool known as Kirmani wool imported from Persia.

3. The Decay of the Indian Shawl Industry.

The history of the Indian shawl industry is interesting. At one time the industry was in a flourishing condition. There was a large demand for shawls by the Indian courts. But with the disappearance of the royal courts or rather their diminution in number and change of fashion under the British rule the demand for the artistic shawls diminished and the quality of the manufacture deteriorated. And the process of deterioration caused by adulteration went on so far as to cause a falling off of demand even in the European market where, especially in France in the middle of the 19th century Indian shawl became very popular.

The development of the foreign trade in Indian shawls with Europe, especially with France, led to a considerable

change in the character of the industry. The quality of the Indian shawl deteriorated owing to the introduction of French designs and maggetta dyes employed in the manufacture of these sumptuous fabrics. But the introduction of European pattern to suit the European taste increased the demand for Indian shawls in the European market. The subsequent falling off of the European demand is generally believed to be due to the change of fashion in France, which took place after the Franco-Prussian War. But there were other reasons of greater importance which accounted for the extinction of the Indian shawl trade with Europe:

“The causes given for the decline in the export of shawls and other pashmina goods are various. The persons concerned put it down to the check caused by the siege of Paris by the Germans, that city being formerly the chief customer, and to a subsequent change of fashion in Europe. I am inclined to attribute the decline rather to adulteration in the manufacture, to the success of the Rampur Chadder industry in England, to the want of ingenuity in the production of new and artistic designs, and to the evil effect of the hard water of Nurpur on the material used. The change of fashion is a good deal the result of these causes” (Monograph on The Woolen Manufactures of The Punjab, 1884-85, p. 10).

It is worthy of note that special measures were adopted by the French and English agents sent from Europe to India to stop adulteration and to improve the quality of the shawl, but it appears that their efforts did not meet with anticipated results. Regarding the practice of adulteration the same writer observes:

“The habit of adulteration of woolen fabrics for the purpose of deceiving customers is very prevalent in all those manufactures that are intended for sale. Besides the passing off of wool as pashm...we find that in shawls, chadders and carpets transient colours are used where fast ones are indispensable. In several districts where cotton is cheap, that material is mixed with wool, and white chadders that will not bleach properly or that are flimsy

are loaded with various white powder to conceal the defects. Even in the case of blankets of only medium costliness we find, in the Kurnool district, a nefarious practice of loading the stuff with a preparation of bark and gum of the Kaindu tree and ashes of burnt reeds to make it look warm, thick and heavy. Being secrets of trade, detailed information on such matters is hardly available." (Vide p. 12).

4. The Carpet Industry.

With regard to the origin of the Indian carpet industry Mr. A. M. Pim says: "The weaving of woolen pile carpets known as kalin or kalicha, though not, fairly widespread in India, is not native to that country, but was introduced by the Mahomedans from its original home in Kurdistan and Northern Persia. The harsh wool of the Indian plains will not, however, take the finer shade of colour, and for this reason Persian carpets have always been considered superior to the products of Indian looms." (Monograph on Woolen Fabrics in The North Western Provinces and Oudh, 1898, p 9).

Nevertheless, carpets of fairly good quality used to be manufactured in India since remote times. At present the best Indian pile carpets are made in the Punjab, velvet carpets at Benares and Murshidabad, and silk pile carpets at Tanjore and Salem. Sir George Birdwood in his *Industrial Arts* (p. 289) observes, "Unfortunately there has been a great falling off in the quality and art character of Indian carpets... partly, no doubt, owing to the desire of the English importers to obtain them cheaply and quickly, but chiefly owing to the disastrous competition of the Government jails in India with the native weavers."

The woolen pile carpets are now made in jails. In fact the bulk of the Indian carpets are now turned out by the Indian jails. They are produced in different degrees of excellence. The best ones are done in the Punjab and Peshwar. The jail carpets are sometimes passed of "as coming from the caste weavers' loom." About the respective merits of the jail carpets and carpets made by private weavers in the Madras Presidency Mr. Havell observes "carpets of the superior class, prepared only on special order, are equal in point

of finish and material, and infinitely superior artistically, to the imitations of them made in the various jails of the Presidency" (Quoted By Edgar Thurston in his Monograph on The Woolen Fabric Industry of The Madras Presidency, 1898, p. 4).

The decline of the high class carpet industry is stated to be due not so much to the deterioration of the skill of the weavers, as to the falling off of demand for such articles in the Indian markets with a corresponding increase in the demand for jail carpets and cheap imitation carpets of European manufacture. The preference for European ideas to Indian ideas is believed to be an important cause for the increased importation of European carpets into the country.

Nevertheless, carpets, rugs and blankets of coarse and middling assortments are still extensively produced in India, and there is evidence which goes to show that some of the products are of superior quality. But the Indian production is not adequate for the enormous Indian demand, consequently a large quantity of woollens is imported from the neighbouring countries—Persia, Russia, Turkestan, Nepal and Tibet, as well as from Europe. Only a small portion of Indian carpets enters into foreign trade, especially with the United States.

5. Miscellaneous Woolen Industries.

Beside carpets, rugs and blankets, large quantities of woolen articles—putoo, malida, alwan, socks, etc., are produced by the Indian hand weavers of the Punjab, Peshwar and the United Provinces. Within comparatively recent times a number of woolen mills (at present 13 in number) have been established in the Bombay Presidency, the United Provinces, Bengal, the Punjab and Behar and Orissa. They turn out articles like serges, coat-cloths, putoos, flannels, blankets, and hosiery in general. The whole of the mill-production is consumed within the country by the Army and the Police forces as well as by the public. Beside using local wool the mills import a large quantity of wools from Australia and Africa for the manufacture of woollens. The hand-loom weaving industry of India is getting increasingly dependent upon machine-spun yarns.

It may be noted that the highest out-put ever recorded by the Indian mills within comparatively recent times was a little over 9.7 million lbs. valued at a sum exceeding Rs. 1.9 crores in the year 1917; but the out-put has since greatly fallen off. The imports of woolen manufactures which include piece-goods, shawls, braids, and carpets were put at a figure exceeding 4.14 crores of rupees in 1926-27

CHAPTER 6.

THE PAPER AND THE MATCH INDUSTRIES

I. THE PAPER INDUSTRY.

1. A Short History of the Hand-made Paper.

It is not known when paper began to be manufactured in India. The art of paper manufacture and its use are said to have been known to the Chinese, about 4000 years ago. The Arabs learnt its use and manufacture from the Chinese, and it was "introduced into India by the Mahomedans.....Among the Hindus, the earliest writing materials were palm leaves and birch bark. Prior to the introduction of mill-made paper, bark paper was, till comparatively recently used as writing material throughout Assam. But as the cost of the latter, compared with that of the former was considerable, the industry in bark paper has gradually declined, and is now almost unknown". (J. N. Gupta, I.C.S.: A Monograph on Paper Making and Paper Marchie in The Province of Eastern Bengal and Assam, 1909).

Before the introduction of machinery the manufacture of paper by hand has been extensively carried on in almost all parts of India. The materials used for this purpose were barks, fibres, leaves, gunny bags and sacks, rags and old paper. The bark fibres employed were those of "sachi tree", hemp, flax, madar, daphne and the leaves of plaintain tree, date tree, and straw. Among these the most important substances used were, perhaps, jute rags. The method of manufacture was primitive, but the product, though inferior in fineness and texture, was more durable than many of the modern machine-made papers.

Bark paper is considered to be very durable. It is so strong and durable that "it lasts for centuries." For its durability and for religious reasons bark paper used to be highly valued

for writings of sacred books and for the preparation of horoscopes, but the relatively high cost of bark paper led to the abandonment of its use and substitution by cheap rag-made paper. Until recently paper made by hand from jute and other substances was largely used in Government offices, in Native States, in schools and in shops by merchants for keeping their accounts.

The hand paper industry still exists but it is in a moribund state. The indigenous hand-made paper is still used to a certain extent by native traders for their account books. But for all other multitudinous purposes the machine-made paper is employed. Cheap paper imported from Europe and also manufactured by Indian paper mills, though less durable, is much finer in texture than the hand-made paper. Moreover, the present growing demand for paper brought about by the expansion of commerce, education and enlightenment can hardly be met by the crude processes. Formerly education was limited by caste prejudices and by the absence of printing. Publication in the modern sense of the term was unknown. Newspaper never existed until it was introduced into the country by the Europeans. Under the old conditions of life the demand for paper could not have been considerable. The modern life, complex as it is, calls for a variety of paper for diversity of purposes. The modern demand for paper could hardly be satisfied by the handmade paper.

2. The Development of the Machine Paper Industry.

The history of the Indian paper industry is marked by many a vicissitude. "The first paper mill in India was erected at Serampur and is reported not to have been a success. The next venture was made by the Bally Paper Mills Co., in 1874, for ten years it flourished; after that it did not pay and finally went into liquidation in 1906" (Indian Forest Records. Vol. IV. Part V. p 9). However, as some of the old industries went out of existence some new ones sprang up in their place. Thus in 1881, there were only three paper mills; the number doubled in 1905-06, and it rose to nine in 1915-16; but it dropped to seven after the Great War. It may be noted that the materials employed in the

manufacture of paper by the Indian mills were sabai-grass, imported spruce-wood pulps and a limited quantity of jute, hemp and rags.)

It appears that during the War the Indian paper industry made some significant progress. Owing to the difficulty of securing an adequate supply of wood-pulp and paper during the War the Indian paper mills were forced to make a greater use of sabai-grass as a paper material and also to increase the out-put of paper for the local requirements. Although some appreciable progress has been made during the War in the production of paper by the Indian mills the out-put of paper fluctuated considerably after the War. The highest out-put of paper recorded by the Indian mills was 31,000 tons in 1916, followed by a period of diminished production till 1926 when the out-put broke all past records. With the return of normal condition after the war boom the production of paper diminished and the importation of wood-pulp increased. In 1914 the total quantity of paper turned out by the Indian mills was 28,700 tons, the out-put rose to 31,000 tons in 1916, but after the war it gradually dropped to 23,576 tons in 1922. Within very recent times the industry showed strong revival—recording an out-put of 31,781 tons in 1926.

It is worthy of note that diminution in the production of paper which took place immediately after the war was followed by an augmentation in the importation of wood-pulp from Europe, indicating a preference for wood-pulp to sabai-grasses as a paper material. Thus, in 1914-15 the import of paper-making materials which amounted to 179, 510 cwts., dropped to 41,801 cwts. in 1918-19, but suddenly rose to 110, 719 cwts. in the following year, and from that time onward the import of these articles went on increasing till it reached the figure of 307,605 cwts. in 1926-27. It should, however, be noted that the Act known as the Bamboo Paper Industry (Protection) Act of 1925 was intended to foster the development of the bamboo paper industry by increasing the duties on certain kinds of paper.

On the whole, however, it seems that the paper industry has attained a fair amount of success, and the future pros

pects appear to be promising. Concurrently with the increasing import of paper from abroad the out-put by the Indian mills is also increasing. The present annual consumption of paper is estimated at 80,000 tons. If the annual out-put is set at a minimum figure of 30,000 tons it would appear that about 62 per cent. of the paper consumed within the country is imported from Europe. The import mainly consists of high-grade paper and it includes newsprint, writing paper, envelopes, and note-paper and letter paper, paste-board, cardboard, straw-board, and so on. It is worthy of note that a large portion of the Government paper is now supplied by the Indian mills.

Before entering into a detail description of the comparative advantages and disadvantage which the Indian paper industry possesses it may briefly be noted here that the difficulties which beset the industry are the high cost of raw materials which render it difficult to produce paper at comparative cost. The subsidy granted by the government purchase of the Indian mill-made paper has been considered to provide inadequate protection to the indigeous industry against foreign competition. With a view to make provision for sufficient protection for the home industry against foreign competition and also to develop the bamboo pulp industry the Tariff Board in 1925 recommended (1) that the Government should provide for the Indian Paper Mill of Naihati with capital, and (2) that an import duty of 1 anna a lb. in place of 15 per cent. ad valorem duty should be imposed upon printing paper and writing paper.

The first proposal has been rejected by the Government on account of its differential character, that is to say, for differentiating the bamboo paper industry from the grass paper industry. The second proposal was accepted by the Government and a duty of one anna per lb. has been imposed by the Act No. XXX of 1925 on all writing paper and on all printing paper other than newsprint containing 65 per cent. or less of mechanical wood-pulp. It is believed that the duty changed from the 15 per cent. ad valorem basis to the specific basis of one anna per lb. will increase the ad valorem rate from 15 to 33 per cent.

3. Comparative Advantages Possessed by the Indian Paper Industry.

It now remains to make a brief reference to the comparative advantages and disadvantages possessed by the Indian paper industry. To begin with the raw material, that is, paper pulp, employed in the manufacture of paper. Paper may be manufactured from many fibrous substances. The principal materials employed in the manufacture of paper are fibres of jute, hemp, flax, and cotton, grasses, rags, and wood-pulp. But the selection of the raw material is determined by the cost of production and the quality of paper which it is intended to manufacture. In Europe and in America up to the middle of the 19th century the principal raw materials employed in the paper industry were rags. Only limited quantities of paper could be made from vegetable fibres. Most of the paper of superior quality are still made from rags. Excellent quality of paper is made with linen as a paper material. As between rags and grasses or fibres as raw materials for paper, the yield of paper weight for weight obtained from rags is much greater than that obtained from grasses. But the increasing demand for paper combined with the limited supply of rags available led to an increased use of grasses. Recently grasses have also been largely superseded by wood-pulp. Cheap papers, like newsprint and wrapping paper, are now produced in immense quantities from wood-pulp. However, grasses still constitute an important source of paper material. Large quantities of brown paper and boards are also manufactured from straws of wheat, rye, oats and barley.

The principal raw materials employed in India for paper manufacture are rags, old paper, grasses and fibres of hemp, flax, etc. Until recently rags were the principal raw materials employed in paper manufacture. But the difficulties experienced in securing an adequate supply of this raw material forced the Indian mills to use wood pulp in increasing quantities and to exploit grasses as paper materials. Rags of good quality and in adequate quantity are not easily obtainable in India. About the difficulty of collecting rags Mr. Kirk says:

"Here the paper-maker is forced to be a rag-dealer, with his own collecting agents in principal towns. In Europe rag-collecting is a separate industry, and the rags are carefully sorted by skilled labourer before they are delivered to the mills. Numerous different qualities and kinds are fixed by trade custom, and a supply of any of them is instantly available to order. In India, on the other hand, the rags are sorted in the mills, and are found to contain a greater quantity of old, dirty, and worn and useless material. The Deccan Paper Mill calculates that out of 100 tons of "dirty white" rags received from their agents 40 tons are sorted out as useless, leaving 60 tons as available. Of this 12½ per cent. is lost in dusting and chopping, leaving 52 tons. Of this 40 per cent. is lost in bleaching and boiling, leaving 32 tons" (Monograph On Paper Making In The Bombay Presidency, 1908, p. 8).

For this and for other reasons wood-pulp and grasses are now chiefly used as raw materials for paper-manufacture. Soft-wood suited for paper manufacture occurs in Burma, Assam and elsewhere, especially in the Alpine forests. But it is so remote from the manufacturing center as to preclude the possibility of utilising it for the pulp-industry. India has no wood-pulp industry. This raw material is imported from Europe, but the cost of imported wood pulp has rendered the production of paper at a comparative cost difficult. Moreover, chemicals required for paper manufacture are imported from Europe. These involve a heavy item of expenses. Consequently the sulphate process is preferred to the soda process in the manufacture of paper in this country.

In this connection it may be interesting to note the distinction between the two kinds of wood-pulp or rather the two methods of preparing paper. They are the chemical wood-pulp and the mechanical wood-pulp. Mechanical wood-pulp is prepared by grinding down wood, while chemical wood-pulp is obtained by treating chopped wood with soda, sulphur and other chemical substances. The process of preparing chemical wood-pulp by caustic soda is known as the soda process. The sulphite process involves the treatment of the wood with a solution of bisulphate and lime

and magnesia; and in the sulphate process a solution of sodium sulphate and caustic soda is employed. The sulphite process is less costly than the soda process. It "exercises a less destructive effect on the fibre, so its yield of cellulose is slightly higher....., it does not, like soda, degrade the solutions of the material to a brown colour which stains the pulp. The latter is, therefore, of fairly good yellowish white colour in the unbleached state and can be used for many purposes without further bleaching." The sulphate process "exercises a strong bleaching effect and the pulp produced is consequently lighter in colour and more easily bleached." (Indian Forest Records Vol. III, Part III, pp. 22-27).

Now, of the two varieties of wood-pulps indicated above, the chemical pulp produces better paper than the mechanical pulp. The principal chemicals used in the manufacture of paper are soda, bleaching powder, china clay, gelatine, alum and rosin, and other substances. Among these only rosin or colophony and alum are obtainable in plentiful in India. Although the remaining chemicals occur in India they are not yet exploited to any large extent. They are, therefore, imported from abroad.

Owing to the high cost of wood pulp attempt has been made to utilise some of the Indian grasses for paper material. Immense resources in sabai grass, munji grass and sayanah grass exist in India. Sabai grass has been found to be suitable for the manufacture of paper of fine and medium texture. At present sabai grass is the principal among the indigenous raw materials employed in the Indian paper industry. But, even here too difficulties have been experienced in securing adequate supply of good quality at moderate prices. With the increasing demand for sabai grass the price has gone up. The prices also fluctuate according to the vagaries of the season. The quality of the grass is said to have deteriorated owing to repeated cropping. Moreover, the high cost of wood-pulp imported from Europe increased the demand for sabai and munji grasses resulting in price inflation of these materials. Recourse has to be had, therefore, to the wood-pulp again.

Nevertheless, India has immense resources in sayanah grasses found growing extensively in Burma, Bengal, Assam,

the United Provinces, and elsewhere. Although the yield of paper, weight for weight, from savanah grass is lower than that obtainable from bamboo or espato grass, some species of savanah grass are better adapted for the manufacture of high grade paper. Moreover, in point of strength and durability the savanah fibre is stronger than bamboo fibre. This defect of the bamboo fibre is easily removed by an admixture of savanah grass. Now, the point to be noted is that in savanah grass there is an immense resource of unexploited paper material in India.

Beside grasses, India has vast resources in bamboo. The possibility of utilising bamboo as a raw material has drawn the attention of the authorities since 1875. It is worthy of note that the manufacture of paper from bamboo has long been known to the Chinese. It is used, to a considerable extent in the paper mills at Formosa and Indo-China. In India it is being tried by the paper mills at Naihati, and elsewhere. Investigation and experiments carried on by cellulose experts during the last 50 years have proven the fact that bamboo, from the point of view of the cost of production and quality of paper, is superior to grasses in general (Indian Forest Records Vol. III, Part III, p. 34, and Vol. IV., Part V, pp. 8-9).

The bamboo pulp has a great future before it. It is believed that bamboo will in future be the principal raw material for paper manufacture. The world's supply of wood-fibres or wood pulp which may be derived from spruce, pine, poplar or from coniferous trees is diminishing with the world's increasing demand for this raw material for the manufacture of paper and for other purposes. It is likely, therefore, that the manufacture of paper from wood fibre will be more expensive in future. Bamboo fibre has been suggested as the possible substitute which may be employed in increasing quantities in place of wood fibres. Bamboos are very abundant and are widely distributed in India. It has been held by cellulose experts that bamboo and grass available in India, if exploited to the full extent, may supply the world's demand for paper pulp.

The table below shows the import of manufactured paper.

	(In laks of Rs.)
1895-6	40.99.
1905-6	70.48.
1913-14	1,58.76.
1919-20	2,34.46.
1926-27	3,08.20.

II. THE MATCH INDUSTRY.

The use of the safety matches was unknown to India until they were introduced into the country from Europe. The only matches known to the people were sulphur matches which require fire for ignition or kindling. Since the introduction of the use of safety matches into India the importation of this article rose by leaps and bounds. The bulk of the imports came from Sweden, Norway, Austro-Hungary, United Kingdom and Japan. The Japanese matches, although inferior in quality to the Swedish matches, were comparatively cheap. Consequently there grew a large demand for them in the Indian market. The rapid expansion as well as the recent tendency towards diminution in the importation of foreign matches is indicated by the following statement.

Import of Matches. (Figures in lakhs of Rs.)

1895-6	36.14
1905-6	58.83
1913-14	89.64
1918-19	1,64.75
1922-23	1,61.81
1926-27	75.03

Since the year 1922 the import of matches into India tended to show a decline for the first time as a result of the development of an indigenous match industry.

Many attempts have been made to manufacture matches in India, but they have attended with little success until very recently. Mr. S. R. Troup in his Prospects Of Match Industry In Indian Empire (1910) points out that the chief causes of failure of the pioneer concerns were (1) the injudicious selection of the factory sites and the consequent heavy freight charges for the raw materials; (2) Want of

technical knowledge, and (3) the difficulty experienced in obtaining adequate supply of labour.

Some of these difficulties still persist. The raw materials required in the manufacture of matches are wood, and chemicals. India abounds in wood essential to match manufacture, but the best kind of wood, namely aspen or poplar, pine, alder and willow are difficult of access. They occur in locality so remote that their carriage involves a heavy item of expenses. Consequently a large quantity of these woods especially aspens, to be used for splints, are imported from abroad, (Siberia, Japan, Norway, Sweden), while box woods are drawn from the local sources. The woods easily accessible and comparatively cheap in India are kadam, palash and other trees. Formerly these woods were chiefly employed in the manufacture of matches by the Indian factories, and they are also used by the cottage match industries. But the matches produced from these woods are of inferior quality, and considerable prejudices are held by the Indians against Indian matches. However, in modern times the tendency has been to make a large and larger use of white woods, aspens, etc., in match manufacture.

Beside wood, certain chemicals required for the manufacture of matches are imported from foreign countries. They are potash chlorate, potash nitrate, lead nitrate, and so on. This is another disadvantage of the match industry. The third and the last disadvantage is foreign competition. Considerable difficulty had for a long time been experienced by the Indian match industry owing to the importation of cheap Japanese and European matches. The Indian industry, unprotected as it was, found it difficult to make headway against the superior foreign competition. The cheap imported matches, particularly Japanese matches, which flooded the Indian market practically defied all competition. However, after repeated appeals made to the Government for protection, the Government of India condescended to impose in 1922 a revenue duty of Re. 1-8-0 per gross which represented a duty of over 100 per cent. ad valorem—upon the imported matches.

Although the duty imposed in 1922 was intended to be a revenue duty, in effect, however, it was protective. The

revenue realised from the duty fell from Rs. 154 lakhs in 1922-23 to Rs. 118 lakhs in 1925-26. Under the protection of this revenue duty "the Indian match industry, has made," observes the Report Of The Tariff Board On Matches (1928), "striking progress during the past five years. There are approximately 27 factories with a capacity of 500 gross a day or over and their total capacity amounts to about 18 million gross matches annually. The imports of matches have declined from 13.68 million gross in 1921-22 to 6.13 million in 1926-27." According to the Board's estimate the present consumption of matches in India is in the neighbourhood of 17 million gross a year.

It is worthy of note that among the match factories at present working in India, the one run by the Swedish Match Company situated at Amarnath is the largest concern. The Tariff Board does not consider any action necessary against this company. With regard to unfair competition the Board remarks: "We find that there is no ground for the complaint that the Swedish Match Company has engaged in unfair competition with factories under Indian control by systematically selling the products of their Indian factories at uneconomical prices. In case of imported half size matches, however, uneconomical prices have been charged."

However, the out-put of the Indian industry is not yet large enough to meet the enormous home demand. India still remains an immense consumer of foreign matches. To encourage the development of the industry the Tariff Board recommended, and the Government accepted the recommendation, for the continuation of the existing protective measure for an indefinite period of time. And it is expected that the industry will in future be able to hold its own against foreign competition without protection. About twenty years ago Mr. R. S. Troup, who made an exhaustive study of the match industry, said:—"If the above advantages and disadvantages be weighed against each other, it must be admitted that the prospects of success in the match industry in India are good, provided the industry be developed on proper lines" (Indian Forest Memoirs, Vol. II, Part I, p. 18).

CHAPTER 7.

THE OIL INDUSTRY.

I. THE NON-ESSENTIAL OILS.

The use of oil has been known to the Hindus from the earliest antiquity. Oils derived from oleaginous substances have been used, from time immemorial, for edible and for medicinal purposes as well as for the preparation of perfumery. The old methods of preparation and utilisation of oils persist even to-day. To-day, in the preparation of essential oils a somewhat crude method of distillation is employed, while the usual method followed in the preparation of non-essential oils is what is known as the method of expression. The process of solvent extraction, that is, the extraction of oils by chemical methods has been practically unknown to the Hindus till comparatively recent times. Some of the methods of oil preparation may here be noted:

(1) The oil is expressed by squeezing the seeds by wooden press.

(2) The oil is obtained by grinding the seed, and, then, pressing the ground material in crude wooden wedge.

(3) The oil is obtained from the seeds by boiling them, after mercuration with water and skimming off the oil which rises to the surface.

(4) The "attar" or the Sandal-wood Oil is prepared by distillation. In the preparation of sandal-wood oil the heart-wood is either cut into small chips or reduced to powder which added with water are put into a still and boiled for 10 or 20 days by which time the whole of the oil is extracted.

The bulk of the oil consumed in the country is prepared by the method of expression. The method of extraction by

chemical solvents is an innovation from the West. It is largely employed in the distilleries for the manufacture of essential oils used in the preparation of perfumery. In Europe and in America the method of extraction, purification, refining and deodorisation has reached to such a state of perfection that liquid oils are now converted into solid fats or oils of any desired degree of consistency, and any unpleasant smell or flavour is removed or neutralised by treating the oil with chemical substances, and thus, rendering it suitable for edible purposes.

There are various sources from which oils are obtained. They are derived from vegetables, minerals, animals and fish. But here we are mainly concerned with vegetable oils. Vegetable oils occur in seeds, fruits, leaves, barks, heart-wood or roots of plants. For our present purpose these oils may broadly be divided into two groups: (a) the Non-essential Oils, and, (b) the Essential Oils. The non-essential oils which now have almost universal application in some form or other in daily life will first engage our attention.

There are about a dozen or more of vegetable oils of non-essential origin. Chemically they are all compounds of glycerol (glycerine) and fatty acids. Soaps may be manufactured from all oils by treating them with chemical substances (especially alkali and salts). Glycerine is the most important constituent of soap. But the science of chemistry has shown that beside soap-making, oils could be employed for various other uses. Oils are now used for edible purposes, for preserving, lighting and lubricating, in mixing colours for making paints and varnishes, and for manufacturing candles, lards or fats, cosmetics and perfumery.

It will be interesting to give a classification of the oils according to their characteristic properties upon which their main application depends. The following classification borrowed from The Resources Of The Empire Series, Vol. IX. is important:

Group	Typical Oils	Typical uses.
Drying Oils	Linseed Oil	Paint, varnishes, linoleums.

Semi-drying oils	Soy bean	Edible oils, soaps.
Non-drying oils	Olive oil	Food, soap.
	Castor oil	Lubrication, soap.
Fats (oils not sold at ordinary temperature)	Lard	Food
	Tallow	Soap, candles.

The characteristic property of the drying oils is that they tend to dry on exposure to atmosphere. This property renders them suitable for the manufacture of paints, varnishes and linoleum, while it renders them unsuitable for lubricating purposes. The semi-drying oils are less susceptible to the action of the atmosphere, while the non-drying oils and the fatty oils are the least susceptible to oxidation, and consequently they are useful for edible and lubricating purposes.

It will not be out of place to give a short description of the characteristic property and uses of each of the drying and semi-drying oils. It may, however, be noted that there is no line of clear-cut demarcation between drying and non-drying oils.

1. The drying Oils. Linseed, hemp seed, poppy seed and niger seed—oils.

(1) Linseed Oil. The flax plant yields the linseed from which the oil is derived. The oil owes its commercial value to its drying quality which renders it particularly indispensable in the manufacture of paints and varnishes. Linoleum employed, for certain purposes as a substitute for rubber or gutta percha, is a preparation of linseed oil treated with sulphur and powdered cork. The oil is also used in the manufacture of textile water-proofs, the water-proof coating being a varnish made of linseed oil and some colouring matters.

(2). Hemp seed Oil. This oil is used as paint and varnishes and for the manufacture of soft-soap. An immense quantity of this oil is used in paints and varnishes which are employed for the enormous number of wooden houses built in the United States and Canada.

(3) Poppy seed Oil. The chief use of this oil is in the manufacture of paints and varnishes, although it is also employed to a certain extent for edible purposes.

(4) Niger seed Oil (Sarguja or Karala). It is a semi-drying oil of minor importance, being used in India as an illuminant and for cooking purposes. It is frequently adulterated with more valuable oils (mustard and colza oils) in order to increase its weight and volume.

2. The Semi-drying and Non-drying Oils. Cotton seed, castor seed, sesamum. Brassica seed, groundnut, soy bean, hijli badam, or cashew nut, safflower or kushum oils.

(1) Cotton seed Oil. This is a semi-drying oil being used in India as a substitute for ghee. The Indian oil is inferior in quality to the Egyptian and the American cotton oils. The United States is the largest producer of this oil. The oil in its unrefined state is not useful for human consumption. When refined it is used as a salad oil and in the manufacture of margarine. The oleaginous substances and fats left after refining are employed in the manufacture of soap, phonograph records and candles.

(2) Castor Oil. It is a viscuous non-drying oil. For this reason it is largely and chiefly used in lubricating machinery. The aeronautic industry has increased its demand and it is a very large consumer of this oil. When refined it is also used as hair-oil, for purgative purposes and for the manufacture of Turkey red oil of alizarine dye. It is not an edible oil, although it is used for edible purposes in China.

(3) Sesamum Oil. It is a semi-drying oil used in India as a hair oil, for cooking and for medicinal purposes. The refined oil is also used for edible purposes in the Continent of Europe.

(4) Brassica Oils. The Brassica oils include oils derived from (a) the 'Indian colza' or Sweet Sarisa (*Brassica Campestris*), (b) the Indian mustard or Rai, Lahi Sarisa (*Brassica juncea*), and (c) the Indian rape or Sharshe, Tori, Maghi Sarisa (*Brassica Napus* Var).

These oils are more or less semi-drying and they are used in India for culinary purposes, for lighting and for anointing

the body. The most important of this group is the mustard oil valued for its pungency. The colza oil is employed as a lighting agent in India, while the rape seed oil is stated to be used as an illuminant in some parts of Central Europe. But this use is being superseded by petrol oil. During the last great war the rape seed oil was largely used in the manufacture of margarine and fats. Owing to their drying properties both rape and colza oils are also employed for lubricating purposes. The introduction of lubricating oils prepared from petrol oil and paraffine oil is rapidly displacing the use of these oils for lubricating purposes.

(5) Groundnut Oil. This not-drying oil is used, it is said, as an adulterant for ghee in India, and as a substitute for olive oil in Europe (Watt). In taste it is said to resemble olive oil. It is now used for a variety of purposes, for the manufacture of margarine, salad oil, fats and other oils which are used in pastries, as well as for soap manufacture, especially in France. It is the inferior quality of the oil which is utilised in the manufacture of soap.

(6) Soy bean Oil. It is a semi-drying oil employed for edible purposes and for the manufacture of soap.

(7) Hijli badam or Cashewnut Oil. Two oils are obtained from the nut, one from the kernel and the other from the shell. The one obtained from the kernel is the finest, and, it resembles almond oil closely, while the other oil obtained from the shell possesses the useful property of protecting books, woods and other things from the attack of white ants.

(8) Safflower or Kusum Oil. It is a semi-drying oil used in the manufacture of varnishes and soaps. It is also employed for edible and illuminating purposes. Beside, it has other important uses. The oil boiled with the safflower dye produces a varnish, which when brushed on canvas drill converts it into tarpaulins or water-proof cloth. The oil is also used as a cement for coating glasses or fixing ornamental stones on walls.

3. Fats or Fatty Oils.

These include coco-nut oil, palm kernel oil and mahua or mawha oil. These oils are known as fats or fatty oils.

because they become solid at ordinary temperature in cold countries.

The mahua oil is obtained from the kernel of the seed of *Bassia latifolia* (Mahua). It is largely used in the manufacture of inferior washing soaps, in adulterating ghee, and also in cooking by the aboriginals (Santals). In Europe it is used for the manufacture of edible fats, particularly chocolate fats.

In India the coco-nut oil once used to be employed as an illuminant, but this use of the oil has been superseded by kerosene. The oil is extensively used as a hair oil and for cooking purposes in many parts of India, especially in South India. But its disagreeable flavour or rank taste prevented its application for edible purposes for a longtime in Europe.

The great progress made by the margarine industry within recent times has been the out-come of the discovery of some new method of refining the crude vegetable oils. Since the beginning of this new century the refined oil prepared from vegetable oils has been increasingly employed in the manufacture of margarine. But the Great War gave a great impetus to the margarine trade. The diminution in the production of butter and animal fats brought about by the destruction of a large number of cattle during the war inflated the prices of these articles and led to an enormous expansion in the consumption of vegetable oils and margarine. The manufacture of margarine from fats and oils derived from copra, cotton seed, groundnut and linseed has since the war become an important industry in the Continent of Europe.

Export of Non-Essential Oils—1926-27.

	Quantity in gallons	Value in lakhs of Rs.
Castor oil	647,114	13.97
Coconut oil	193,562	4.70
Groundnut oil	41,263	1.11
Linseed oil	41,266	1.12
Mustard or Rape oil	286,436	8.00
Sesame oil	61,971	1.59
Other sorts	35,665	.74
Total	1,307,277	31.25

4. Artificial Oils and Ghee.

In this connection a brief reference may be made to the recent influx of white oil and artificial ghee which are now largely used in India for adulterating edible oils and natural ghee respectively. It has recently been suggested that measures should be adopted by Government to restrict or to stop the importation of these articles. Investigation by experts, however, disclosed the fact that the white oil is a tasteless kerosene oil produced in Germany, and that although it does not contain any vitamins and does not possess any food value it is free from deleterious matters which may endanger the health of the public. It has, therefore, been pointed out that if any restriction is imposed upon the import of white oil it will produce no effect upon the practice of adulteration. On the contrary it may lead to an extended use of the deleterious substances.

A somewhat similar reply has recently been given by the Government of India with the regard to the suggestion made for restricting the importation of artificial ghee or vegetable ghee from Holland. The "colouring proposal" made in order to discriminate the artificial ghee from the natural ghee might, if adopted, lead to far-reaching evil consequences. "The adulteration of ghee" says the Government of India, "is not a new practice in India" and it is well-known that the oils and fats used as adulterants are often most injurious substances "at times even obtained from the carcasses of diseased animals." On the other hand vegetable ghee although deficient in vitamins is believed to be harmless in itself and if supplanted by ghee may be beneficial. The colouring of the artificial ghee might, it is said, prejudice the public mind and thus, reduce its sale, and the price of ghee already very high may be considerably increased.

However, with all their advantages the importation of artificial oils and ghee into India cannot be viewed without apprehension. The substances employed in the adulteration of edible oils and natural ghee are themselves oils chiefly of vegetable origin. Any extensive use of white oil and artificial ghee cannot but affect the oil industry of India.

II. THE ESSENTIAL OILS.

The essential oils obtained from the wood, fruit and grasses of forest origin constitute an important class of commercial oils. They are chiefly employed in the manufacture of soap, perfumery and for aromatising pomades and hair oils, and for officinal purposes. The essential oils may be classified into three groups on the basis of their origin:—(1) Wood oils—sandal wood oil, agar wood oil, deodar, teak or pine wood oil; (2) Grass oils—rosa grass oils, lemon grass oil, etc., and (3) Oils derived from certain spices. By far the most important essential oil obtained from vegetable sources is that of sandal-wood.

1. Wood Oils.

India has a practical monopoly of the sandal wood tree. The oil is obtained by distilling the wood of sandal trees. It is said that the wood of the tree growing on the dry rocky mountains is richer in oil than that of the tree growing on the plains. The wood of the tree growing on the plains is practically odourless, while the wood of the tree growing at altitudes of 1500 to 4000 feet is highly aromatic. The yield of the oil varies according to the quality of the wood. A higher percentage of oil of superior quality is obtained from the better wood, while the percentage of oil obtained from the inferior wood is low and the oil is of inferior quality.

The indigenous method of distillation involves pulverisation of the wood or reduction of the wood into small chips which, added with water are boiled in a still for a period lasting from 10 to 20 days. During the process of boiling the oil is extracted. In Europe the oil is distilled by superheated steam in some form of steam-stills. Mr. Puran Sing in his Memorandum on The Oil Value of Some Sandal Woods From Madras states that "Owing to the more up-to-date processes of distillation the oil distilled in Europe is better in quality than that distilled in the primitive method obtaining in India. The former is light coloured, and has a pleasant odour, while the latter is more or less contaminated with empyreumatic products towards the latter stages of crude distillation, and is consequently of a higher specific gravity and

a darker colour." The same writer adds, however, that the average yield in India is about 2.5 per cent., while that obtained in Europe ranges between 3 per cent. and 6 per cent. But the Kanauj distillers of the United Provinces obtain sometimes by the crude method as high as 6 per cent. of oil.

Sandal wood oil is by far the most important essential oil industry of India. The manufacture of Indian 'attar,' perfumes, pomades, and scented oils consume a very large quantity of sandal wood oil every year. Historically Kanauj has been an important centre of sandal-wood oil manufacture. But the industry has declined owing to the growing scarcity of fuel and the rising price of sandal wood. The Sandal Wood Oil Factory with up-to-date machinery established at Bangalore is a promising industry. In view of the increasing demand for sandal wood oil all the world over the industry is believed to have still a very large scope for expansion.

A very large quantity of sandal wood oil is annually exported from India. In the year 1923-24 the total quantity of oil exported amounted to 16,151 gallons, valued at Rs. 28,17,924, but the export dropped in 1926-27 to 15,938 gallons valued at Rs. 22,60,405. The bulk of this oil—about 94 per cent. went to the United Kingdom. Apart from this large export a large quantity of sandal wood oil is consumed by the Indians themselves. "The Kanauj perfumers alone," says Mr. Puran Singh, "consume about 10,000 to 15,000 lbs. a year." For the development of the industry Mr. Singh recommends the introduction of the modern method of distillation which will considerably reduce the cost of production of the oil, and yield liberal profits. The capital out-lay for machinery, building, etc., is estimated (by Mr. Puran Singh) at Rs. 40,000.

It is worthy of note that apart from the exportation of sandal-wood oil from India a considerable quantity of wood is also exported for distillation to Europe and America. The bulk of the wood is purchased by the United Kingdom and the United States. In the year 1923-24 the total quantity of wood exported amounted to 739 tons valued at Rs. 11,22,148. Besides sandal wood there are other woods which yield oils on distillation. The oil known as "agar attar" is dis-

filled from the wood of agar tree found in Eastern Bengal, Assam and Burma. The oil is used as a scent. There are other trees from the wood of which essential oils are extracted, but these are of minor commercial importance.

2. Grass Oils.

Rosha Oil.—The rosha oil known also as *rossa* oil, palmarosa oil, nimar oil, and Turkish Geranium oil (in Europe) is an important essential oil of India. The oil is obtained by the distillation of a grass of the same name found in the Deccan and elsewhere in India. There are several varieties of rosha grass, but the two most important varieties from which the commercial oil is extracted are known as "Motia" and "Sofia." It may be noted, however, that from a botanical point of view these two varieties belong to the same species. "Form a commercial point of view there are two forms of this botanical species which are popularity known as "Motia" and "Sofia," although up to date, these have not been recognised as historically distinct. From a chemical point of view the oil which they yield differs, "Motia" oil being superior in quality to "Sofia" oil, and fetching a correspondingly high price in the market" (Indian Forest Records. Vol. V. Part VII p. 2).

In India the oil is chiefly used for adulterating attar of roses, but in Europe it is employed chiefly for the extraction of geranial. Motia oil contains as much as 90 per cent. of geranial, while Sofia contains only about 40 per cent. of this oil. "It is also used, and specially Motia oil by European firms as a basis for various important perfumeries, while the Sofia variety is brought by soap manufacturer for scenting soap." (Vide p. 28).

Lemon Grass Oil.—There are two varieties of the grass, namely *C. Citrolus* and *C. Flexuosus*, both occurring chiefly in South India. It is believed that an oil of superior quality known as Travancore Lemon Grass Oil is distilled from *C. Citrolus*, while the oil extracted from *C. Flexuosus* is known as "Malabar or Cochin oil." These oils are also used to perfume soap and greases. Dr. Watt says that in Europe lemon grass oil is used also in adulterating Verbena oil and Eau de Cologne.

Citronela Oil.—It is an oil obtained from a grass grown in many parts of India for its oil which is of a strong and aromatic odour. The oil is somewhat inferior in quality to lemon grass oil.

Khas Khas Grass Oil or Vetiver Grass Oil.—The leaves of these grasses are odourless, but the roots are pregnant with aromatic odour. The roots are also manufactured into aromatic mats and baskets. The scented mats wetted with water are hung over doors during summer in order to cool the atmosphere. On distillation the roots yield an oil used in perfumery.

Eucalyptus Oil and Geranium Oil.—The Eucalyptus oil is an aromatic essential oil obtained by distilling the leaves of the Eucalyptus plant. There are several varieties of the plant and the oils obtained differ widely from one another. But there is one variety known as the Eucalyptus Glabulus which is highly valued on account of the high per cent. of the cineol it contains. And it is said that the leaves of the old trees give the best oil. A large factory is erected at Ootacammand for the manufacture of this oil and also for the distillation of Geranium oil. Geranium oil is distilled from the herb of several species of Pelargonium. The climate of Ootacammand is said to be admirably suited for its cultivation. "It has been stated that the cultivation of geranium should be extended in the Nilgiris to provide the Eucalyptus oil distiller with an alternate material to distil." (Indian Forest Records. Vol. V. Part VIII).

3. Oils derived from Spices.

Among the oils obtained from spices cinnamon oil and cardamom oil are important. Cinnamon is a native of Ceylon, but it is also cultivated in S. India. Three essential oils of distinct aroma and flavour are distilled from the plant. The bark yields an important essential oil of aromatic odour used in perfumery. The leaves of the tree on distillation give an essential oil, while the root of the tree, besides yielding camphor, gives on distillation an essential oil with an odour of cinnamon and camphor.

Cardamom oil is derived from the seed of the tree which grows wild in Ceylon. On account of the high cost of the seeds of the cultivated trees they are sparingly used for oil distillation. The oil is employed for officinal purposes, and in perfumery.

The table below shows the export trade of the essential oil.

Export of Essential Oils 1926-27.

	Quantity in gallons	Value in Rs.
Sandal-Wood oil	... 15,938	22,60,405
Lemon grass oil	... 67,565	11,88,507
Palmarosa oil	... 7,550	3,21,555
Citronela oil	... 274	5,878
Ginger grass oil	... 629	26,113
Thymol oil	...	...
Cinnamon oil	...	...
Other sorts	... 2,919	76,196
Total	... 94,875	38,78,654

CHAPTER 8.

THE TANNING AND LEATHER INDUSTRY.

I. The Development of the Tanning Industry.

1. The History of the Tanning Industry.

From what we can gather from ancient literature about the use of leather goods in ancient India it appears that the tanning industry in India is an ancient one. It is, however, impossible to trace the history of the industry from early times to the modern time. But it is now known that tanning processes, uninfluenced by the European methods, which still exist in remote villages must date back at least to the Mahomedan period. The native tanning processes are imperfect, and the leather produced is malodorous and not durable.

The modern method of tanning was introduced into South India by a French Eurasian of Pondichery, named Charles de Susa during the forties and latter by the Military Department of the Government at Cawnpur. It is said that De Susa went to Mauritius where he learnt the French processes of tanning, and after his return to this country, introduced it into the Madras Presidency during the forties. Mr. A. Chatterton in his excellent Monograph On Tanning and Working in Leather in The Madras Presidency (1904) observes:

“De Susa introduced many important improvements in the native processes of tanning and he was probably the first tanner in this Presidency who succeeded in producing skins which on exposure to the air showed no tendency to that fawn red discolorisation which was previously one of the distinguishing features of the country tanned leathers... Following De Susa this new tanning was at first largely in

the hands of the Eurasians but their lack of energy, improvidence and inferior business capacity enabled Mahomedan and native tanners to cut them out, so that at the present day there is scarcely a single tannery in this Presidency worked by Eurasians" (p. 4).

The introduction of the new processes of tanning into the Madras Presidency led to a rapid development of the trade especially after 1875, "when various causes," says Mr. Chatterton, "operating at the same time led to a very rapid expansion." These causes may briefly be stated here. Prior to 1875 the skins shipped to England were disposed of privately, but about 1875 public auctions were established in England which tended to increase the demand for the Indian tanned hides in that country. After the conclusion of the Franco-Prussian war there also developed in Germany a large demand for Indian hides for the manufacture of army requisites. The repeal of the export duty on skins in 1875, and the epidemics among livestock in the famine year 1876-77 led to an enormous expansion of export trade in these articles. Last, and, perhaps, the most important cause was the completion of the trunk railways which enabled the Madras tanners to draw supplies of the raw material from different parts of the country.

These are the causes which laid the foundation of the Madras and Bombay tanneries, especially the former, and Madras used to lead and even now leads the rest of India in the export trade of tanned hides and skins. Reference has already been made to the establishment of Government tanneries at Cawnpur sometimes after the Mutiny. "Before the Mutiny" says Mr. Walton in his *Monograph On Tanning And Working In Leather In The United Provinces Of Agra And Oudh* (1903), "Saddlery, harnesses, accoutrements for the East India Company's native army and also for the Bengal Artillery were largely manufactured at Cawnpur by native contractors from leather locally tanned. The processes then in use were imperfect; the leather produced, though malodorous, was not durable" (p. 1). However, it was not till a decade after the Mutiny that the Government began to think seriously to erect a leather factory in India. Two causes are given to account for the decision. First,

the Sepoy Mutiny began to make the Government realise the difficulty of securing leather goods locally; and, secondly considerable difficulty was experienced by the Government to secure a regular supply of good leather goods from England. The establishment of the Government factory known as the Harness And Saddlery Factory at Cawnpur in 1868 was largely due to the efforts of one Captain Stewart. Captain Stewart "took furlough in 1867 and studied the theory and practice of tanning at all the centers of the leather industry in England and Scotland. On his return... he introduced the European methods and processes, tools and machines into all departments, with the result that the factory justified its existence." At present this factory supplies the needs not only of the army but also of the civil population.

The Government Harness and Saddlery Factory at Cawnpur was soon followed by a number of other tanneries in subsequent years. Within comparatively recent years tanneries on European lines have been set up in almost all provinces of British India. In the year 1924-25 there were altogether 25 tanning factories in India of which 4 were in Madras, 4 in Bombay, 8 in Bengal, 5 in the United Provinces, 2 in the Punjab and 2 in Behar and Orissa. These tanneries are mostly engaged in the production of leather employed largely in the manufacture of leather goods to be consumed within the country. Besides vegetable tanning, the chrome tanning industry has also made good progress within comparatively recent years. The earliest experiment at chrome tanning was made by a German firm in Madras in 1902, but the enterprise proved a failure. Successful beginnings were afterwards made by Mr. Chatterton and Mr. Chambers before the out-break of the war. The Chrome Leather Company situated at Pallavaram, Madras, has developed considerably within recent years. Chrome tanning is now successfully carried on in all important tanning centers.

2. The Decline of the South Indian Tanning Industry and Efforts at its Revival.

It seems necessary to indicate here the present condition of the South Indian tanning industry. After the intro-

duction of the improved methods of tanning by De Susa among the Madras hand-tanners the trade made considerable progress for some time, and an export trade in Indian tanned hides and skins developed with the United Kingdom, Germany and with other countries. There grew up a great demand in these countries for the vegetable tanned leathers of Madras Presidency, and Madras led the rest of India in the export trade of tanned hides and skins.

However, the tanning industry of the Madras Presidency declined sharply as a result of the development of European competition. The discovery of the chrome tanning processes in the United States, the difficulty of treating the already vegetable-tanned hides and skins of India by the chrome-processes—led to a serious diminution in the demand for Indian tanned hides and skins. Moreover, the application of machinery and scientific processes to the leather industry in Europe and America created an enormous demand for raw hides and skins in these countries, which brought about a great inflation in the prices of these articles.

The enormous expansion of the export trade in raw hides and skins which has taken place during the last fifty years led to a continued inflation in the prices of these articles benefitting the owners of cattle, sheep and goats, but causing a great injury to the interests of the poor tanners. Before the development of the foreign trade the raw hides cost nothing or cost very little. It now appears that after the close of the great war the prices of the cow-hides per 20 lbs. ranged from Rs. 8 to Rs. 18 depending upon the quality of the materials. The high prices rendered it impossible for the poor tanners of S. India to secure the good hides for tanning purposes except the rejected ones. This situation tended to depress the Madras tanning industry, and many a tanner gave up tanning and took to agriculture or other pursuits of life.

However, the out-break of the great war (1914) gave a great impetus to the South Indian tanning industry. The demand for tanned hides and skins from the allied powers became so great and urgent that not only were special efforts made by the Government of India to secure as many

tanned hides from India as possible, but to take necessary steps to promote the industry. For the promotion of the industry experts were appointed to carry on researches for the discovery of the best tanning agents. The measures were eminently successful. The success achieved is reflected through the improvement made in the tanning trade during the war. However, the prosperity of the trade did not endure very long. After the end of the war the extraordinary demand for tanned hides and skins ceased and the trade diminished.

Another attempt to revive the industry under protective tariffs made in 1919 also ended unsuccessfully. In that year an export duty of 15 per cent. was imposed upon raw hides, but with a preference of 10 per cent. for the British tanners. The duty caused a great fall in the export trade of raw hides. In 1923-24 the duty was, therefore, reduced to a uniform rate of 5 per cent., the British preference being abolished. But in 1926 hide and skin cutting and fleshings, such as are used for glue-making were exempt from payment of export duty.

3. The Modern Method of Tanning.

In this connection it may be interesting to introduce here the main processes of tanning in use nowadays. Tanning is the process by which hides and skins are converted into suitable forms for human use. The hide or skin of an animal tanned or otherwise dressed is ordinarily known as leather. The principal tannages employed in converting hides and skins into leather are vegetable tannages, chemical tannages and oil tannages. Among these the first two are of fundamental importance.

Vegetable tanning is done by tanning agents obtained from vegetable sources. Some of the important tannages obtained from vegetables are *Acacia arabica* (babul bark), *Shorea robusta* (sal bark), wattles, cutch, divi-divi, turwad (*Cassia auriculata*), Pyingadu (iron-wood of Burma), and mangrove barks. But the most important vegetable tannages are myrobalan (*Terminalia chebula*), Turward (largely used in South and West India), babul bark (employed largely in Northern India), and mangrove.

Vegetable tannage is very important and largely used in Indian tannery. All heavy hides and skins are tanned by vegetable tans. Harness, saddlery, etc., are tanned by this process. But vegetable tanning is slow and it requires a considerable amount of time to obtain the desired pliability or softness.

The discovery of the chrome tanning process has brought about a revolution in the tanning industry. Chrome tanning is done by a salt or salts, of the metal, chromium (a mixture of iron, chrome and oxygen). The application of the substance increases the tensile strength of the leather, imparts elasticity and reduces toughness or hardness in a short period of time. In fact the superiority of the chrome process over the vegetable process lies in the quickness with which skins and hides are tanned into superior leather. By it superior leather may be produced from the strongest buffaloe hides in a few days, from cow hides in twenty-four hours and from sheep or goat skins in four or six hours. To obtain the same results the old method of vegetable tanning may take a longer time—from a month to a year or over a year. Nowadays various kinds of leather are produced by the chrome processes. Practically all the leathers required for the uppers of the shoes and boots are tanned by this process. Finer classes of leather, glace kids, gloves, etc., are made by this process.

Among other minerals used in tanning alum is important. The alum tanning process is employed in the manufacture of gloves and furs, the aldehyde process is used in the tanning of white leather. And in the manufacture of chamois leather oil-tannage is employed.

All the improved processes of tanning are now in use in the Indian tanneries carried on on European lines. The leathers turned out by some of the tanneries of Cawnpur, Madras and Calcutta are considered to be as good as the best imported leather.

II. THE LEATHER INDUSTRY.

It now remains to make a brief reference to the indigenous leather industry and to the present condition of

the leather trade. The processes of tanning and the use of leather goods have been known to the Hindus from the remote ages. Mr. W. Croke in his Tribes and Castes (Vol. II, p. 170) observes that "among the Indo-Aryan races the use of hides for clothing prevailed in primitive times. The Vishnu Purana enjoins all who wish to protect their persons never to be without leather shoes" (Quoted from a Monograph On Tanning And Working In Leather In The United Provinces of Agra And Oudh By H. G. Walton, 1903). In the code of Manu references are made to the use of sandals. In the Mahavarata the use of leather articles like shield, armour, whips, drums and leather quiver are mentioned.

However, the leather industry had never been considered to be a respectable trade among the Hindus. "For all practical purposes the rise of the native leather industry," says Mr. Walton, "is coincident with the establishment of the Mahomedan rule in India. In what is now the United Provinces of Agra and Oudh, the districts of Cawnpur and Lucknow soon became the chief centers of the industry." It appears that various kinds of leather goods—viz. water bags, harness and saddlery and ornamented shoes and artistic leather goods (for the kings and nobles), and rough and hard shoes for the army—used to be manufactured during the Mahomedan period. Up to the middle of the 19th century (*i.e.* the Mutiny) the East India Company used to obtain its leathers for the army from the local sources. The old industry is still extant in the remote villages.

Until recently the leather manufacturing industry has been a part of the village organisation. According to the customs of the village economy the chammar supplied the villagers with shoes, water-bags and other leather requisites. They used to be manufactured of the hides and skins which the chammar obtained from the carcasses of the village. In fact his services served two important functions of the village—*viz.*, scavenging or removing the village carcasses, and utilising the hides and skins for leather manufactures. The raw materials, thus, obtained were tanned and, then, turned into crude leather goods. Free scavenger service, free raw materials and free supply

of leather goods to the villagers—were the chief advantages claimed of the old village economic order. Things are, however, changed, and the old system is breaking down under the influence of western civilisation.

With a very few exceptions the tanning industry and the leather industry were and still now are the caste occupation of the chammars and muchis and of the Mahomedans. The trades are still considered to be unclean by the Hindus in general. The reason for this is that hides and skins are tabooed by the religio-social customs of the Hindus and are regarded to be impure. Under such circumstances the demand for leather goods could not have been very considerable. The tabooed industry, therefore, did not attain any high degree of perfection until the introduction of European tastes and European methods of manufacture among the people.

The influx of western things and ideas has within comparatively recent times created various new demands for leather articles which never existed before. Until recently few people used to wear shoes in India. Even to-day the finely clad Madrassé gentleman walks barefooted. Moreover, the wearing of shoes by the low castes, under the old regime, in the presence of the high castes or nobles used to be regarded as an insult to the dignity or superior rank of the latter in many parts of India.

However, things are changing under the influence of western civilisation and the demand for English boots, and shoes, saddlery and harness, leather bags and purses, holdalls, writing-pads, footballs, and leathers in general for book-binding and for many other purposes—have had a tremendous development in recent years. And in all probability the demand for shoes and other leather articles will increase with the increasing economic prosperity and with the spread of western education and culture among the rural population of the country.

The development of the use of leather goods in India is reflected in the enormous expansion of the leather trade. The total value of leather goods and leathers imported into India in the year 1895-96 was only Rs. 22 lakhs, but in 1926-27, that is, thirty years later, the value rose to a figure

exceeding Rs. 53.61 lakhs. Apart from this large import, an immense quantity of leather goods, perhaps greater in volume and value than the import trade—is manufactured and consumed within the country. The exports of leather goods from India are comparatively insignificant. The Indian exports consist mainly of East Indian tanned kips and tanned hides to Europe and America, and some boots and shoes and unwrought leather shipped to the Straits Settlement, Ceylon, Mauritius and to other British possessions.

CHAPTER 9

THE GLASS INDUSTRY.

1. The History of the indigenous Glass Industry.

The manufacture of glass has been known to the Hindus from time immemorial. References to the use of glass ornaments by women are made in the Rig Vedas, the oldest scriptures of the Hindus. Glass mirrors, glass tumblers, drinking cups, and other glasswares had been in use during the early Christian era in India and in Ceylon. Mr. H. C. Tilly in his Glass Mosaics of Burma, (1901) gives illustrative account of glass mosaics on pillar and altar, on the image, on the throne, on the ceiling and on walls of the Burmese temples. During the 16th. and 17th. centuries of Mogul rule, coloured and enamelled glasses were used by the Mahomedan royal families and by the nobles. Elegant glass wares and widow glasses used to be manufactured at Delhi. "A glass gulab bowl and a hooka bowl found in the Mahomedan capital, Bijapur, were shown by Major Cole, R. E. at one of the Simla Arts Exhibition. These he describes as probably of the sixteenth century" (Dictionary of The Economic Products Vol. III, p. 503 By G. Watt).

It seems, however, that the Indian industry never attained any high degree of perfection. The manufacture of glass is still carried on in the old ways as a cottage industry in many parts of India, but especially in the Punjab, Behar and in the Bombay Presidency, and Bengal. The articles of manufacture are broadly divided into two classes: (1) Bangles or churi, and, (2) Glasswares which include such things as bottles, flask, lotus, flower-vases, baskets, jugs, cups, saucers, glass fragments for embroidery and glass mirrors. The bangles which constitute the most important part of the industry are made from glass slag or

crude glass or of broken imported glass. The articles under class (2) are also made of broken glass or from imported glass.

The principal raw materials employed in the manufacture of glass slag or crude glass are "reh" and quartz. The "reh" or sands generally contain an admixture of impure carbonate of soda or sulphate of soda and clay. The sands are melted into crude glass slag from which bangles and other glass-wares are manufactured. Glass is also produced from quartz pebbles which are ground to powder and treated with potash (khair, sanji). The colouring of the glass is done with lac, indigo and with other dyes. The chief fuels employed in the smelting and manufacturing processes are wood, dried leaves, indigo stalk, and similar fuels.

Now, the quality of the indigenous glass has been pronounced to be crude and poor owing to the want of the knowledge of chemistry and metallurgy. The chemical composition of the glass has been far from satisfactory. The indigenous glass manufactures are generally full of air bubbles. They are brittle and cannot stand heat or high temperature. The want of proper annealing accounts for these defects of Indian glass in general. Mr. Fox explains the meaning and process of annealing as follows:

"Nearly all kinds of glass waresdevelop a condition of strain as a result of too rapid cooling....Consequently there are few kinds of glasses which do not require annealing subsequent to the operations involved in their manufacture."

"This removal of the strain is effected by heating the manufactured glass to the temperature at which the strains in glass are able to relax and assume a uniform distribution. This temperature is usually in the neighbourhood of 500 C." (Notes on Glass Manufactures p.35).

The defect of the indigenous method of glass manufacture and of the product is described by Dr. Watt in the following terms: "Too much alkali is employed, and too little heat given with the not unnatural consequence that the resulting material is a coarse, impure, dirty, coloured

mass, full of flaws and air-bubbles, unfitted for any better use than the manufacture of beads, coarse and other minor unimportant articles." (Watt: The Dictionary of The Economic Products, Vol. III, p. 503).

The old-fashioned furnaces and the wood fuels employed in the manufacture of glasses are not productive of higher temperatures required for the production of the better quality of glass. Comparatively large or improved furnaces employed in the cottage industries of Italy, Austria and Japan with coal as fuel and with better tools and implements have been recommended by experts as the possible remedies for the defects of the cottage glass industry of India.

It is needless to dwell upon the effect of foreign competition upon the Indian glass industry. Suffice it to say here that the industry has to suffer greatly from the superior competition of Japan and Europe until it has recently been protected (1923) by import duties of 30 per cent. on glass bangles and beads and false pearls, and 15 per cent. on glass and glassware. It is worthy of note that the old hand industry is in a moribund state. It is the machine industry which is growing important in modern India.

2. The Development of the Machine Glass Industry in India.

"Ever since the year 1877," says Mr. H. R. C. Dobbs, "the Government of India has at various times considered the possibility of the manufacture in India of the large quantities of glass articles now imported from Europe. Experiments have been specially tried in the matter of beer bottles and of ornamental glass beads" (A Monograph on The Pottery and Glass Industries of The North Western Provinces and Oudh, 1895, p 30). Mr. Dobbs then goes on to describe the experiments on glass made at glass works erected at Jhelam (Punjab), Aligar and Bhagalpur for the manufacture of bottles and glass beads. The failures of these tentative attempts are ascribed to accidental causes and not to any impossibility of success.

Since the year 1890 good many glass works under Indian and European management have been started and worked

in Bengal, in the Bombay Presidency, in the Punjab, Hyderabad, Baroda and elsewhere. Considerable difficulty has been experienced by these works and most of them met with failure owing to either want of sufficient capital to meet the running expenses or to the want of technical knowledge.

However, the character of the industry underwent great changes during the last great war. The war gave a great spurt to the infant industry. Previous to the war India has been a great importer of glass ware, glass beads and glass plates. Unable to secure these in sufficient quantities during the war India was compelled to produce them at home. Sheltered by the war conditions the industry made some significant progress. And India now turns out bottles, and window glasses, plate glass, scientific glass instruments and also optical glasses. The value of the glass manufactured within the country is believed to be one-fourth of the total import value of glasses.

However, the condition of the industry after the war has not been very promising. The "majority of the factories have been recently started, and their record so far is, in most cases, a continuous struggle against difficulties, due partly to inexperienced control and lack of trained labour and partly to short supplies at very high rates, of essential raw materials, such as soda and coal." (Industrial Handbook, Indian Munitions Board, 1919, p 265). For these reasons the indigenous glass industry found it difficult to make headway against foreign competition of Japan, Italy, Austria, Germany and other European countries. To protect the industry against foreign competition import duties of 30 per cent. on glass bangles and beads and false pearls, and 15 per cent. on glass and glassware have been imposed in 1923. The following statement shows the development of the import trade in glass manufactures.

Year	Figures in lakhs of Rs.	Year	Figures in lakhs of Rs.
1885-86	50.52	1913-14	1,94.52
1895-96	74.10	1918-19	724.61
1905-06	1,12.47	1926-27	2,52.88

3. Comparative Advantages and Disadvantages possessed by the Indian Glass Industry.

It may be interesting to note that the essential raw materials employed in the manufacture of glass are silica, soda compounds, and potash, and the power used is fuel, especially coal. Silica is the principal substance of which glass is made. Silica is ordinary sand. But the solid or the compact form of silica, quartz, flints and sand stones are grounded to powder before they are melted into glass slag. Silica is treated with numerous chemical substances to obtain glass of desired quality. The chief chemical substances used are carbonate of soda, sulphate of soda, lime or common salt. Glass made of silica and carbonate of soda is brittle, but added with lime the product becomes strong. Lime enters into the chemical composition of all common glass. Boric acid or potassium carbonate is an essential constituent of flint and optical glasses. Lead is used where softness and lustre are desired, while aluminium is added in order to produce colourless glass.

The fuels employed in the manufacture of glass are wood, dried leaves, coal and gas. Mr. Chisholm somewhere in his Handbook of Commercial Geography points out that "at a trial of window glass made from coal and from gas fuel at Pittsburg it was found that newsprint could be read through 18 sheets of gas-made glass placed behind one another, whereas nothing could be seen through six sheets of similar coal-made glass".

In India the raw materials employed by the factories are silica, lime, alkali, lead and other chemical substances and coal. Silica and lime are found in abundance in many parts of India. Lead is mined at the silver-lead-zinc mine of the Northern Shan States. At present alkali or sodium compounds of Indian origin are more expensive than the imported products. The coal fuel, although abundant and cheap in Bengal is expensive in other parts of India owing to heavy freight charges. The two heavy items of expenses involved in the manufacture of glass in India, therefore, are alkali and coal, both of which are comparatively dear in India. Moreover, the hot climate is not very favourable to

the manufacture of glass. The high temperature required for glass blowing undermines the constitution and ruins the eye sight of the workers. So the industry has to be adjusted to the climatic conditions of the country.

On the whole, however, India is well-provided with the materials needed for the development of the glass manufacturing industry. In order to minimise the coal expenses Mr. Fox suggests that the industry should be erected in places where all the raw materials, especially coal and alkali can be obtained without incurring large expense. He says:

“A large number of existing glass works in India have been erected without sufficient attention to their normal economy. In some instances the raw materials and coal are brought long distances by rail.....It is evident, therefore, that glass factories for the manufacture of any of the above kinds of glass wares would, if established in the Bengal coal-fields or in Calcutta, have the great advantages against imported glass” (Notes on Glass Manufacture By R. C.S. Fox, 1922, pp. 44-46).

CHAPTER 10

THE IRON AND STEEL INDUSTRY.

1. The Early History of the Indian Iron Industry.

The manufacture of iron and steel has been known to the Hindus from time immemorial. Large heaps of iron and steel slags found in different parts of India..... at Kapadvanj (Guzrat), Ahmedabad, Salem, Hyderabad and at several other places testify to the fact that iron and steel were manufactured in India from antiquity. "The famous iron pillars at the Kutub, near Delhi, indicate an amount of skill in the manufacture of a large mass of wrought-iron, which has been the marvel of all who have endeavoured to account for it. It is not many years since the production of such a pillar would have been an impossibility in the largest foundries in the world, and even now there are comparatively few where a similar mass of metal could be turned out" (A Manual of The Geology of India, Part II, By V. Ball, pp. 338-339).

The iron pillar "consists of pure malleable iron without any alloy, and it does not rust although it has been exposed to the air for centuries. This work is the most complete testimony of the skill and art of the Indian iron makers 4500 years ago."

The same writer adds that steel of superior quality used to be manufactured in ancient India. "First in importance," he says, "is the manufacture of cast-steel in crucibles, which attracted so much notice many years ago. For a time Indian wootz or steel was in considerable demand by cutlers in England. Its production was the cause of much wonderment and became the subject of various theories" (Vide pp: 339-40).

The famous damascene sword blades were made from this wootz steel also known as damascene steel produced in South India. It is conjectured that this steel used to be exported for centuries from India to Damascus, Iran and Spain. The damascene steel industry continued to flourish in South India till the first quarter of the 19th century. The industry is now extinct, and it is believed that the knowledge of the art of wootz manufacture is lost.

The quality of Indian iron is considered by Sir George Birdwood in his *Industrial Arts Of India* "to be superior to any English iron or even the best Swedish." According to the opinion of another authority Indian iron was superior in point of durability to European iron, though it was more costly than the European product. Thus, Captain J. Campbell over ninety years ago said :

"I consider the worst I have seen to be as good as the best English iron and that its supposed defects arise from it almost always containing a considerable portion of steel" (Quoted by Mr. W. E. G. Dobbs in his *Monograph On The Iron And Steel Work In The United Provinces Of Agra And Oudh*). He adds, however, that the Indian smelters were not "acquainted with the use of a flux in smelting."

2. The Causes of the Decay of the Indian Iron Industry.

Until recently the Indian demand for iron was met from local sources. But the "manufacture of iron has in many parts of India," says Mr. V. Ball (p. 338) been wholly crushed out of existence by competition with English iron while in others it is steadily decreasing and it seems destined ultimately to become extinct."

This statement of Mr. Ball needs no corroboration. The indigenous iron industry is now virtually extinct. It appears that different causes led to the decline of the different aspects of the industry. It is a well-known fact that the best side of the Indian iron industry was primarily connected with the manufacture of the weapons of war and of religious works rather than with the production of agricultural and industrial instruments.

It seems that there are four causes which account for the decay of the Indian iron industry. These causes are not independent of one another, but they are more or less inter-acting. The once famous steel industry may be said to have declined as a result of the disappearance of the native sovereigns and semi-sovereigns and with them of the mediaval conditions of warfare. The arms and weapons of war of those days are no longer considered to be of much importance in modern times. They were excellent "in the good old days" of the dandelion age. Moreover, the Arms Act has produced some baleful effects upon the still-lingering industry. "It is needless," says Mr. Baden Powell, that the operation of the Arms Act has done much to diminish the number of weapons, but very few of the best makers who still remember the Sikh days or have learnt from the armourers of those times, hold licenses and are able to ply their trade." (Manufactures And Arts Of The Punjab, Vol. II, p. 145).

The second cause which wore out the industry in general was the restriction imposed by the Government upon the utilisation of wood fuel or upon the cutting of trees for fear of deforestation. The third general cause was foreign competition which rendered it difficult for the hand industry to hold its own against the superior European competition. The influx of cheaper products of superior quality from Europe tended to displace the demand for indigenous articles. The fourth cause which is closely allied with the third cause is the inability of the Indian manufacturers to adapt themselves to the superior western methods of production or to invent new methods of their own.

The Indian method of production and the nature of consumption, especially the former, are primitive, whereas, the modern western method is scientific and progressive. In India production is adjusted to consumption which is determined primarily by customs or long-standing habits, while in the modern western world, production, to a large extent, creates new desires and new wants, and thereby not only controls consumption but enhances production e.g., railways, steamers, motor cars, &c. It is much easier to alter

the nature of consumption than the method of production. This is clearly evident in modern India. And it needs no schooling in engineering to know that the new things and new ideas introduced into India from abroad could ever be produced under the old economic regime equipped as it had been with rudimentary knowledge, especially empirical knowledge, of sciences.

Under the old economic regime the extent of the iron and steel industry could not but be small. Regarding the extent of the old iron industry Major W. V. Scudamore says: "Statistics are naturally not available to show on exactly what scale the industry existed, but there is evidence to prove that even in its most palmy days its development was exceedingly diminutive as compared with the vast scale on which it is now dealt with in western countries" (Iron And Steel Work In The Bombay Presidency. A Monograph By Major W. V. Scudamore. R. E., 1907). The old industrial organisation is insignificant as compared with the modern enterprises, like the Tata Iron Works, or the Bengal Iron Works established in India on the western scientific line. Under the old regime the consumption of iron and steel per head of population must have been extremely small. Even to-day, for her size of population, India is a small consumer of iron and steel.

The fundamental factor which determines the growth of modern iron industry is the development of the knowledge of chemistry, metallurgy and engineering. And the industry calls for vast quantities of raw materials and power. The construction of railways, steamships, bridges and machines and instruments of production consume a huge quantity of iron ores and coal which cannot be produced by hand-tools. Moreover, the perfection of each branch of the industry has come about as the result of specialisation. In India under the old regime, it seems that too much attention has been paid to the military and religious aspect of the industry, and too little to the industrial side. A huge pillar, no matter of how excellent steel it might have been made, is not a productive instrument. It expresses the religious sentiments of the potentate who had it erected, at exorbitant cost of the people's money.

On the other hand, the bulk of the articles of common use whether for domestic or for industrial purposes are of inferior order. "The common articles of daily use, knives, scissors, tweezers, horse bits, stirrup irons, and such like when of native manufacture and pattern are generally rough." (B. H. Baden Powell: *Manufactures And Arts Of The Punjab*, p. 144). The furnaces used are of the crudest form, and the smelting and manufacturing processes simple and primitive. "The method is.....hand-capped by primitive methods of mining and smelting, for it is only the softer varieties of ores which can be made use of and the furnaces are of small capacity blown by leather bellows, and the maximum yield reported for a single furnace is about 30 tons per annum." (The Resources Of The Empire Series, Vol. VIII, p. 44).

3. The Present Condition of the Indigenous Industry.

The old industry both on its smelting and manufacturing sides still survive in a precarious condition. The smelting industry is practically dead. The raw material—iron and steel, employed in the hand manufacture of iron wares is generally imported, but it is also now produced within the country by machine.

The condition of the indigenous industry is, perhaps, much better in native state than in British India. In the former the production of the old things and ideas is still carried on to a great extent. The "superbly ornamented arms of the costliest description," steel blades, spears, daggers and weapons in general are, perhaps, made in Kashmere, Hyderabad and in other native states.

It will be out of place to go into a detail description of the various articles produced by the hand industry. Reference may be made to the monographs written on the subject. But the principal articles made may here be noted. They are agricultural implements, domestic utensils, tools and implements used by the blacksmiths, goldsmiths and silver-smiths, cutlery—betel-nut cutters, scissors, knives, fishing hooks and tools, locks and padlocks, iron boxes, or trunks, iron safes, weapons of war and of chase—swords, daggers, cannons, matchlocks; and artistic and damascened iron and steel works, and wrought iron works, etc.

4. The Early British Enterprises.

The existence of enormous resources of iron in India early drew the attention of the Government to the possibility of producing iron in India at a cost cheaper than the imported iron. Investigation carried on in this direction established the belief that iron could be effectively produced in India. Various tentative attempts were, therefore made by Government and private firms between 1771 and 1865 in Bengal, Madras Presidency and in the United Provinces to manufacture iron with charcoal as fuel. The Government took to iron production on its own account; but the general character of the Government enterprise "has been either to expend money upon experimental trials, to subsidise companies, or to direct the different departments to obtain their supplies, as far as possible from local sources, and, thus, aid the efforts of companies" (A Manual Of Geology Of India by V. Ball, Part III, p. 345). But in spite of the subsidies granted by Government to private firms and relaxation made in the forest laws in their favour, the early ventures turned out unsuccessful. The two factors which combined to bring about this result were the exhaustion of the supply of fuel in the vicinity of the smelting centers, and the absence of the adequate means of

transport facilities to carry the ores to or near the fuel.

Experience gained from the early ventures led to the conclusion that the development of the industry on a large scale with charcoal as a fuel was impossible. It was not until the development of railways and of coal mining that successful, or to be precise, relatively successful efforts were made in this direction in this new century. Production of iron ores on a large scale on European lines is being carried on in the provinces of Behar and Orissa and Bengal by the three great recently established companies, namely, the Tata Iron And Steel works, the Indian Iron And Steel Company and the Bengal Iron Company. Among these the Tata Iron and Steel Company is the largest and the most important. To have a clear idea of the position of the Indian iron industry one must know something about the history of the Tata Iron and Steel Works.

5. Comparative Advantages and Disadvantages possessed by the Indian Iron Industry.

Before we pass on to the next stage of the history of the industry as represented by the Tata Iron and Steel Works it is desirable to indicate some of the conditions upon which the iron industry depends. The iron and steel and the coal mining industries are the basic industries upon which depends the development of all other industries. The industrial condition of a country may easily be gauged from the degree of the development of the basic industries: iron and coal. Coal and iron are the necessary instruments of manufacture. A nation's position as a manufacturing power depends upon the production of cheap iron and coal. Abundance and relative cheapness of iron and coal, organising ability, and inventive ability account for the industrial greatness of countries like Great Britain, the United States and Germany.

It is, therefore, desirable to enquire into the comparative advantages possessed by the Indian iron industry. The principal raw materials required in the manufacture of iron and steel are iron, coal, limestone manganese, chromium, wolfram, etc. An adequate supply of these is essential to the efficient production of iron or steel of different kinds.

It is a well-known fact that India possesses enormous deposits of iron ores of different kinds which are widely distributed over the country. No accurate estimate of the total amount of the iron resources available in India has yet been made. However, recent geological investigation carried on in the provinces of Bihar and Orissa in connection with the institution of the Tata Company disclosed the fact that enormous deposits of iron ores of excellent quality exist in these provinces. Millions of tons of hematite and magnetite iron ores are located in the Singhbhum districts only. The Singhbhum deposits are believed to contain as high a percentage of the metal as 65. This single deposit is so extensive that it is believed to be greater and richer than all the deposits of Great Britain, Germany or of France.

Now, turning to manganese we notice that it is an essential ingredient for steel production. It is used in very large quantities in the iron and steel industries "to prevent over-oxidisation, to add carbon and manganese, and to eliminate sulphur and phosphorous, to impart desirable mechanical properties, and increase the fusibility of slags" (Bulletins of Indian Industries and Labour. Notes on Manganese By J. C. Brown, 1921, p. 1). This mineral is widely distributed in India and is found pretty close to the iron ores. The deposits of the Central Provinces contain high percentage of iron, which is a defect. But this defect is easily removed by mixing it with manganese ores containing less percentage of iron than is ordinarily necessary.

Now the power used for smelting iron is coal or coke. India is tolerably rich in this valuable material. But the quality of Indian coal in general is not satisfactory for smelting purposes. In smelting iron ores the best result is obtained with hard coke. The quantity of coal available for producing hard coke is limited, being found only in a few of the localities of the Jheria and Raniganj coal-fields. Moreover, the quality of coking coal is inferior to British coking coal. As a rule Indian coals do not coke satisfactorily. It is also worthy of note that the coal supplies are at a distance from the smelting centers. This disadvantage is, however, of minor importance at present being overcome by the concessions granted in the shape of low rates to the Tata Company by the Bengal Nagpur Railway.

Another important raw material required for iron manufacture is limestone. When the ores are melted, limestone is added to the molten metal as a flux to absorb impurities. Limestone is dear in India and is of poor quality, especially in the locality where the Tata Company is situated. Consequently steel manufacture in India is stated to consume a larger quantity of limestone than does the steel produced in the United States. The high cost of limestone enhances the price of steel produced. This, of course, has been the experience of the Tata Company.

According to the established hypothesis that iron can be produced cheaply where iron ores, coal, limestone and man-

ganese occur in abundance and in close proximity, it appears that India possesses comparative advantages. The disadvantages with regard to raw materials are of minor importance and they may be overcome. But there are other difficulties of greater importance against which the pioneers have to struggle. They are technical skill, organising ability or business ability, capital and climate. Both iron and steel industries require the highest degree of technical knowledge and organising ability. The supply of these two factors is not yet well-developed in India, and consequently they have to be imported at heavy cost from Europe and America. The same difficulty arises with the question of capital which is very shy in India. With the exception of the Tata enterprise and a few others the bulk of the capital invested in the Indian industries is of foreign origin. In fact Indian capital is much dearer and more difficult to obtain than European capital in the Indian market.

Another obstacle, a natural one, which stands in the way of developing large iron and steel works is climate. The very high temperature required for smelting added to the hot climate of the country is detrimental to the health of the workers. It is practically impossible to continue to work for long hours during hot seasons. This climatic difficulty is overcome only by reducing the period of work from 12 months to 8 months a year.

6. The History of the Tata Iron And Steel Works.

These were the surrounding conditions to which the Tata Iron and Steel Works, established in 1907, under American and European organisation and management had to be adjusted. It is worthy of note that the enterprise owed its origin to the genius of the late Mr. J. N. Tata, a Parsi merchant. In this great venture he was assisted by Mr. C. P. Perin, an American engineer, who still directs its development and management. The great work started by "Tata" is unique in the history of India. It is considered to be the largest of its kind in the whole of Asia and it is ranked amongst the great iron works of Europe and America.

(i) **The Site of the Industry.** This great establishment is situated at Jamsedpur, in the Singhbhum district of Chota Nagpur. The reasons for selecting this site have already been explained. They are (a) the facility of obtaining raw material, that is, iron ores, from the Singhbhum district, (b) proximity to coal resources; the distance between Jamsedpur and the Jheria coal field is about 14½ miles, which is connected by a branch of the Bengal Nagpur Railway, and (c) easy accessibility to market (Calcutta). These are among the chief advantages considered in the selection of this site.

(ii) **State Aids and Concession.** Apart from the natural advantages stated above certain concession and aids have been granted by the Mayurbhanj State and by the Government of India to the Tata Company for the development of the industry. Concessions granted to the Tata Company by the former consist of an enormous supply of iron ores lying in the Mayurbhanj State in Orissa and in the Raipur districts of Behar. According to the stipulation of leases based upon a fixed annual out-put the Company is required to pay royalties averaging 2.5 annas per ton for the first 30 years and 5 annas per ton for the next 30 years. In order to encourage the enterprise the Government of India promised to purchase 20,000 tons of steel rails annually for a period of ten years for the Government railways. During the last great war the Government demand largely exceeded the amount promised by the Government. The Company also enjoys reduction of rates from Government railways for the conveyance of its products.

With these advantages in its favour the Company started work in the year 1913. At the end of the first year (1913-14) it realised a net profit of about Rs. 8½ lakhs. In the following year the great war broke out and brought about conditions most favourable to the Company. The curtailment of the imports of iron and steel and manufactures thereof from Europe naturally offered a great opportunity to the Company for the expansion of its out-put. In fact large increase in the production of a wide variety of articles took place during the war and after the war. The

principal articles turned out by it are pig iron and steel, although a large number of manufactured articles, including jute and cotton mills and machinery, electrical machinery, chemicals, explosives, etc. are also produced.

The Tata enterprise has been specially successful in the production of pig iron, a material out of which steel is manufactured. There is no direct way of producing steel on a commercial scale from iron ores. The ores are melted by heat and the molten metal is then poured into moulds of sand or cast by machine. The products or the resulting bars are known as pig iron. Pig iron is never pure. It contains impurities like carbon, sulphur and phosphorus.

To return to the question under discussion. The success of the pig iron industry of India is evidenced by the increasing production and exportation of this material. India now exports pig iron to many countries, and successfully competes with their products, and even undersells them in their own markets. Indian pig iron is considered to be the cheapest in the world. This is attributed to (1) abundant and cheap ores of excellent quality; (2) application of up-to-date machinery, and (3) scientific management.

Success did not, however, attend the steel industry. In the production of steel the Company has been unable to compete successfully with Europe. The manufacture of steel demands the highest degree of technical knowledge and a large supply of skilled labour. It is upon this factor that the cost of production greatly depends. The discrepancy in the cost of production arises, apart from other considerations (raw materials) from the difference in the cost of skilled labour. The supply of this factor is inadequate in India. Consequently India has to import skilled labour from Europe and America at very high prices. Even the skilled Indian labour force or technical experts who have had their education in Europe and in America are generally very liberally paid. On account of the high cost of labour and exchange fluctuations caused by trade depressions after the

war India has been unable to quote steel prices in competition with the Europeans. Consequently the Tata Company was forced by reason of foreign competition to seek for protection from the Government in the shape of a bounty and import duty on imported steel.

With a view to protect the Tata steel industry against foreign competition protection in the form of bounty and higher import duties has been granted by the Government in the year 1924 for three years, beginning from June 1924 to March 1927. The rates of the bounties on steel rails and fish plates were based upon a sliding scale.

For various reasons the protection granted by the Act of 1924 was found to be inadequate. The high cost of labour, and fall in foreign exchanges rendered it difficult for the "Tata" to hold its own against foreign competition (especially Belgian and French). Further assistance was, therefore, sought by the Company from the Government in 1925. It was not until 1926 that supplementary bounty was granted to the iron and steel waggons manufactured in India from ores worked in India.

In the year 1927 when the Act of 1924 expired the Steel Industry Protection Act of 1927 was passed providing two scales of duties.....one, a preferential rate for the British and, another, a higher rate for all others sending iron and steel into India.

7. The Present Condition of the Industry.

The brief outline indicates that the industry is not yet out of the difficulties which beset it from the very beginning. It has recently been pointed out by experts that the Indian industry possesses comparative advantages with respect to the production of steel waggons and under-frames, but it does not yet have comparative advantages for the production of steel ingots and steel railings. For these reasons no bounty was provided for them in the Act passed in 1927. However, there is every reason to believe that if the policy of protection is continued the industry may within a reasonable period of time be able to stand on its own footing.

The following table indicates the production of iron ores in India.

	Quantity (in tons)	Value in lakhs of Rs.
1893	33,961	
1900	127,814	
1914	441,574	5.44
1919	563,750	4.58
1924	1,118,313	38.86
1926	1,659,295	46.87

In this connection it may be noted that so far as the export trade is concerned pig iron ranks first in importance and iron manufactures come next. In the year 1913-14 the export of Indian pig iron amounted to 82,592 tons, and it rose to 309,505 tons in 1926-27. Among the other articles of export may be mentioned hardware and cutlery, railway plants and rolling stock, machinery and millwork, vehicles, implements and instruments.

The history of the import trade is more interesting than the export trade. With the development of industries, commerce and transport facilities the importation of iron, and steel, machinery and millwork, hardware and cutlery, railway plants and rolling stocks, &c., have had a tremendous expansion in the course of the last sixty years.

Space does not permit us to enter upon a detail analysis of this aspect of the trade. Reference may, however, be made to the trade returns published annually. It may, however, be pointed out that the total value of the imports of iron and steel, and manufactures thereof for the year 1926-27 amounted to a sum exceeding Rs. 16.72 crores as against Rs. 1.41 crores of exports.

CHAPTER 11.

IRON, COAL AND PETROL.

I. IRON.

Minerals are valued for their usefulness or productivity of utility. Iron is the most useful and productive of all minerals. It has already been pointed out by us that the use of iron and steel has been known to the Hindus from antiquity. For centuries iron ores had been extracted from mines and worked into iron and steel products with hand tools. The primitive method of mining and smelting continued up to the first quarter of the 19th century. Foreign competition and scarcity of fuel practically ruined the old industry. But within comparatively recent times the mining and smelting industries have been revived by the introduction of modern power-driven machinery.

It is superfluous to lay stress upon the existence of enormous iron resources in India. In South India "magnetite occurs in beds or in veins of greater or less extent in most of the regions where metamorphic rock prevails. In some places, as in the Salen district, in the Madras Presidency, the development of this ore is on a scale of extraordinary and almost unparalleled magnitude, whole hills and ranges being formed of the purest varieties of it." (A Manual Of The Geology Of India By V. Ball, p. 335). In Behar and Orissa are also found in abundance some of the purest varieties of iron ores (*i.e.*, hematite and magnetite). At present most of the irons are obtained from the deposits of Behar and Orissa.

It is needless to repeat what has already been said about the history of the iron industry elsewhere. It may, however, be added here that in the course of the last decade the production of iron has practically doubled. Behar and

Orissa in British India and Mayurbhanj State (also in Orissa) are by far the largest producers. Of the total production of iron ore in the year 1926 which amounted to 1,659,295 tons Mayurbhanj State alone contributed 1,041,929 tons.

II. COAL.

The powers used for mechanical purposes are wood, coal, water, electricity, and petrol. Among these coal is the cheapest and the most important source of power to-day.

It has rightly been said that a nation's position as a manufacturing power depends upon the production of cheap coal. The annual production and consumption of coal within a country may roughly be taken as an index to the industrial position of the country. Great Britain's position as a manufacturing nation was built upon a foundation of cheap coal—"cheap coal to run her factories, railways and steamers, and cheap coal to sell abroad in exchange for foodstuffs and other raw materials".

The various uses to which coal is used in the industrially developed countries are: smelting of metals, manufacturing and mining, railway and steamship traction, lighting and heating and domestic services. At present coal is employed for most of these purposes in India.

Although the coal-mining industry has been in operation for over a century and a half (since 1775) the use of coal power on a large scale is of comparatively recent development. In the early days of the British rule India made use of her abundant resources of wood for all industrial purposes. Almost all the early experiments and ventures on iron manufacture until the middle of the 19th century, had been carried on with charcoal as the basis. The majority of the coal fields were far away from the ports and manufacturing centers. The absence of transport facilities retarded the speedy development of the coal resources of India. Moreover, prior to the introduction of railways and steamships there was little demand for coal power in India. Even to-day railway is the largest single

coal consumer in India. The table below shows the progress of the coal mining industry.

COAL PRODUCTION
(Figures in million tons)

1880	1.01
1895	3.54
1900	6.11
1908	12.76
1913	16.20
1924	21.17
1926	20.99

As the table indicates no great progress has been made in coal production till the beginning of this new century. And the production of coal has increased rather rapidly since the coal 'boom' of 1905, and progress in this direction continued unabated till 1920 when coal out-put dropped to 17.96 million tons from 22.6 million tons produced in the previous year.

The recent depression in the coal trade has been ascribed to over-production. The production has been in excess of demand. Recently imports of coal have increased but to a smaller extent than the increase in exports to eastern ports. Although the Indian coal industry is now reaching a position of relative stability, production being adjusted to demand, any further extension of coal production can only be made by the expansion of coal consumption within the country and by extension of coal export. At present practically the whole of the coal produced in India is consumed within the country. India's foreign trade in coal is insignificant. In the year 1927 the total export of coal amounted to 576,167 tons, and import to 243,603 tons.

Turning now to coal consumption in India we notice that at present the most important single coal consumer in the country is the railways. The Indian railways consume about one-third of the coal produced in the country. The next important coal consuming group are the mills, factories and workshops which together consume nearly the remainder. But the demand for coal by the steamships, though small,

is growing important, while the consumption of coal for cooking purposes is insignificant. Although the use of coal for domestic purposes is increasing owing to the growing scarcity of wood fuel there seems to exist some prejudices against the use of coal. On this point the Royal Commission On Agriculture observes: "We also realise that traditional custom (referring thereby to the use of cow-dung cakes and wood) will be a strong barrier to change of method." The forest laws which prohibit the cutting of wood, especially of the forests reserved by Government, have stimulated the demand for coal and also led to an increasing use of cow-dung cakes. But the difficulty of obtaining a cheap grate which may suit the economic conditions of the people also stand as a barrier to the extension of coal consumption for domestic purposes.

The only other way by which coal production may be increased is to extend the export of coal. The recent drop in the coal export trade has been due to the poor quality and comparative dearness of Indian coal. The quality of Indian coal varies considerably. It has been stated by experts that the Indian coal in general is of poor quality. "Its characteristic distinction is 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 average 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." (Statement Of The Moral And Material Progress Of India, 1872-73, p. 103).

Most of the Indian coal do not coke well. There are few regions where the best coking or metallurgical coals are obtained *e.g.*, Raniganj and Jheria. The coal of Raniganj is said to be superior to that of Jheria. Recent geological investigation shows that the deposits suitable for metallurgical purposes will not exceed two thousand million tons. At the present rate of use the deposits will exhaust in 40 years. However, India has an immense store of water power, especially in the Deccan.

Apart from the defect in quality, Indian coal is not graded according to quality. This defect, however, is now being removed by the introduction of the practice of coal grading for the purpose of encouraging the export of Indian coal.

There is a point, however, in favour of Indian coal. It is its comparative cheapness at the pit's mouth. It is said that Indian coal has a lower price at the pit's mouth than the coal of any other country except South African coal. This low cost at the pit's mouth is ascribed to the comparative nearness of surface, the application of up-to-date machinery and cheap labour. Yet coal is believed to be comparatively dear in India. The reason for this is that the price of coal is greatly affected by its quality and by the cost of freight. The difference in the cost of transport causes a great difference in the price of coal. The coal-fields are far away from the cotton mills situated in the Bombay Presidency, but being situated in and around Bengal they are relatively close to Calcutta. The disparity between the coal prices in Bengal and Bombay is considerable, owing to the difference of distances over which coals have to be hauled. It is also attributed to heavy freights. For this reason Bombay and other ports of S. India found it cheaper to buy foreign (S. African) coal at their very doors than to buy Raniganj or Jheria coals. But the comparative cheapness of S. African coal is ascribed to the subsidy granted to it by the Government of that country.

In order to protect the Indian coal industry against foreign competition the Indian Mining Federation recently proposed the imposition of a protective duty upon the import of foreign coal. It was also suggested that a protective duty should also be imposed upon the export of petroleum, and the proceeds therefrom be utilised in subsidising the coal industry. But no step has yet been taken by the Government in this direction.

III. PETROLEUM.

1. General Use of Petrol Oil.

Petroleum or rock oil is a bituminous oil. From the crude or unrefined oil pumped up from under-ground is

produced a variety of oils, *viz.*, the illuminant oil, (kerosene); white oil or adulterant for table or cooking oil, lubricating oil, the volatile oils—gasolene and petrol, and vasceline. The term 'fuel oil' includes a number of mineral oils—gasolene, petrol, benzine, etc., which are obtained by the distillation of coal, lignite, peat and other minerals.

Not very long ago the only form in which mineral oil was utilised was kerosene for illuminating purposes. Mineral oils have now a variety of applications both for domestic use and for industrial purposes. The gasolene, petrol and benzal oils are now extensively used for driving machinery and locomotives (*i.e.*, motor cars, railways and boats). The rubber industry makes use of benzine oil as a solvent in the manufacture of rubber and gutta-percha. Some of the refined varieties of mineral oils are employed for lubricating purposes, while vasceline is employed as an ointment, and refined parafine oil for medicinal purposes.

Until very recently the use of kerosene for lighting purposes in supersession of vegetable oils has been the most important feature of the Indian petrol oil. But the growth of motor traffic, and the use of oil fuel in some of the industries has brought about a great change in the oil industry, both in India and in foreign countries.

2. The History of the Indian Oil Industry.

It is said that the exploitation of rock-oil in India is a very old industry. "Whether it be true or not, as has been stated that the exploitation of the rock-oils of Upper Burma has been going on for 2000 years, it is certain that for a considerable period there has been an unfailling supply from this source". (A Manual Of Geology Of India By V. Ball, p. 138). During the Burmese rule in Burma oil-mining was the hereditary profession of certain heads of families, about 24 in number. The method followed even to-day in Burma is primitive. The comment made by Mr. N. M. Penzer on the indigenous method of oil extraction is interesting:

"Although in the midst of modern machinery the native at Yenangyareng still labouriously digs his 5 ft. square

shafts which are boarded within wooden planks. Dr. Noetling describes the diggers going down with their eyes bandaged so that no time should be lost at the bottom in getting accustomed to the darkness, and being brought to the surface again in a state of complete exhaustion. He worked in an atmosphere of gas which he could not endure for more than a few minutes, and when he was hauled up he required half an hour to recover.....By the native method it takes about two years to attain a depth of 400 ft., whereas, a machine drill will do the same work in a week or ten days". (The Mineral Resources Of Burma, 1922, p. 129).

The Upper Burma was annexed by the British in the year 1885, and in 1886 the Burma Oil Company was formed for exploiting the oil resources of Upper Burma. By its enterprise and perseverance the Burma Oil Company "laid the foundation to the real petroleum industry of Burma." (Vide pp. 129-30). The table below shows the enormous expansion of the oil industry.

Production And Import Of Oil.

(Figures in million gallons)

Production		Import	
1890	1.5	1885	17.59
1893	10.35	1895-6	66.64
1900	37.72	1905-6	61.20
1905	144.79	1913-14	95.02
1910	214.82	1918-19	60.44
1913	277.55	1927	100.00
1918	286.58		
1927	281.00		

The Indian oil is obtained from Burma, Assam and the Punjab. But the major portion of the out-put, over 90 per cent., comes from Burma. However, the production of oil in India has been on the decline since 1921 due to the exhaustion of the main Burma field. The future prospects of the Assam deposits are believed to be promising. The Indian export trade in oil is comparatively small owing

to the enormous home demand. The total Indian demand exceeds the total Indian supply. Consequently a large quantity of oil is annually imported from the foreign countries. Until recently the major portion of the import came from the United States, but, now the import is chiefly drawn from Borneo, Persia and Russia. Of the total import of 100 million gallons in the year 1927 over three quarters of the supply were derived from Persia, and the greater part of the rest from Borneo.

The question of protecting the Indian oil has been brought to the notice of the public over and over again either in connection with the coal industry or in connection with foreign competition. The question of protection came into prominence, especially in April, 1928, when the Indian oil companies were subjected to "unfair and unreasonable competition" as a result of the oil war between the Standard Oil Company of New York and the Royal Dutch Company. It is stated that to test their strength they selected India as the "battle ground". As a result of the "war" the kerosene prices were "brought down to a level below the cost of production," inflicting enormous loss upon the Indian oil companies operating in Burma and elsewhere. The Indian oil interests sent deputation to Government for protective legislation against this "unfair" competition. The matter has been investigated by the Tariff Board which reported (Sept. 1928) to the following effect: "After considering the various national interests affected by the oil industry and the effect of the price war on them we are of opinion that no case has been made out for safeguarding the Indian oil industry against the sale of imported kerosene below world parity".

3. Competition Between Petrol and Coal.

It will not be out of place to make a brief reference to the relative position of coal and petrol as sources of power. Since the discovery of oil as a source of motive power oil has assumed an enormous importance all over the world. The tendency of oil to displace coal has within comparatively recent years been evident everywhere. The shortage of coal during the great war led to an increasing use of oil as

a substitute for coal. More than 50 per cent. of the tonnage of the ships now under construction throughout the world are being fitted with oil engines. The use of oil fuel is extending fast in the furnaces of the shipyards, in the factories and in railways and ships. The oil engine recently developed in England will, it is claimed, reduce the fuel cost by 60 per cent. If these experiments become completely successful they will cause a revolution in locomotive traction.

It is worthy of note that the competition between coal and petrol is also growing slowly in India. On certain section of the North Western railway at Karachi oil has been substituted for coal. Some tea gardens have cut out their steam plants and replaced them with oil-engines.

It appears, therefore, that the supremacy of coal as a fuel has been challenged by oil fuel. But the scarcity of supply and the comparatively high cost of the initial outlay of the oil-plants may prevent the complete substitution of coal by oil. Although oil-engine is more efficient than steam engine the initial out-lay on a Diesel engine is much greater than on a steamship of equal capacity. By reason of high cost oil is not likely to displace coal. Coal is still the cheapest power available. The reign of coal over all other powers is still dominant even in the United States, the world's largest producer and consumer of oil. It is estimated that the oil deposits of this country (United States) will deplete within a short period—in about 20 or 30 years, whereas the world's coal deposits are still practically inexhaustible.

On the other hand, successful efforts have been made to discover and to employ alcohol as a substitute for petrol oil. Alcohol is obtained by distillation from sugar, starch, maize, potatoes, saw dust, and from various grasses, nettles and straws. In Germany alcohol distilled from potatoes is employed for driving motor cars, engines, for lighting the streets and for cooking purposes. Owing to the absence of petrol in Great Britain and the high cost of imported oil alcohol is employed alone or in combination with petrol oil as a motive power. Millions of gallons of alcohol are produced by distillation from saw dust in the United States. In Norway and Sweden alcohol is also synthetically produced from ethylene and acetelene. Thus

there are numerous unexploited vegetable sources from which alcohol or spirit may be obtained by distillation. It is not therefore, likely that the exhaustion of petrol resources will lead to a reversion to the increasing use of coal. The contrary seems to be true. There are indications which go to show that the reign of coal may come to an end at any time. Recently a Brazilian scientist, Dr. Walter von Hohenau claimed that by applying to water very high vibration he was able to release the hydrogen. The hydrogen could then be used in the same way as coal gas is used for power purposes. Dr. von Hohenau said that the low cost of the process would mean the end of coal as a fuel. (The Statesman, Daily Edition, Oct. 28th, 1928).

CHAPTER 12

MINOR MINERAL INDUSTRIES

Besides iron, coal and petroleum India has an immense store of wealth in numerous other minerals the exploitation of which has begun only within comparatively recent times. These are copper, lead, zinc or spelter, tin, salt, manganese, wolfram, gold, silver, and other precious metals. For several reasons the economic exploitation of these minerals has been delayed till comparatively recent times. The want of capital, enterprising spirit and technical knowledge debarred the Indians from undertaking such risky enterprises. It was not until the opening of the railways that Europeans undertook the work of exploitation.

1. LEAD.

Lead ores are found in various places in India. However, the bulk of the out-put is now obtained from the silver-lead-zinc deposits of the Northern Shan States. The Chinese worked for ages (from 1417 to 1868) on these mines in order to extract the silver from these valuable deposits, and left the by-productts, lead and zinc and also a little of silver, behind. "Some hundreds of thousands of tons of slags were staked about the mine containing on an average from 45 per cent. to 50 per cent. lead, and 16 per cent to 18 per cent. zinc. The first smelting furnace to treat the slags was started in 1909, and since then the old slag heaps been exhausted. In 1918 only about 2,000 tons recovered". (The Mineral Resources of Burma By N. M. Penzer, 1922, p 51). The working of the silver-lead-zinc mines of the Northern Shan States was started only in 1914. In the course of the decade between 1915 and 1926 the out-put has quadrupled, that is to say, it has risen from 13,522 tons in 1915 to 54,330 tons in 1926, valued at Rs. 47.41 lakhs and Rs. 2,25.94 lakhs respectively. This is, perhaps the only mine-

ral belonging to the minor group, in which concurrently with the expansion of production the importation has fallen off in recent years.

2. ZINC.

Zinc in its natural condition is rarely found pure. It is always associated with some other substances—silver, lead or copper. Spelter is the metallic zinc of commerce. Among zinc compounds zinc blend is the most important in India, because in addition to the metallic zinc it contains sulphur. Zinc occurs in Burma, Sikkim and Rajputana. But the principal sources of supply are the silver-lead-zinc deposits of the Northern Shan States. The industry is a recent development (1913) and its out-put has increased from 3,198 tons in 1914 to 43,056 tons in 1926.

3. SILVER.

India is not an important silver-producing country. The world's greatest silver-producing countries are Mexico, the United States, Canada, Peru and Australia. However, silver occurs in small quantities in various places in India, the Madras Presidency, Mysore and the Northern Shan States. At present the bulk of the out-put is obtained as a by-product from the silver-lead-zinc deposits of the Northern Shan States. The out-put rose from 236,446 oz. in 1914 to 5,126,088 oz. in 1926.

4. COPPER.

Extensive deposits of copper occur in Sikkim, in the Northern Shan States and in Chota Nagpur. At present the operation of this metal is confined to the deposits of Behar and Orissa and of the Northern Shan States. Over 90 per cent. of the out-put is, however, obtained from Behar and Orissa. The out-put of copper has declined from 30,804 tons in 1922 to about 5000 tons in 1927.

5. GOLD.

India is fairly rich in gold, which occurs in various river-beds and in rocks. The bulk of the out-put in British India

is derived from the Madras Presidency and Burma, and in Native States from Mysore and Hyderabad. The production in British India and also in Mysore has considerably declined within recent years. In India the most important single source of supply is the Kolhar deposits of Mysore which contribute about 99 per cent. of the total Indian out-put. The out-put amounted to 607,388 oz. in 1914, but it gradually dropped to 384,158 oz. in 1926.

6. MANGANESE.

India is the largest producer of manganese in the world. The mineral occurs in the Central Provinces, in the Madras Presidency and Bombay Presidency, Mysore and Behar and Orissa. Of these sources of supply the Central Provinces is the most important, contributing about 85 per cent. of the total annual out-put. The total out-put of manganese rose from 682,898 tons in 1914 to 1,140,051 tons in 1927. India is an important exporter of this mineral. It may be noted here that the chief demand for manganese arises from its use in the manufacture of steel. The great increase in the world's production and consumption of manganese has been entirely due to the expansion of the steel industry since the discovery of the Bessemer process of steel manufacture.

Among other important minerals of commerce which are produced to a more or less extent may be mentioned mica, monazite, tin, chromite, aluminium, wolfram, and asbestos. The total value of the minerals, about twenty in number, mined in the year 1926, amounted to about Rs. 32½ crores. It should, however, be noted that out of this large number of minerals only six, namely, coal, petroleum, manganese, lead, gold and salt accounted for over 90 per cent. of the total value.

BOOK II.
**DEVELOPMENT
OF THE
AGRICULTURAL INDUSTRIES.**

CHAPTER 13

COTTON FIBRE

1. The Chief Uses of Cotton.

Cotton is a soft, white fibrous or filamentous substance of great strength and flexibility. Owing to these properties it is employed for the manufacture of clothings. The cotton fibre is the most important of all fibres, vegetable or animal. It is the principal raw material employed not only for the manufacture of cotton fabrics, but for mixed fabrics, belting, cordage and paper. Absorbent cotton is merely a modification of cotton effected in its chemical constituency by treating it with alkali and with other chemical substances. Gun cotton is, likewise, prepared from it by treating cotton with nitric acid and sulphuric acid. The beautiful mercerised clothes having a silky lustre are produced by treating cotton yarns or fabrics with caustic soda and other chemicals. Cotton yarns or woven cottons on being mercerised become stronger and more durable than when they are in a pure or natural state. Cotton, like other vegetable fibres, is an important source of celluloid containing about 90 per cent of cellulose.

2. The Early History of Indian Cotton with special reference to its quality.

The cotton plant has been cultivated in India from the remotest antiquity. But nothing about the quality of the cotton or about its cultivation is known except that the industry is very old. It is a well-known fact that during the Mogul rule and also during the early British rule India used to produce some very fine and silky cottons of which muslin and other finer cotton fabrics were made. "Cotton, it is well known, has been cultivated in India from the most remote antiquity; that it is naturally of a good quality is evident from the fine muslins which were manufactured

with it, as well as from the durability of the Indian cotton piece-goods, now driven out of the markets, not only of Europe, but even of India itself, by the cheaper manufactures of English clothes". (Memoir On The Cultivation of Cotton by Dr. Royle, July, 1840, p. 24).

The evidence of one Mr. Henry Faucett before Sir John Anstruther, the Chairman of the Committee shows that Surat cotton grown during the early years of the 19th century was of good quality but in small quantity. In fact it never came into competition with American cotton or with West Indian cotton. It had some properties which rendered it specially suitable for certain purposes. "The Surat cotton, if we can get it clean and fine, as we do sometimes, is preferred to the Bowd Gorgias, as it takes dye better; in general the Bowd Gorgias are much better than the Surats". (Supplement to The Fourth Report On The Affairs of the E. I. Coy., Appendix 47, 1809).

Another cotton highly spoken of in those days was Ahmed cotton. It was a very fine cotton "but not a long staple. The specimens upon which the experiments have been made, fully prove that if such cottons can be improved by the East India Company, it will always command a very high price, and meet a ready market, to the extent of six millions of pounds, without interfering in the most distant degree with the growth of West Indian Islands..." "(Supplement To The Fourth Report On The Affairs Of the E. I. Coy. Memoir On The Trade To And From India No. 22, 1795-1802).

However, with a few exceptions the generality of Indian cottons have been recorded to be of inferior quality. It was "found that the cotton of India could not enter into competition with that produced nearer home in Brazils, the West Indies and North America." (Papers Relating to The East India Company's Charters, &c., Jan. 1809). It is also recorded in the Parliamentary Papers that although the import of raw cotton from India into the United Kingdom rose from 2,039 bales in 1805 to over 40,000 bales in 1810-11, the trade did not develop to the extent anticipated owing to the subsequent revival of trade with America in consequence of the comparative superiority of American cotton.

Apart from the natural causes, the inferiority of Indian cotton is ascribed to the faults of the growers themselves. The chief faults of Indian cotton are uncleanness, carelessness in cultivation, shortness of staple and adulteration. Many passages occur in the Parliamentary Papers which go to show that the practices of fraud and adulteration existed from a very early date. Perhaps the most glaring instances of the practices of fraud and adulteration are disclosed by the Court of Directors in a letter addressed to the Government of Bombay, 22nd February, 1811 (East India Affairs). I can do no better than transcribe an excerpt from this letter:

“It is with the cleaning of cotton that fraud begins to multiply. Every stage thence forward is marked by trick, and dishonesty; the article is mixed with one of inferior sort, or picked when only imperfectly cleaned; it is removed from the cleaning wheels without being teased, in order to separate any remaining leaves or seeds, put into darkened damp warehouses, which are cow-dunged to keep them moist; and the cotton, to preserve it humid, is almost daily sprinkled with water, the deceit being covered by putting dry cotton on the outside of that which has been wetted. The night before the purchaser means to begin weighing, the seller exposes his cotton to the heavy dews, spreading it on the ground to receive as much moisture as suits his purpose; the wind at the same time assisting his object, by blowing into the cotton a quantity of dust, sand, or other impurities.....Frauds still more gross are practised. The cotton is sometimes wetted with a mixture of salt and water, to increase doubly the weight; and even leaves, dirt and stones are purposely mixed with it.”

The practice of adulteration was very common during the American Civil War which gave a great impetus to the cultivation of Indian cotton. It is said that large handfuls of cotton were removed from inside the bales and the spaces were filled up with dirt. These malpractices led to the passage of the Cotton Fraud Act of 1863. By this Act inspectors were appointed to inspect the bales. The expences of the establishment were realised from a tax

of three annas levied upon each bale of cotton shipped. The rate of the tax was reduced from three annas to two annas per bale in 1872. The Cotton Cess Act passed in 1923 has somewhat similar object in view, that is, to improve the quality of cotton by removing frauds or adulteration. The Indian cotton industry has now an organisation known as the Indian Central Cotton Committee incorporated under the Cotton Cess Act. The object of the Committee is to prevent malpractices, improve cotton marketing and to promote research for the improvement of cotton cultivation.

Now to return to the subject under discussion about practices of adulteration. The practices of adulteration and carelessness in cultivation are continued up to the present. The Report of the Indian Cotton Committee, 1919 informs us that both the ripe and the unripe cotton balls are picked indiscriminately in order to save the cost of labour for second picking. The leaves of the plant and valves of the balls are mixed with cotton. Cotton is frequently heaped on the bare ground and consequently becomes mixed with dirt, sand and small stones. If cotton is picked early in the morning when the ground is wet with dew, no trouble is taken to dry it. Moreover, to increase the weight, the practice of watering cotton is common. Fresh cotton is mixed with waste cotton. Broken seeds are mixed with cottons, and cottons of different qualities are mixed together.

The quality of Indian cotton is, thus, impaired by bad picking, damping, or watering and by adulteration. The effect of all this has been to render Indian cotton short stapled, coarse, unclean and consequently cheap or low priced. It is unsuited for the manufacture of finer cotton yarns and fabrics for which purpose American and Egyptian cottons are chiefly used in Europe and even in the Indian mills.

Apart from the causes stated above which account for the inferiority of Indian cotton, there are, however, other reasons which have led to the deterioration of the quality of the Indian cottons. They are (i) the decay of the hand

cotton-industry and the consequent falling off of demand for the finer cottons; (ii) the introduction of the mills and machinery for the manufacture of cotton yarns and fabrics, and, the consequent substitution of hand-spun yarns and fabrics by machine-made yarns and fabrics; (iii) the growing practice of separating the seed from the fibre in ginning factories, instead of by hand-ginning as was done formerly; (iv) the growing demand for short-stapled cotton by Indian mills, by the mills of Japan and by those of the Continental countries of Europe which rendered the cultivation of short-stapled cotton more profitable to the growers than that of long-stapled ones; and, (v) the deterioration of the fecundity of the soil by repeated cultivation.

Regarding the deterioration of the better grade Indian cottons the Imperial Gazetteer of India (Vol. III, p. 44) remarks: "The Hinganghat cotton of thirty or forty years ago was longer and silkier than that which is now produced, while Broach and Surat cotton considered by some not to have maintained their ancient reputation, although higher cultivation is practised in those districts than elsewhere in India".

3. Efforts to Promote the Cultivation of Cotton in India.

From its earliest days the Lancashire cotton industry has mainly depended upon American cotton. Her textile machinery and the superior quality of her products are specially adapted to the American and Egyptian cottons. Owing to the comparative largeness of supply and the superiority of American cotton, not only England but all the great cotton manufacturing countries of the world are more or less dependent upon American cotton. The apprehension that any shortage in the out-turn by war or by price manipulation in the American market may seriously affect and even cripple the British cotton trade, various efforts have been made by the British Government to improve the quality and quantity of the Indian cotton. It has been early recognised by the East India Company that the climate of India is congenial to the growth of cotton.

Instances of the efforts made by the East India Company to develop the cultivation of cotton in India are too numerous to be mentioned here. Volumes have been written on it. A few instances may, however be cited here. "As early as 1790, we find", said Dr. Royle, "that Dr. Anderson was employed in sending Mauritius cotton seeds, as well as, "brown cotton seeds" imported from Malta to different parts of the peninsula; and Dr Roxburgh...who took charge of the Calcutta Botanical Garden in 1793, had already ascertained that the elevated, dry and less fertile soil of Coromandel was better suited than that of Bengal to the Bourbon cotton. Mr. B. Metcalf, who had resided several years in Georgia in the capacity of a merchant and a cleaner, was sent in 1813 by the East India Company with American merchants for cleaning cotton, and directed to be employed at one of the factories in the Ceded districts ..." (Memoir On the Cultivation Of Cotton By Dr. Royle, July 1, 1840, p. 24).

In the year 1828 Lord Ellenborough "recommended the cultivation of cotton of all the finer sorts of foreign cottons in different and distant parts of India, under every different circumstance of soil and climate" (Vide p. 36 footnote). For the promotion of the cultivation of cotton rewards were offered, money advances were made to cultivators and experimental farms were established and seeds from America, Egypt, and from other countries were distributed among the growers.

The Report of the Select Committee On The Growth of Cotton In India (July 17, 1848, p. iii) observes that "as far back as the year 1788 experiments were made under" the direction of the East India Company, "enquiries were instituted, reports were called for, and seed was distributed to the Natives. In 1813 an American gentleman was engaged to assist in the efforts of the Indian Government, and American gins were procured to promote the better cleaning of the cotton. Again, in 1818, 1831 and 1836 experiments were made, and in 1840, a number of Americans skilled in the cultivation of cotton were sent out to India, and experimental farms were established in various portions of the Company's territories. For sixty years the

‘Court of Directors have taken an interest in this question; they have expended considerable sums in various attempts to stimulate the growth of cotton in the countries subjected to their rule...’

Attempts to develop the cultivation of cotton in India continued unabated, and measures were adopted for the purpose. Experimental farms and Agri-horticultural societies have been established at Alahabad, Hyderabad, Nagpur, in the Bombay Presidency, the Punjab, and in other places during the 19th century. “For many years experiments were tried in the Bombay Presidency, at considerable expense to the Government, with the view of improving the growth of Indian cotton, and introducing the cultivation of exotic species, foreign seed was procured, model farms established under the supervision of American planters, and machines for cleaning and packing the wool produced” (Moral And Material Progress of India for 1864-65, p. 64).

Turning now to more recent periods we find that strenuous efforts have been made by the Government through the Department of Agriculture to acclimatise the American and Egyptian varieties and also to produce new types by hybridisation. Experiments made to acclimatise the exotic varieties did not meet with anticipated results. Success of minor importance has been attained in the acclimatisation of American varieties in limited areas, as for example, at Dharwar. Recent scientific investigation carried on by the Central Cotton Committee and experiments conducted by the Departments of Agriculture have established the belief that American cotton cannot be grown successfully in India, and that the best results can be obtained by selecting and improving the indigenous varieties.

It should, however, be noted that some new types of cotton of better quality have been evolved by selection and hybridisation. In these new types there is much hope for success. Some of the best varieties of Indian cottons may be mentioned here: Broach and Dhollerias (Guzrat),

Hinganghat (C.P.), Coomptas (Dharwar), "Dharwar" (an American variety acclimatised), Tinnevely (Madras), &c. &c.

4. Staples of American, Egyptian and Indian Cottons.

The quality of the Indian cotton in general is inferior to that of the American or Egyptian cotton. The two principal varieties of cotton grown in the United States are the "Sea Island," and the "Upland." The "Sea Island" cotton is so called because it is grown on the sea shores of the West Indies and on the islands near the coasts of South Carolina and Georgia. This cotton has the longest staple and the most lustrous and silky fibre found in the world. The length of the fibre varies from one and three fourth inches to two and a quarter inches, with a diameter of about 0.00064 inch. It is in great demand for the manufacture of the finest yarns and fabrics and for the strong cords required for the automobile tyres. The annual out-put of this cotton is, however, small, being about 25-30 million pounds a year in the United States and about 4 million pounds in the West Indies. The production of this cotton has considerably declined within comparatively recent years owing to the attack of insects.

The "Upland" variety may be divided roughly into three broad classes:—the Upland short staple, the Upland medium staple and the Upland long staple. The length of the Upland fibres varies from three quarters of an inch to one and three fourth inches. The average length of the Upland is estimated at about an inch, with a diameter of 0.00078 inch. It is white, strong and of medium fineness, being employed for the manufacture of ordinary yarns and fabrics, viz., gauze, nainsook, tucking, chintz, satin, &c.

The Egyptian cotton may broadly be divided into two classes: the varieties grown in the Upper Egypt, and the varieties produced in the Lower Egypt. The major portion of the cotton grown in the Upper Egypt is known as the "Ashmouni," and that grown in Lower Egypt as the

"Sakellaridis." The former is cream-coloured, silky and strong, while the latter is brownish and of medium quality. The staple of the Egyptian cotton in general varies from 1.2 inches to 1.5 inches.

The Egyptian cotton has some peculiar properties of its own. It is of superior quality and is employed for the manufacture of finer yarns, fabrics and strong cords. It is particularly suitable for certain purposes for which American Upland and other varieties are unsuitable. It takes dyes with comparative ease, and is specially suited for mercerisation. It is superior in quality to the American Upland which constitutes the bulk of the American cotton.

The bulk of the Indian cotton is of short staple, varying in length from half an inch to one and one eighth inches. The average length is much below an inch. For this reason as well as for bad preparation it is unsuitable for the Lancashire mills adapted for the production of finer yarns and fabrics.

The best index to the quality of cotton is its spinning capacity. The spinning capacity of cottons grown in different parts of the world is as follows:—

The best Sea Island	150s & upward.
The best Egyptian	100s to 150s
The best upland	60s to 70s.
The rough Egyptian and middling Upland	40s to 50s.
Brazilian	30s to 40s.
Good Indian	20s to 30s
African	10s to 16s.

The quality of the cotton reflects in the products and in the quantity of cotton consumed per unit of spindle. Mr. J. S. Ward remarks: "The finer the cotton, the better the product of the spinning and weaving mills, but at the same time the less cotton is used in proportion to the number of spindles employed" (Textile Fibres and Yarns, p. 33. The Resources of The Empire Series, Vol. III). The quantity of cotton consumed per spindle varies directly with the quality of cotton. Thus, the same writer says, "the lower

the type of production, the cheaper the labour employed and the cheaper the goods sold, the larger the proportionate consumption of the world's stock of cottons, whereas, the bigger the industry and the finer the goods, the less cotton per thousand spindles is consumed" (Vide p. 34). The consumption of cotton per unit of spindle in India is much greater than that in England, the difference being due to the difference in the quality of cotton used and the product turned out.

5. Extension of Cotton Cultivation in India.

Before concluding this chapter, it may be interesting to make a brief reference to the extension of cotton cultivation in India. The various efforts and experiments made to promote the cultivation of cotton in India have borne fruitful results. The quality of cotton has improved and the quantity of out-turn has been considerably increased. The rise in the price of cotton during the American Civil War led to a considerable increase of cultivation. In fact the rapid development of the raw cotton trade dates from the year, 1860. Unable to obtain cotton from the United States England was forced to draw her supply of cotton upon India. This unexpected demand inflated cotton prices and led to an unparalleled development of cotton cultivation and cotton trade in India. Cotton was sold at enormously high prices and the speculators made enormous profits. The table below shows the development of the cotton trade.

Export of Cotton

(In Cwts).

1775	2,398
1800	60,773
1820	208,606
1840	687,606
1845	520,767
1860	1,507,143
1863	4,229,271
1875	5,600,086
1885-6	4,191,604

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1895-6	5,248,428
1905-6	7,399,534
1913-14	10,626,312
1919-20	8,593,960
1926-27	11,385,760

It may be noted that the export of cotton rose rapidly during the Civil War, but it declined as rapidly after the peace was established in the United States as it had increased during the war. However, the demand for Indian cotton soon developed with the development of cotton industries in other parts of the world—in the Continent of Europe, Japan and China, which gave a great stimulus to the cultivation of cotton in India. In the year 1875 the area under cotton was only 6.29 million acres; the acreage rose to 15.84 million acres in 1913-14, the pre-war year, and in 1924-25 the figure went up to 17.41 million acres breaking all past records.

CHAPTER 14.

SERICULTURE.

1. Classification of Silk-worms.

Broadly speaking there are three varieties of silk-worms which figure largely in the sericulture of India to-day. They are:—

- (i) the mulberry-fed silk-worms supposed to have been introduced into India from China;
- (ii) the wild and semi-domesticated silk-worms of native origin;
- and, (iii) the hybrids derived by crossing the foreign varieties with the indigenous varieties.

These three classes may, however, be reduced to two groups only, viz., the domesticated mulberry-fed silk-worms, and the wild and semi-domesticated silk-worms, for the group three comes naturally under group one* or group two. It may, however, be noted that the classification of silk-worms, into domesticated mulberry-fed silk worms and the wild silk-worms is not accurate, for some varieties of silk-worms, viz., *Ocinara*, *Theophila* and *Trilocha*, are wild, while some of the so-called wild silk-worms have been more or less domesticated since antiquity.

The mulberry-fed silk-worms are collectively known as the Bombycidae, and the wild species as the Saturniidae. These two tribes are divided into many genera which are in turn sub-divided into numerous species.* It is not possible within this brief sketch to study them in detail. However, it may be interesting to introduce here a few of the genera and species of silk-worms for the sake of illustration.

The Bombycidae include the *Bombyx*, *Ocinara*, *Theophila*, *Trilocha* &c. The *Bombyx* are sub-divided into many species, viz., *Bombyx aracanensis*, *B. croesi*, *B. fortunatus*, *B. mori*, *B. sinensis* and *B. textor* (Boro polu of Bengal). The Saturniidae embraces many genera: *Actias*, *Antheraea*, *Attacus*, *Caligula*, *Cricula*, &c. Of the Saturniidae, *Antheraea* and *Attacus* are important for our purpose, for *Antheraea* embraces the tassar, the muga and the mezenkuri species, while *Attacus* includes the eri varieties. Of the Bombycidae the *Bombyx* species is important from a commercial point of view.

Of the Bombycidae tribe some species yield annually one crop and they are therefore, known as univoltine, while others which give two, three, four or more crops are respectively known as the bivoltine, trivoltine, quadrivoltine and multivoltine species. Among the univoltine species *B. mori*, the silk worm cultivated in China, Italy, France, Spain, Persia, Turkey and in Kashmere, yields the largest cocoons and the best silk which is of a golden yellow colour. The cocoon of the *B. mori* is of a firm and close consistency, and it can be easily reeled. *B. mori* thrives best in the temperate climate.

Bombyx aracanensis (Burmese silk), *B. croesi* (Nistari or Madrasi of Bengal introduced from China), *B. fortunatus* (the Deshi or Choto polu of Bengal), *B. sinensis* (the Sina or the small Chinese of Bengal), and *B. textor* (the Boro polu of Bengal)—are examples mainly of multivoltine species which thrive well in warm moist climate. The last-named four are cultivated in Bengal. The multivoltine yield several crops a year. But the cocoons of the multivoltine are somewhat inferior to the cocoons of *B. mori*. The cocoons which the former spin generally contain little silk and are difficult to reel. Of the four varieties reared in Bengal nistari occupies the first place. But the annual yield of

*T. Wardle: The Wild Silk Of India, 1881, pp. 1-5

G. Watt: Dictionary Of The Economic Products Of India Vol. VI, pp. 2-23.

L. Liotard: Memorandum On Silks In India, Part I, p. 3.

silk from the nistari is small as compared with that obtained from the Boro polu and Choto polu. The Boro polu spins the largest cocoon and the cocoon spun by the Choto polu is larger than that given by nistari and other varieties. However, the nistari silk is finer and softer and is easily reelable.

Among the Saturniidae tassar is a wild silk-worm never successfully domesticated. The tassar cocoons are generally hard and compact with coarse, strong buff-coloured silk. They can be reeled and spun. The muga is a semi-domesticated silk-worm. It is cultivated in Assam and in North and Eastern Bengal. The silk fibres derived from muga cocoons are of yellowish colour, which can be reeled. Like muga the eri is also a semi-domesticated silk worm. Its cocoons which are of white colour are unsuitable for reeling, but good for spinning.

It may be worthy of note that the Bombyx feeds upon the mulberry leaves, but the Ocinara feeds on the leaves of *Ticus infectoria* and other trees. The tassar, muga and mezenkuri feed on a large number of trees, while the eri feeds upon the castor leaves.

With these preliminary observations on the principal varieties of silk-worms, we may now proceed to retrospect the Indian sericulture industry, a subject extremely difficult to epitomise.

2. The History of the Mulberry Culture in India from the 17th Century up to 1882-83.

The ancient history of mulberry culture or even of sericulture itself is wrapt in obscurity. Nothing is known of the industry except the fact that it is very old. One of the earliest and best accounts of the Indian silk industry is to be found in Mr. J. Geoghegan's *Silk In India* (1872). With regard to the origin of the industry he says:

"The date of the introduction of silk into India is probably not to be ascertained. A word *Keuseya* occurs in the *Ramayana*, the *Mahabharata* and the laws of *Manu*, but whether it means silk; whether, if so, the silk was what is

now known as tussar silk or silk of a domesticated bombyx, and whether, in the latter case, the silk was imported, either raw or in fabrics, or produced in India, are questions on which the learned are not yet decided. Whatever may be the date of the introduction of the worm, its geographical distribution at the present day, and the fact that the species first introduced was a multivoltine, seem to me to lead to the conclusion that the insect was first introduced into India from the north-east" 1.

The history of the Indian silk industry really begins from the time of the establishment of the British trade settlements in India, and especially from 1757, the year of the conquest of Bengal and the establishment of the British rule in India. However, the account left by the celebrated French traveller, J. J. Tavernier, who visited India during the 17th century is pregnant with suggestions about the prosperous condition of the industry during the later part of the Mogul rule. Tavernier who spoke highly of the indigenous silk industry of Bengal observed:

"Kasembasur, a village in the kingdom of Bengala, sends every year two and twenty thousand bales of silk, each bale weighing a hundred pound, at sixteen ounces to the pound."

About the method of dyeing raw silk the same traveller said: the raw silk of Kasembasur yellowish, as are all the raw silks that come from Persia and Sicily, but the natives of Kasembasur have whiten it with a dye made of the ashes of a tree which they call Adam's fig-tree, which makes it as white as the Palestine silk"

It was, however, declared to be a fact that Tavernier's account of the dimension of the silk industry of Bengal had been based upon guess rather than upon weighty estimation or calculation. "It is difficult to see how", says Dr. Watt, "Tavernier was able to get the figure of the total production, but his remarks show the importance of the Bengal mulber-

1. Introductory, p. iii. In this connection reference may also be made to Mr. L. Liotard's Memorandum On Silk in India p. 1.

ry silk industry during his time and his notice of it is perhaps the earliest direct reference by European writer" (Dictionary Of The Economic Products Of India, Vol VI., pp. 183-84). The magnitude of the industry as it existed in those days, would compare unfavourably with that of the comparatively recent periods. Thus, writing in 1903 Mr. N. G. Mukerji remarks: "But the number of workmen in the principal silk factory of Bengal is mentioned by Bernier to be seven or eight hundred, while a good many factory at the present time employ at least thrice that number" (A Monograph On The Silk Fabrics Of Bengal, 1903, p. 60).

However, in the absence of statistical data there is no way of knowing accurately the annual production and exportation of raw silk during the period under discussion. It appears, however, that the silk industry attained dimensions during the days of the East India Company's rule, mainly as a result of the development of a demand for raw silk in England. The English demand for raw silk arose from the Spitafield silk manufacturers who hitherto used to draw their supply of the raw material upon Persia, China, Japan, Siam and Cochin-China. The silks of these countries, especially those of Persia were held in higher estimation by England than those of Bengal.

Before proceeding to the next stage of the history of the industry it seems advisable, for the sake of clearness and simplicity, to divide the subject into four main divisions:

(1) The Development of the Industry under the E. I. Company.

(2) The Causes of the Decline of the Mulberry Culture in Bengal, and (3) The Conditions of the Mulberry Culture in other provinces.

(1) The Development of the Industry under the E. I. Company.

During the earlier years of the E. I. Company's trade with India it paid little attention to the raw silks of Bengal. The reason for this was that Bengal silk was

inferior to those of other Asiatic countries. There was a great demand for Persian silk in England, and efforts were, therefore, made to obtain monopoly of the Persian silk by England. "There is a long and interesting account of negotiations carried on in 1617 and the following year between Sir Thomas Roe and the "Sophy" of Persia, with a view to secure to the English Company the monopoly of Persian silk. The export was estimated at from 2000 to 3000 bales, and in 1619 Persian silk sold in London for 26s. 10d. per lb. The only specific notice of Bengal silk, on the other hand, in these earlier years, is an order of 1621 countermanding the buying of the commodity".

"But the treaty with the Shah fell through and as the settlement in Bengal spread, Indian silk seems to have attracted some attention" (Silk In India by Geoghegan, p. 1).

It was from 1670 that the East India Company "turned attention to the improvement and development of the industry first in Bengal, then in other provinces". (L. Liotard: Memorandum On Silk In India, Part I, 1883, p. 18). But the export trade in Bengal raw silk did not attain importance till a century later. The demand for Bengal silk in the British market was inconsiderable because of the inferiority of the silk produced, by defective reeling. "The main fault of Bengal raw silk was inequality in the same skein. It was common to find part single, part double, treble, and in many instances, even quadruple. The mode of assortment was also much neglected, and the article had fallen into disrepute." (J. Geoghegan: Silk In India, p. 2).

After the conquest of Bengal the East India Company made special efforts to improve the quality as well as to increase the quantity of raw silk by the introduction of the superior breeds of silk-worms and by teaching the silk-growers the European methods of reeling silk cocoons. With regard to the efforts made by the Company the Statement of the Moral and Material Progress of India for 1872-73 (p 41) observes:

The East India Company took great pains to foster the production of silk. The planting was urged on the zeminders 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 in 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".

There are other evidences which go to show that great improvement had been effected in the Bengal silk industry by the East India Company. Thus, the Supplement to the Fourth Report On the Affairs of the East India Company, (Memoir No. 22, 1808) remarks: "It is with satisfaction we are enabled to observe, that owing to the unremitting care and attention that has been for years past given to this article, both at home and abroad, it has been progressively improving, and continues to improve, in its quality. It has already attained a degree of perfection which it was formerly pronounced to be altogether incapable of reaching and it is, perhaps, susceptible of still further improvements, under the same vigilant and active superintendence".

Towards the beginning of the 19th century the silk industry was developed to such an extent that "Bengal silk drove all competitors, except Italian and China silks, out of the English markets" (Vide Geoghegan: Silk In India, p. 3).

The progress of sericulture in Bengal during this period is also ascribable to the Napoleonic Wars. The wars which cut off the regular supply of raw silk from France and Italy forced England to obtain her supply of the raw material from other sources—India, China and Japan. Strenuous efforts were, therefore, made by the Company to increase the quantity as well as to improve the quality of the Bengal silk so that it might be acceptable to the British manufacturers. Consequently expansion in production and improvement in the quality of the Bengal silk proceeded apace. The Indian trade in raw silk was at a high web with large exports till 1835, that is to say, just after the trading function of the Company came to an end (1833), when its connection with sericulture ceased. Even

after 1835 the export trade in silk did not diminish in volume but in the character of the trade. And although the trade in raw silk suffered from periodic depressions the volume of export continued practically undiminished till 1875 when it assumed its present shape.

(2) The Causes of the Decline of Mulberry Culture in Bengal.

The principal causes of the decline of the mulberry culture in Bengal are (i) the superior foreign competition from Italy, France, China and Japan; and (ii) the degeneracy of silk worms in Bengal. These two topics will be taken up in their serial order.

(i) The Effect of Foreign Competition upon Sericulture in Bengal.

Throughout its history the raw silk trade of Bengal had to struggle hard against the superior competition of Turkey, Italy, France, China and Japan. In this competition India did not always fare well, for the quality of her silk was poor and defective and unsuitable for the European markets. It was short-stapled, unclean, coarse and 'endy' or broken. And the method of reeling was defective. In this connection the development of a superior quality of silk in Europe is interesting. Repeated efforts were made by France and Italy to develop sericulture at home. For this purpose mulberry silk-worms from China and Japan were introduced and acclimatised in these countries. Under the Mediterranean climate, a superior quality of silk with special virtues was produced. This new silk practically revolutionised the nature of the silk industry. The development of the new silk industry with this new raw material produced baneful effects upon the Indian silk in the European markets.

Regarding the effect of the competition of foreign silks upon the Indian silk Dr. Watt observes :

• "Changes in the constitution of the East India Company threw open the vast resources of China and Japan. These countries did not, however, come permanently forward until the out-break of disease was feared to imperil the European

supply. The alarm, thus, aroused, temporarily revived the Indian trade, and it placed China and Japan upon a permanent footing. In India the point appears to have been gradually reached when it became no more profitable undertaking to contend against climatic disadvantages, and the apathy and the indifference of the Indian growers. A market had, however, been discovered for even the most inferior qualities and waste materials of silk, and export in these things was found to be more profitable than the troublesome and expensive production of mulberry silk under direct European supervision." (Dictionary of the Economic Products, Vol. VI, p. 193).

"Various causes have combined of late years," observes the Statement Exhibiting The Moral and Material Condition of India (1874-75, p. 39), "to affect the Bengal Silk industry, namely, the growing preference in Europe for woolen fabrics, the competition of China and Japanese silks, the increased production in Italy and frequent attacks of the silk-worms by an incurable disease..."

Thus, in consequence of a superior competition the once-famous Bengal silk lost its European market. Nevertheless, there still remained some demand for Indian silk in the European markets. The Indian silk possesses certain virtues not possessed by others. For certain purposes of manufacture they were preferable to other silks. But the scope and range of the demand for such purposes was very limited. The major portion of the European demand for Indian silk consisted of "waste silk". The degeneration of the silk trade from fine silk into waste silk began from the year 1835, that is, after the East India Company withdrew its support from it. And it was from 1858 onward that the export consisted mainly of waste silk.

(ii) Decay of Sericulture caused by the Degeneracy of Silk-worms.

The raw-silk industry of Bengal suffered from periodic depression owing to two other circumstances: first, the prevalence of diseases and epidemics among the silk-worms, and, secondly the climatic conditions of Bengal. The fact

of the degeneration of the silk-worms in Bengal was early discovered by the East India Company. The general opinion was that the Bengal silk-worms had degenerated owing to the prevalence of diseases and epidemics, and that the remedy lay in the introduction of European or Chinese worms and in the education of the native growers in the improved European method of cultivation and reeling (Vide Geoghegan: *Silk In India*, pp. 15-16, and J. Louis: *Present State and Future Prospects of Sericulture In Bengal*).

From 1770 onwards renewed efforts were made, first, by the East India Company, and after 1835 by the Horti-agricultural society of India, to improve sericulture in Bengal by the introduction of Chinese, Italian and Japanese silk-worms. Efforts to produce hybrids by the crossing of the indigenous varieties of silk-worms with *B. mori* of Italy and China and Japan were made, but little success attained these experiments. The conclusion arrived at from these experiments was that the warm climate of Bengal is not suitable for the production of the superior quality of silk produced by some of the temperate countries like Italy, France, China and Japan. The temperate or the sub-temperate climate was especially favourable for the cultivation of the better species of silk-worms i.e., *B. mori*. The only regions in India where the French and the Italian seeds have met with a fair amount of success are Kashmere, Dehra Dun and Mysore, especially the first and the last places. It is said that the efforts of the Kashmere State to develop sericulture have, after many failures, been crowned with success. The largest and the most important industry under State control in Kashmere is sericulture. Three circumstances which favour the development of sericulture in Kashmere are the abundance of mulberry trees, the suitable elevation and favourable climate.

In Bengal the industry has, however, met with partial success with Nistari, Choto polu and with other multivoltine varieties which thrive well in the tropics. The progress made in these silks has, however, been attained through prolonged and expensive experiments conducted under government and private enterprises. The introduction between

1886 and 1896 of M. Pasteur's system of selecting disease free seeds among growers in Bengal revived the industry. Previous to the introduction of this new method sudden outburst of epidemics would sweep away all the worms. Gradually the people were educated in this system and the industry re-established.

(3) The Conditions of Mulberry Culture in Other Provinces.

In a work of this character a detail description of the early history of sericulture in other provinces would be out of place. Reference may, however, be made to Geoghegan's *Silk in India* (pp. 43-109) and L. Liotard's *Memorandum On Silk In India* (pp. 18-59). It is worthy of note that sericulture in provinces other than in Bengal (except, perhaps, Burma) is of inconsiderable importance. Turning to more recent periods we find sericulture, although existing elsewhere, not in a flourishing condition. In the Punjab it has been carried on in a desultory manner. "At no time," says, Mr. H. C. Cookson, "does the cultivation of silk-worms seem to have been carried on systematically by the natives of the Province..... Efforts have been made by European gentlemen to re-establish the industry on a former footing, but the success achieved has been very small." (*Monograph On Silk Fabrics In The Punjab 1886-87*). Writing in 1889 Mr. W. M. Haily also expresses similar opinion, but he adds that the climatic conditions for the cultivation of the mulberry worms are favourable in many districts of the Punjab.

In the Bombay Presidency the condition of climate is unfavourable for mulberry culture. There are very few places (e.g., Kalligal) in the Madras Presidency suitable for mulberry. In the United Provinces some unsuccessful attempts have been made to develop sericulture at Moosoori and in Oudh. The only places where the experiments have been successful are at higher elevations—Chakrata (7,000 feet above the sea level), Deban (9,000 feet above the sea level), and at Dehra Dun. The experiments at the last-named place have met with a fair amount of success.

3. The Present Condition of Sericulture in India.

Writing in 1880 Mr. J. Louis observed that from 1870 the production of silk, in Bengal was "decreasing at an alarming ratio" as a result of "a steady deterioration in the breed of the Bengal Bombyx and in the quality of its cocoons." The deterioration in the quality of the silk in spite of the constant improvement effected in Bengal continued. During the last quarter of the last century there grew up an impression that the Bengal sericultural industry was moribund.

However, the "Government of India at the early part of 1880 took fresh measures in view to promoting the silk industry in the country" (L. Liotard's Memorandum On Silk In India, p. 77). Since the introduction of the improved methods of selecting disease-free seeds, and the discovery of the new methods of combating diseases the silk industry of Bengal has taken a new turn and some definite progress has been made in this direction. It appears that the Government has been making ceaseless efforts to revive the industry. For the education of the growers sericultural schools have been established and for the distribution of seeds among the growers many nurseries have been set up at the important silk regions of Bengal.

At present there are twelve nurseries in Bengal for rearing disease-free seeds of Nistari and Choto polu silk worms. The distribution of selected seeds among the growers has reduced the losses caused by pebrine, but flacheric continues to levy its toll. Hybridisation is being resorted to for breeding disease-resisting species.

The Annual Report of the Bengal Agricultural Department (1925-26) informs us that the Sericulture Department in Bengal contributes about 40 per cent. of the entire demand for seeds in the Province. The Berhampur and Rajshahi schools provide training for sons of professional rearers. Eighteen stipends of Rs. 10 each are offered to students for one year's training in these schools. Moreover, a sum of Rs. 400 is granted to the successful students for establishing model rearing house in his village. Primary

schools for giving elementary education in modern sericulture to children have been established near the important nurseries. Moreover, sons of silk-rearers are taken as apprentices by Government nurseries for giving them practical training in sericulture. For the propagation of sericulture and for demonstration purposes Government has kept a special staff of officers whose duty is to assist rearers in sericulture. A co-operative silk union has also been established at Malda for financing silk-rearers, silk-reelers and silk-weavers and to assist them in marketing their produce. Under the co-operative silk union a number of subsidiary rearers' societies have been established. Recently, a silk reeling and weaving school has also been instituted at Berhampur. (Report by the Deputy Director of Sericulture).

Signs of progress are also visible in other provinces. The Coonoor silk station in the Madras Presidency has developed some hybrids by inter-crossing the univoltine French worms with the multi-voltine Mysore worms. These selected seeds which show appreciable increase in size and yield of silks are being distributed among the rearers. In Behar and Orissa Government is distributing disease-free seeds among the growers, and teaching the new method of reeling silk to the people. The Punjab has many schools for teaching the people in silk-rearing. Numerous nurseries have also been established at Maymyo and in Promé in Burma for the same purpose.

There are, thus, signs in evidence everywhere that the silk industry of India is in the process of recovery. The out-look appears to be promising and it seems that the industry may assume importance in future.

The following table shows the condition of the trade:

	EXPORT (In lbs.)	IMPORT (In lbs.)
1865	1,582,341	1,276,773
1885-86	1,523, 224	1,732,559
1905-6	1,779,316	1,645,695
1913-14	1,203,098	2,563,720
1919-20	1,451,090	2,342,587
1926-27	1,294,972	1,783,260

The above table indicates that the demand for Indian raw silk in the European markets remains practically steady since 1865. The export consists mainly of waste silk and wild silks. The import which also is practically stationary consists of raw silk from Japan, China, Italy and France.

4. Cultivation of wild and Semi-wild silks.

The wild silks of commercial importance are the tassar (*Antherea mylitta*, *Antherea p.*), the muga (*Antherea assama*), and the eri (*Attacus ricini*). It should be noted here that the wild silk industry is not so valuable and important as the mulberry.

The tassar silk worm is the most abundant and the most important of the wild silk-worms of India. Different species are found in different parts of the country. The tassar worms appear to thrive well in warm and moist climate, and is found in wild conditions in Assam, Bengal Central Provinces, Orissa, Chota Nagpur, Santal Pargana and elsewhere. It has been introduced into the Punjab and the Madras Presidency with meagre success. The only places where it has been partly domesticated are the Mirzapur districts of the United Provinces and in Vizagapatam.

The tassar industry was known to India from the earliest antiquity. Before 1878 tassar silk was not much used in Europe. The difficulty of dyeing and bleaching the silk prevented its utilisation. However, these difficulties were soon overcome by valuable researches made in connection with dyeing and bleaching and in the utilisation of this silk. Soon a demand for it developed for the manufacture of imitation seal-skin (i.e., for cloaks and mantles of winter wear); for the manufacture of Utrecht velvet and carpet (Vide Dr. Watt's Dictionary of Econ. Prods., Vol. VI, pp. 150-151). Sir Wardle, writing in 1914 said that it is said that "Tassar silk as an article of dress was rapidly gaining favour and becoming very popular in France, and that the demand for it might increase to such an extent as to make its price almost as high as that of other silks." (Kashmere. Its New Silk Industr. &c. p. 336).

There is a large demand for tassar silk in Europe but the greater part of the European import has always been drawn from China and Japan. China tassar silk is inferior to the Indian variety in point of the length of the fibre. The average length of the China tassar fibre is 550 metres as compared with 700 metres of the average staple of the Bengal fibre. But the Bengal product is much more difficult to reel than the China tassar.

Now, turning to eri we notice that from a commercial point of view it is the next important wild silk of India—that is to say, of Assam and northern and eastern Bengal. The eri cocoon fibres are too delicate to be reeled. They are, therefore, spun like cotton and made into coarse fabrics of great durability and strength. The eri market is practically local *v.e.*, Indian. The muga silk found in the same localities as the eri is not so important commercially as the eri or tassar. But it yields a silk which is much superior in quality to the eri. The demand for the muga silk exceeds its supply. If its production could be increased, and prices reduced it would have a brighter prospect than the tassar.

5. The Menace of the Artificial Silk.

It now remains to make a brief reference to the artificial silk industry which is growing rapidly. Writing in 1899, Mr. Edgar Thurston observed: "Sericultural industry is at present day threatened by a rival to the silk of the silk-worm in the form of artificial silk, the industrial significance of which may be gathered from the number of patents which have been taken out, during the last year or two, for improvements in, and appliances for mercerising and imparting a silky lustre to web-fabrics." (Monograph On The Silk Fabric Industry Of The Madras Presidency, p. 4).

The artificial silk is produced from cellulose and gelatine. "Within the last five years a purely artificial filament has been produced from cellulose, and this product, inspite of its being rather dear, rather difficult to dye, and very deficient in tensile strength, has been found to be of great value for many textile purposes,

where its splendid lustre has out-weighed its serious defects." Mr. Millar (whom Edgar Thurston quotes in his Monograph) then proceeds to describe the process of producing artificial silk from gelatine, "which claims to possess very considerable advantage over cellulose, especially in its more economical production." (Vide p. 4).

* Artificial silk is produced from the cellulose of wood, cotton, jute and other substances. At one time saw-dust was largely employed, but now raw cotton waste and wood are the materials more generally used. The first artificial silk establishment was set up at Besancon near the forest of Jura. Within quite recent times the artificial silk industry has made unexpected progress. There are indications to show that the use of artificial silk is spreading fast. If the use of this silk continues to increase at the present rate, it may threaten the ruin of the natural silk industry.

CHAPTER 15.

JUTE AND OTHER MINOR FIBRES.

I. JUTE FIBRE.

1. A Short History of the Jute Fibre.

The fact that India is the home of the jute fibre is well-known to all. However, considerable doubt as to the antiquity of the jute fibre still remains. "There can be no doubt," says Dr. Watt, "that jute was known to the people of India from comparatively remote periods, but.....from the confusion which existed down to the present century in the words sunn, pat, patta, bhunga and hemp, etc., names applied to certain Indian fibres, it is difficult to determine for certain many of the fibre yielding plants referred to by ancient writers. The probability is that sunn-hemp (the fibre of *Crotalaria juncea*) was better and earlier known to the ancient Hindus than jute, and that the true hemp (*Cannabis sativa*) was known to them, if not brought to India by their invading and conquering ancestors" (Dictionary Of The Economic Products, Vol. II, pp. 545-546).

The development of the cultivation of jute and of jute manufacture, in its present dimensions at least, is comparatively recent. "It should be noted that," said Mr. Hem Chandra Kar in 1874 who made a special study of the Indian fibres, "though the plant was known in this country from the time of the Mahavarata it was not very extensively cultivated until very recently." (East India Products, Part II. Report On Jute And Other Indian Fibres, 1874, p. 18). According to the district reports (continued Mr. Kar) the cultivation of jute has been carried on "in Bogra since 1847, in Noakhali and Tippera for the last 20 years, in the 24-Parganas 'for many years,' in Hugli 'from a long time,' in Dacca 'beyond the memory of man,' in Goalpara before the time of the British rule, in Darjileing from the time of the

Sikim War and in Nowgang 'so far back as 400 years ago when the use of the fibre in tying up books was expressly forbidden by Sankar and Madhav.'

It appears that the tremendous development of the jute trade in Bengal has come about as a result of the increasing demand for jute fibres and jute fabrics in Europe and in America within comparatively recent times as the table below shows. The growing demand for jute both at home and abroad inflated its prices which in turn reacted upon the extension of cultivation and upon the manufacture of jute. The export trade in raw jute began as early as 1795, perhaps, earlier than that date. But the trade did not assume importance in volume and value till 1857. "The quantity of jute exported in 1828 was 364 cwts., worth 62l and the extraordinary increase that has taken place is due solely to the energy of the ryots of Bengal. 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." (Moral And Material Progress Of India for 1872-73, p. 110).

Since the establishment of jute industry at Dundee and its subsequent transference to the banks of the Hugli the demand for raw jute increased by leaps and bounds and went on increasing with the development of jute manufacturing industries in the Continent of Europe and America. The table below indicates the enormous expansion of the raw jute trade.

EXPORT OF RAW JUTE.

	(In cwts.)
1832-33	11,800
1852-53	439,850
1865	2,100,677
1875	5,493,957
1885-6	7,782,435
1895-6	12,266,781
1905-6	14,480,407
1913-14	15,369,020
1919-20	11,836,280
1926-27	14,155,640

2. The Geographical Distribution of Jute in India.

It is a well known fact that India has a monopoly of the jute fibre. The jute plant is cultivated chiefly in Bengal and sparsely in Assam and in Behar and Orissa. But the Bengal fibre, both from the point of view of quality and quantity, is the most valuable product. Bengal is the principal source of supply of jute and upon it depends practically the jute manufacturing industries of the world. The two commercial varieties of jute plants grown in Bengal are the *Chorchorus capsularis* and *Chorchorus olitarius*. The fibre of the latter is inferior in quality, and is, therefore, less valuable than that of the former which is largely grown in Eastern Bengal. The jute filament varies in length from 5 feet to 8 feet. The length of the ultimate fibre, however, varies from .1 to .2 inch.

3. The Value of Jute as a Commercial Fibre.

The best criterion for judging the value of a fibre is the percentage of cellulose present in it and the quality of the cellulose, that is to say, whether it is pectocellulose or lignocellulose. Cellulose is the principal constituent of vegetable fibres. It is a substance made up principally of carbon, hydrogen and oxygen. The higher the percentage of pure cellulose present in the fibre the better is the fibre. Cotton has about 90 per cent. of pure cellulose and jute about 76 per cent. The percentages of cellulose present in the several Indian fibres are as follows:—Urena 77.7, Calatropis 76.5, Abutilon 75.0, Agave 75.8, Abroma 80.0; Rhea 80.3, Flax 81.9, Sida 83.1, Crotalaria 83.0, Marsdenia 83.3, and Girardenia (Nilgiri nettle) 89.6. "Jute possesses 76.0 per cent, and is thus in of point of cellulose about the eighth most valuable fibre in India. It is noteworthy that of the fibres enumerated Abutilon, Urena, Abroma, Sida and Jute are obtained from closely allied plants and yield very similar fibres." (Dictionary Of the Economic Products by Dr. Watt, Vol. II. p. 252).

From a commercial point of view none of the fibres enumerated above are equal with jute. Jute differs greatly

from cotton, hemp and flax, but resembles Manila hemp, and Sisal hemp. Jute possesses many special properties which render it valuable for commercial purposes. It has a fine silky lustre. The carpets and rugs made of them do have a silk-like appearance. Jute takes dyes easily and it can be spun into yarns up to 20 counts. These last two properties are also possessed by many other fibres. The chief defect of jute is that it is not so strong and durable as cotton, hemp, or flax fibre, and it is very susceptible to deterioration under moisture. Moreover it cannot be bleached nor spun into counts above 20.

Nevertheless the comparative cheapness of jute recommends it for the manufacture of cloths, bags, tarpaulins and ropes, and for the production of artificial silk fabrics. The comparatively low cost of jute renders it specially valuable as packing agents for food-grains, sugar, cotton, wool, &c. Certain classes of cheap carpets, rugs and mats are made jute. Jute fibre or jute cellulose is used in the manufacture of woollulose, a mixed product of wool and jute, while in the production of artificial silk which is a growing menace to the sericultural industry, jute fibre is an important ingredient. Jute is adulterated with linens or flax fibres and is also used extensively as a substitute for hemp, for the manufacture of certain kinds of paper, and its waste products are employed in the manufacture of whisky.

4. The Menace of Jute Substitutes.

The recent expansion of the jute manufacturing industry all over the world has increased the competition for jute fibre and has led to an exorbitant rise in jute prices. A part of the price-inflation must, of course, be ascribed to speculation in the jute market and to the inelasticity of supply. However, the demand for jute has had an enormous development and still is on the increase inspite of the rising prices. Moreover it is evident that the demand for jute fibre will grow with the increasing need of the growing population of the world and with industrial expansion.

A combination of circumstances, viz., the monopoly of jute by Bengal and its limited supply and the continued

rise in the jute prices have led manufacturers to look for some suitable substitutes for jute. Efforts have been made to acclimatise the Bengal jute in many other countries and also to discover a fibre or fibres that may supersede jute or successfully compete with jute. Some progress has already been made in this direction. Jute substitutes have been discovered and experimented in several parts of the tropical world, Africa, Java and S. America. Experiments carried on in Java and Africa have proved that suitable substitutes can be grown in these countries. And among the several substitutes discovered the most successful and the promising one was declared to be that of roselle, a plant grown in Malay. But the possibility of exploiting it on a commercial scale still remains doubtful. Owing to the high cost of labour and the difficulty of extracting the fibres from the plants none of the substitutes discovered have been able to attain commercial importance.

But the most recently discovered jute substitute known as 'brotex,' a cross between two fibre plants, grown in Britain (Devonshire) which is believed to threaten the ruin of the jute fibre calls for notice in view of the numerous virtues claimed for it. Brotex is said to possess an inner pulp suitable for paper manufacture, a seed admirably suited for the manufacture of cake, and above all, a fibre which can be employed for all purposes (spinning and weaving) for which jute is used, including the manufacture of artificial silk. The chief defect of brotex, however, is that it takes a long time, at least two years, to mature.

However, like other substitutes the supposed superiority of brotex over jute has not yet been established beyond doubt. The new fibre needs yet to be tested to show whether a successful industry could be established on a commercial basis. In fact none of the substitutes, so far discovered has yet been able to defy the Bengal jute in cheapness of production and in excellence of quality. Unless and until the superiority of brotex is definitely established it is difficult to shed one's doubt about its supposed excellence.

It appears, therefore, that the jute manufacturing industry of the world must depend upon the raw materials

grown in Bengal, and that the growing demand for jute must be met, if possible, from Bengal. The possibility of increasing the supply of jute by the extension of cultivation in Bengal has already drawn the attention of the Government and of private firms. But little progress in this direction has yet been made. Investigation carried on by the Department of Agriculture shows that a substantial increase in the production of jute in Bengal is possible by extending the area under jute. The area under jute is not more than 10 per cent. of the total cultivable area of the districts in which jute is grown. There is considerable room for expansion of jute cultivation in Bengal. It is needless to add that the extension of area under jute is not likely to interfere with the cultivation of rice.

II. MINOR FIBRES—HEMP, RHEA AND KAPOK.

1. Hemp (*Cannabis Sativa*).

Besides cotton and jute there are other fibres of commercial importance. Of these hemp, rhea and kapok are important.

The term "hemp" includes a number of fibres derived from widely different plants, viz., bhang or ganja (*Cannabis sativa*), sun hemp, Manila hemp, Sisal hemp, Deccan hemp, &c. The Indian hemp (*Cannabis sativa*) or the bhang plant has been cultivated in India from time immemorial for the narcotic which it yields. According to the Hindu beliefs the male plant is the one which yields the narcotic, while the female plant yields the fibre. "When the fibre of hemp was first used in India does not appear." (Hem Chandra Kerr). However, the fibre which the hemp plant yields is very strong and durable and it can withstand the effect of water longer than many other fibres. These properties recommend it for the manufacture of ropes, cables, twines, fishing-nets, bird-nets, bags, sail-cloth, canvas, tarpaulins, and even shoes. Its inelasticity, however, renders it unsuitable for the manufacture of finer fabrics.

The importance of hemp for the manufacture of ropes, cordages, sail-cloths and tarpaulins for the Royal Navy and for general use has early been recognised by the East India Company, and strenuous efforts have been made by the Company to grow hemp in the Bombay and Madras Presidencies, in Malabar and in Bengal. The earlier attempts to promote the cultivation of hemp plant did not attend with anticipated results, and the export trade in hemp was insignificant. It was not until the third quarter of the 19th century that the export trade in this article made some significant progress. During the decade, 1863-73, the annual average export amounted to 60,000 cwts., but in the next decade the export of this article from India nearly doubled. Since then the hemp trade made steady progress and in the pre-war year, 1913-14, the export figures reached as high as 711,548 cwts., breaking all past records. However, the export trade in hemp has within recent years tended to decline.

In this connection it may be interesting to make a brief reference to the evils of adulteration and speculation which exist in the hemp trade. The methods adopted in preparing and baling the hemp fibre is severely criticised in the Annual Report of the Maritime Trade of Bengal (1927-28). The report states that Indian hemp bears unfavourable comparison with the Italian and Russian hems. "Unfortunately some of the Indian hems shipped" says the report, "has been found to be extremely dirty, the hanks being flat and hard with dried mud at ends while it has been so tightly baled that the fibre has been crushed and spoilt". (pp. 24-25).

The opinion expressed by a Calcutta exporter on the subject is note-worthy:

"Complaints are constantly reaching Calcutta from buyers from the United Kingdom, the Continent and America, regarding the high percentage of sticks found in the bales sent from India.....It is quite common to find 20 per cent. of sticks, cleverly concealed in the middle of the hemp, in a single bale. Occasionally cases are found where the percentage of sticks has been as high as 40.....

"Between 60 and 70 per cent of the total white hemp crop is exported from Calcutta. When the bales are received by us, a large percentage of the sticks are weeded out, but as this entails a loss of profit to the exporter, who has paid the Indian producer for the bales as they are received, it can only be done in a limited degree." (The Statesman, June 26, 1928).

It is stated that about 95 per cent. of the hemp export trade is controlled by Indians. Under such circumstances "grading system similar to that in existence in Manila and strict supervision over the Indian hemp trade by the Government for an improvement in the quality of the fibre" is desirable.

2. Sunn Hemp (*Crotalaria Juncea*).

Sunn hemp is a fibre plant which grows wild all over India. Its fibre is not, however, so strong as hemp fibre, but it is stronger and more durable than jute. It is used for many of the purposes for which hemp fibre is employed. The fibre is manufactured into ropes, twines, money-bags, nets, canvas, tarpaulins and coarse fabrics. It is utilisable for many of the purposes for which flax fibre is used. It must be noted that at present the export trade in sunn hemp consists mainly of the fibrous products. No separate statistics are kept for the individual articles included in the term 'hemp'. But it is known that the bulk of the hemp export consists of sunn hemp.

3. Manila Hemp.

This fibre is derived from the leaves of a plant native of the Philippines. It is specially suitable for the manufacture of marine cordage for which it is largely used. Coarse fabrics are also made of it. Combined with silk it is utilised in the manufacture of curtains and coverings. The plant was introduced into Bengal and Madras Presidency by the East India Company, and special efforts were made to grow it there, but the result was not very promising. On the question of tariff inequality recently raised by some rope-manufacturers in respect of the manufacture of manila

rope the Tariff Board observed that "the manufacture of manila rope in India out of hemp imported from the Philippines could hardly be a profitable proposition."

4. Sisal Hemp (Agave Sisalana).

Sisal hemp or Henequen is a plant native of Mexico and Central America. It was introduced into India and successfully acclimatised in Assam, Central Provinces, S. India and Burma. But Madras Presidency is the only place where it is cultivated successfully on a commercial basis. It may be noted that there are several species of the agave plant yielding Sisal fibre, and that the plant, although grows wild it is also cultivated. The bulk of the commercial fibre is derived from the cultivated plants.

The Sisal hemp is characterised by its strength, softness and inflexibility. It is mainly employed for the manufacture of twine. Mexico is credited to supply about 85 per cent. of the world's supply of twine. In the absence of separate statistics for Sisal hemp it is not possible to know the extent of the Indian trade in this article.

5. Deccan Hemp. (Hibiscus Cannabinus).

The Deccan hemp known also as Ambari hemp or Bimlipatam jute does not properly belong to the hemp group, Deccan hemp and "Indian Mallow" (Abutilon avicennae) resemble jute rather than hemp, and are mostly used for the purposes for which jute is used. The Indian Mallow is strong and lustrous like jute, but it is less important commercially than jute or Deccan hemp. Deccan hemp is widely cultivated in the Bombay and Madras Presidencies and to a less extent in Behar and in the United Provinces, and it figures largely in the foreign trade of India. It furnishes one of the so-called jute substitutes, but its fibre is coarser than jute and is, therefore, less valuable than jute.

The export trade in this article which consists mainly of raw fibres, was considerable before the War. In the pre-war year it amounted to 440,060 cwts., but the export declined considerably since the Great War. Although there

are three factories in the Madras Presidency for the manufacture of bags and gunnies with this fibre the export of the manufactured product is inconsiderable.

6. Grass Fibre. Rhea.

There are three important species of grasses yielding fibres which are used for various purposes. Rhea fibre is one of them. It is the same as "China Grass." Rhea is obtained from a plant cultivated in Eastern Bengal, Assam and Madras Presidency. In Bengal it is cultivated by the fishermen for making nets.

The rhea fibre possesses many properties not possessed by any other fibre. It is considered to be "the queen of vegetable fibres, surpassing all others in lustre, silkiness, strength and durability." It is twice as strong as hemp fibre and is much stronger and more durable than jute. It has a great moisture-resisting power. But the chief defect of rhea is that it is extremely elastic and brittle being liable to break much more easily than any other fibre. Nevertheless, its strength, durability and moisture-resisting power render it specially suitable for the manufacture of fishing-nets, fishing lines, cables, &c. It also forms a useful combination with wool, silk, and cotton in the production of certain kinds of mixed fabrics, such for examples as sail-cloth, table-cloth, alpaca-velvet, lace, cambric, handkerchief, curtains and carpets. There is an unlimited demand for it in the British and in the American markets. The difficulty of separating the fibre from the plant and its consequent high price prevent its extensive application for commercial purposes. The export trade in this article amounted to 65 cwts. valued at Rs. 1,350 in the year 1923-24.

A brief reference may here be made to the endeavours made by Government to cultivate Rhea or Ramie grass fibre. Since the middle of the 19th century the Government and subsequently the Department of Agriculture made strenuous efforts to encourage and to extend its cultivation. Rewards were offered by Government for the invention of a suitable machine for the separation of the fibre bark and the fibre from the plant. But the inventions so far made

and submitted were either too costly or were unsuitable for commercial purposes. The Ramie grass industry could not, therefore, attain that much importance as it ought to have done.

Besides rhea there are two other important industrial grasses viz., the Munji grass and Bhabar or Sabai grass. They are employed largely in the manufacture of paper, mats, cordages, baskets and for thatching purposes. The importance and utilisation of these grasses in the manufacture of paper pulps has already been discussed elsewhere in connection with the paper industry. It is, therefore, unnecessary to reiterate the subject here.

7. Kapok.

The term 'kapok' includes a number of flosses obtained from various forest trees. The best known species yielding the floss is the Semul or cotton tree (*Bombyx malabaricum*), found in Eastern Bengal, Assam, Burma and S. India. Kapok is thus, a forest product. Consequently its annual production and export fluctuate considerably from year to year, and until recently its export has been inconsiderable. In 1914-15 the total export amounted to 16,000 cwts., in 1917-18, 11,800 cwts., while in 1923-24 it rose to 33,836 cwts. (valued at Rs. 20,40,004).

It may be interesting to introduce here some of the important properties and uses of kapok floss. It should be noted that kapok floss is also known as white cotton or silk cotton belongs to the cotton 'group'. The floss is soft and silky, but it is too brittle, too elastic, and too short for spinning threads. But the difficulty of making thread from kapok has been removed by treating it chemically. The discovery has been due to the ingenuity of a German firm which has developed some special machinery for the purpose. Kapok floss is now spun into yarns and woven into fabrics.

Apart from the properties indicated above kapok floss possesses some unique properties which render it specially valuable for certain purposes. On account of its extreme elasticity or spongy character and lightness it finds its best

applications in stuffing cushions, pillows, mattresses, chairs, in short, in upholstering work. Its extreme lightness, non-absorbent character or water-proof character, and buoyancy, render it specially suitable for the manufacture of life-boats, life-saving coats and similar floating articles which do not or need not sink in water.

CHAPTER 16.

WOOLEN FIBRE.

1. The Nature of Indian Wools.

The Indian wool is obtained mainly from the sheep, the goat and the camel, and from the Tibetan shawl wool goat. The last named product is imported. From a scientific point of view the hair derived from sheep and from the Tibetan shawl-wool goat which possesses more or less the property of felting is called wool; while the hair obtained from goat and camel, which does not possess the character of felting does not fall within the class "wool."

The term 'pashmina' needs explanation. It means the fabrics made of pashm only, e.g. felts, shawls, blankets, malida, etc., and the term "pashm" means wool in general, but the term "asal pasham" for the wool stands of the Tibetan shawl goat. Thus, the well-known Rampur wool used in the manufacture of Rampur chaddar is also called in popular parlance "pashm." This wool is very fine and is much like the real pashm. The Wahab Shahi pashm is also a fine wool derived from a sheep of Persia, which is passed off as pashm. It is adulterated with real pashm. The Kirmani wool from Kirman, Persia, is also called pashm. But these wools are regarded as imitation (nakal) pashm in order to distinguish them from the real or genuine pashm obtained from the Tibetan shawl goat wool.

The Kirmani wool is soft and white, having a long staple. The Bikanir wool is also a long stapled wool but inferior to Kirman wool. The Afgan wool obtained from the 'dumba' or the long-tailed sheep is of fairly good quality. A large quantity of inferior wool is produced in the Punjab, the United provinces and in the Bombay and Madras residencies.

The best sheep in the Madras presidency is the Coimbatore breed. This sheep is generally white and yields a white wool. The black Mysore breed is also met with in some districts of the Presidency but the wool is inferior to that produced by its kind in Mysore. "The prevailing colour of Sind Guzrat wool is white, while Khandesh and Deccan wools are generally black" (A Monograph On the Woolen Fabrics of The Bombay Presidency by B. A. Brendson, I.C.S., 1899). In the Punjab the wools are of different colours—white, black, brown and grey.

Although the original home of genuine pashm is Tibet it is also produced in Kasmere. It is the silky wool of a goat introduced, perhaps, from Tibet and reared in Kasmere. It is superior to any Indian wool. The Bikanir wool is the next best of its kind in India. It is, as has already been noted, a sheep's wool having a long staple varying from six to ten or twelve inches, and is suitable for the manufacture of clothing. The softest and the finest variety of the Punjab is the Lauhauri wool. It has a staple ranging from four to five inches. But it is inferior to Australian wool. Some Punjab varieties of the hilly tracts have as long a staple as six inches or more. But the staple of the common sheep is over two inches on the average.

The wool derived from the sheep of the Bombay Presidency is coarse and short in staple. It is full of hairs and 'kemps' which protrude from the surface of the fabrics when woven. The kemps are "removed by passing the cloth under an extremely sharp knife, which shave off all the projecting hairs. In the case of Kasmeri wool, which has a very fine staple, kemps are removed to a certain extent by hand, a tedious, costly and at best ineffective method, for a large number of hairs are certain to remain with the wool" (Vide p 1).

The Indian wool in general is not suitable for the manufacture of clothes. This is because no worsted yarn can be spun from the short-stapled wool. The better class of woollen clothes is made of worsted yarns spun from the long stapled wool. Neither the Bombay, nor the Madras, nor the Punjab breed of sheep nor the breed of sheep of the

United Provinces furnish wool fit for textile purposes. There are, however, some varieties of Indian wool (Bikanir wool) which are suitable for textile purposes. The wools from which worsted yarns are spun come from Kashmere, Kandahar, Turkistan, Khorasan, Persia, Australia and from Europe.

The quality of the wool fibres varies greatly from country to country and from one breed of sheep to another. "Broadly speaking, sheep, from the point of view of their wool, are divisible into three main groups: the merino and those approximating it, where the wool is fine and soft; secondly, the enumerable half-breeds and cross breeds, where wool is of good quality but coarser than that obtainable from the merino; and thirdly, those whose wool is mainly used for carpets, as for example, the Oriental sheep" (Ward: Textile Fibres and Yarns. Resources of the Empire Series Vol III, p 38).

About the Indian wool, the same writer observes: "For the most part Indian wool falls into the lowest category of the three classes into which wool is classified for trade purposes—namely, merino, cross-breed, and carpet wool. The wool exported from India is generally utilised for the manufacture of blankets, rugs, carpets, and felt, though there are some better qualities, such as Bikanir, which may be utilised for clothing" (Vide p. 76).

The fleece yielded by the generality of the Indian sheep compares unfavourably with that of the Australian sheep or the English sheep. In the United Provinces the "weight of the fleece varies from 3 Chattacks* in the case of ordinary plain's sheep to 12 or 14 Chattaks for the best hill-breeds; and taking an average for the Provinces the annual yield of wool cannot be more than 12 Chattaks per sheep, a very small yield compared to six or seven pounds of an English sheep" (Monograph On Woolen Fabrics In The North Western Provinces and Oudh by A. W. Pim, 1898, p 4).

*16 Chattacks make a seer which is a little over two pounds in weight.

In the Punjab the weight of a fleece varies from three Chattaks, in the case of the inferior plain sheep to one seer in Kangra hill-sheep. "As these Kangra sheep are shorn three times, it may be taken that three seers is the very largest annual yield from any sheep in the Province. Excluding Kangra and Kulu sheep, the annual yield cannot exceed one seer per sheep, and the quality also is inferior..." (Monograph On The Woollen Manufactures of the Punjab in 1884-85.)

In the Bombay Presidency the "weight of a clean fleece of wool must, of course, vary," says Mr. Brendon, "but the average of fleece grown on this side of India is about 1 lb." In the Madras Presidency the weight of fleece will not diverge much from that of Bombay.

2. The Influence of Climate upon Wool Production.

The sheep yielding the best wool requires a relatively dry temperate climate and limestone soil. These conditions are best represented by Australia where the best merino sheep are reared. This country is almost ideally suitable for the development of the finest and most lustrous wool obtainable. Australia furnishes a vivid illustration of the effect of climate upon the quality of wool. The fibre of the original merino sheep of Spain or of N. Africa from which countries it was introduced into Spain and later into Australia, though fine and soft, is quite short. Efforts once made to improve some of the Indian breeds by the introduction of merino sheep into Agra and Dehra Dun, are stated to have ended in failure. The imported sheep could not stand the extreme heat and moisture of the locality. Experiments are still in progress to develop a better breed of sheep by selection and hybridisation with the imported Australian and other varieties.

Better classes of wool utilised for the manufacture of clothings are derived from the sheep of dry, warm and temperate climate. Extremes of temperature, extremes of heat and cold or moisture or rain are unfavourable to the development of the best quality of wool. For these reasons Indian wool, except the wool of the arid regions of Rajputana (Bikanir), is hard, dry and frizzy. And although

the cold and dry climate of Tibet produces a fine wool with a long staple, it lacks "in the elasticity and wary carb necessary to the manufacture of the finer classes of fabrics."

"Even the best Thibetan wool is.....markedly inferior to Australian wool. This inferiority is mainly caused by the presence of the dead hairs, and by the irregularity in length and fineness of the fibre, defects which render the finest Thibetan wool impossible as a constituent of the better class fabrics" (Monograph On the Woollen Fabrics In the North Western Provinces and Oudh by A. W. Pim, 1898, p 2).

Although climate is a very important factor in determining the quality of wool, scientific breeding and rearing has also an important effect. The merino sheep was introduced into Germany from Spain in the 18th century. The wool produced in Saxony by the imported breed excels in quality that of Spain. The fineness of the Saxonian wool is due to care and not to any climatic advantages.

In India no serious efforts have been made until recently to improve the stock either by the infusion of fresh blood or by the application of improved methods of rearing. It has often been pointed out by experts that in some dry regions of the northern parts of the country the quality of the sheep and wool may be improved by cross-breeding and by better feeding and tending. But the extension of cultivation and the consequent diminution of pasture land has put a set-back to the sheep rearing industry of the country. Sheep rearing is chiefly a pastoral industry in India, and about 23 million sheep are reared mostly on waste lands. The great problem for sheep-rearing is that of fodder. Unless the sheep are properly fed they cannot be expected to yield wool of good quality. Recently one expert suggested that the fodder problem could be solved through the village unions or districts which may make arrangements for co-operative pasture lands. The Royal Commission On Agriculture in India (1928) has made some valuable suggestions on this point. It observes: "We are of opinion that no large additions to existing grazing areas are possible and efforts should, therefore, be concentrated on increasing the productivity of land already

growing grasses. The scope for such efforts is very great." Then the Commission goes on to suggest ways and means by which the productivity of lands may be increased, which for want of space we could not reproduce here.

It should be noted that some minor progress has already been made in sheep-breeding in India. "Experiments are in progress in some provinces," says Dr. D. Clouston, "to grade up the indigenous sheep by selection and by cross-breeding with Merino and other superior wool breeds. On the Hissar farm in the Punjab, local sheep are being crossed with Merino rams imported from Australia, and the rams sold to private breeders.....At Hosur in Madras the local breeds of pure white and black-faced white sheep are being graded up by selective breeding. The average clip per sheep has already been increased by six ounces. The second generation of Merino in Mysore has been found superior to the first both in the quality and quantity of wool produced" (Review of Agricultural Operations in India 1926-27, pp. 100-101.)

Although the quality of Indian wool is generally inferior, yet India produces annually an immense quantity of wool. It is not possible to determine the exact annual yield of wool in India, but if the average yield of wool per sheep is taken to be a seer or two pounds a year, the 36 million sheep must be producing some 72 million pounds of wool annually, perhaps much larger than that amount. The table below shows the development of the export trade in wool.

STATISTICS OF WOOL.

Export.		Import.
In million lbs.		In million lbs.
1865	23.4	2.49
1885-6	31.3	3.0
1905-6	42.5	2.9
1913-14	48.9	3.7
1919-20	36.31	1.31
1926-27	44.79	4.956

In the year 1926-27 the values of the export and import of wool amounted to Rs. 3.93 crores and Rs. 31.98 lakhs respectively.

CHAPTER 17.

HIDES AND SKINS.

India has immense resources in hides and skins which are obtained from her countless cattle, horses, camels and goats and sheep. It has been calculated that India has 180 million cattle and 87 million goats and sheep. The agricultural stock in British India has increased by about 50 per cent during the decade from 1906-7 to 1916-17. But the increase during the next-decade has been insignificant, being only about 4 per cent.

The sources of the hides and skins are the cattle, that is—buffaloes, cows and oxen, and horses and camels; and of the skins the calves, goats and sheep. Horses and camels yield a comparatively small quantity of hides, though camel hide is extensively used in Sind. Broadly speaking there are three methods of curing or preserving hides in India. They are the wet-salted method followed in Burma especially, the dry-salted method employed in north-east India, especially in Bengal (Dacca), and the air-dried method used in the dry regions of north-west India. The skins are also prepared in somewhat similar manner before they are shipped.

The hides are also divided into two broad classes, viz., (1) the hides of the slaughtered animals, and, (2) the hides of the dead animals. The former are called the "kill", and the latter the "common" in commercial parlance. Most of the "kill" hides come from the municipal slaughtered houses, and from the army head quarters where a large number of animals are slaughtered for food for the army. But the slaughtered hides constitute only a small fraction of the Indian raw hides. By far the largest number of hides are obtained from dead animals. The slaughtered hides are

considered to be of superior quality and naturally command higher prices than the "dead" hides. However, the quality of the Indian hides in general is poor owing to the fact that the animals are badly branded, and are not taken proper care of by the owners. But the case is different with skins which are much superior in quality to hides. The reason for this is that most of the skins are obtained from slaughtered animals.

Hides as well as skins differ widely in hardness, softness, or pliability, and are, therefore, suitable for different purposes. Buffalo hides are very strong and stiff. The soles of shoes are often made of these hides. Ox-hides are used largely in the manufacture of saddlery, harness and other leather articles in which strength and durability is desirable. Cow hides are employed in the manufacture of the upper of the shoes and boots. Goat and sheep skins are softer than hides and are used in the manufacture of finer shoes, boots and gloves, and for book-binding purposes. Goat skins are softer than, and superior to, sheep skins, and, they, are therefore, employed in the manufacture of finer leather articles like gloves, etc.

A huge quantity of hides and skins are annually exported from India. The export trade in hides and skins fluctuate according to the vicissitudes of the seasons. That is to say, it depends upon the mortality caused by natural causes or by drought and epidemics among the cattle. In the famine years of 1899-1900 and 1900-01, the mortality among cattle was so great that the export trade in raw hides amounted to 1,188,765 cwts., and 1,282,630 cwts. of raw hides, while in the previous year, 1898-99, and in the following year, 1901-02, the export dropped to 695,958 cwts. and 679,493 cwts., respectively. However, the trade in hides and skins has had a tremendous development during the course of the last sixty years. The table below shows the enormous expansion of the industry.

Statistics Of Export Of Hides And Skins.

(Figures in Lakhs of Rs.)

	Raw hides and skins.	Dressed and tanned hides and skins	Total
1865			72.52
1875			2,67.77
1885-6			5,33.62
1895-6	3,62.82	4,01.11	7,63.94
1905-6	10,09.86	3,65.84	13,75.71
1913-14	11,72.29	4,22.57	15,94.86
1918-19	9,34.23	9,66.96	19,01.19
1926-27			7,17.96

It is worthy of note that the export trade in raw skins developed as a result of the demand caused by the discovery of the chrome tanning processes in about 1890 in the United States. A very large proportion of the Indian goat skins taken by the United States for the production of glacé kids. In the pre-war year the percentage shares of the hide and skin trade were as follows:

Quantity (in cwts.)	Value (in Rs. 1000)
Raw hides	1,115,747 8,29,60
Raw goat skins	453,356 3,12,77
Raw sheep skins	33,067 26,10
Total	1,602,170 11,68,47

Before the great war the principal markets for the Indian raw hides and skins were in order of importance—Germany, Austro-Hungary, the United States and Italy. The hide trade had been largely in the hands of the German firms in India before the war, and Germany had been the best customer of Indian hides taking about 35 per cent. of the total exports of raw hides and skins. The German demand had been specially for cow-hide for the manufacture of boots and shoes, saddlery and harness for the German

army. Austria and Italy were the next best customers of Indian cow hides. The United States and Austria were the principal customers of Indian buffalo hides. The cessation of intercourse with Germany and Austria during the War caused a great slump in the hide trade. However, soon after an enormous demand for Indian hides and skins, both raw and tanned, developed in Italy and in the United States for military purposes.

After the cessation of the war, however, the extraordinary demand for hides and skins, by the allied powers vanished and a gloom spread over the hide and skin trade for a while. With the break-up of the German army the military demand for hides and skins did not revive after the war. However, with the gradual rehabilitation of Europe the hide and skin trade grew and Germany has again become the principal customer of the Indian hides.

CHAPTER 18.

THE INDIGO INDUSTRY.

1. The Early History of the Indigo Trade.

The "culture and manufacture of indigo has been known and practised in India from time immemorial; that Europe was many ages supplied by India previous to the discovery of America, that the Company's first establishment in 1600, indigo formed the most extensive and profitable branch of their commerce, large quantities of which were purchased by the British merchants at the Company's sales, for supply of the Hollanders in the dyeing of woolen clothes, before that art was brought to perfection in this country. This traffic was carried on for more than a century with considerable success, and the Company's only motive for relinquishing it was to favour the introduction of the commodity in the British West Indies, where the cultivation had been taken up and carried to great perfection, both in Barbados and Jamaica. These being British plantations, had undoubtedly a fairer claim to national protection than India, with which we had only a mercantile connection" (Supplement To The Fourth Report On The Affairs Of The E. I. Coy. Appendix 47.....1810).

Before the conquest of India by the Europeans the European merchants had numerous trade settlements in India, and indigo constituted the most important article of commerce. Indigo used to be grown by the Indians in the Western (Guzrat) and Southern India long before its cultivation was undertaken by the East India Company in Bengal. During the 17th century the Portuguese purchased the dye in Surat, carried it to Lisbon and sold it to the dyers of

Holland. After the overthrow of the Portuguese power in India the trade was carried on by the Dutch, and subsequently by the English. "The success of the Dutch merchants aroused the jealousy of Europe. The woad growers and merchants of Germany, France, and England were threatened with ruin, and to protect them every country passed edicts rendering the importation or use of indigo an offence severely punishable. In the reign of Queen Elizabeth the use of indigo was permitted along with woad; but the opposition to it was so strong that it was again prohibited on the pretext of being poisonous, and in 1660 Charles II had to procure dyers from Belgium to reteach the English the art of using the dye.

"When the East India Company began to export indigo from Surat direct to England, the trade flourished so much that the European colonists in America took to growing and manufacturing the dye" (Imperial Gazetteer Of India Vol. III, p. 70). The industry developed so rapidly and extensively in the West Indian colonies that St. Domingo alone is said to be able to supply nearly half of the world's demand of indigo.

2. The Establishment of the industry in Bengal and its rapid Development and subsequent Decay.

In the meantime, conditions, however changed, and after the establishment of the British rule in India the British indigo industry was shifted from the West Indian colonies to British India. There were two reasons which accounted for this transference of the site of the industry. It was found out that the cultivation of sugar and coffee was more profitable than indigo in the West Indian colonies. Consequently preference was given to the cultivation of these articles in the West Indies. Moreover, the transference of the indigo industry from the West Indies to India came as a natural consequence of the British conquest of India. "Revolutions in politics frequently produce revolutions in commerce. A decided instance of this occurs in the article in question. The acquisition of India and the loss of America, having changed the relative situation which

these countries bore to Great Britain, in a great degree led to the revival of the indigo trade with India, after a suspension of nearly a century... Having thus fostered and protected this article of Indian produce, and brought it to a state of maturity, the Company agreed to leave it in the hands of their servants in India..." (Supplement To The Fourth Report On The Affairs Of The E. I. Coy. Appendix 47).

In the year 1778 the East India Company introduced the cultivation and manufacture of indigo in Bengal, and later in Behar, with planters from the West Indies, whom it settled in Bengal. For a time the Company held the monopoly of the indigo trade but it gave up its connection with the industry in 1799. Some of the servants of the Company took to indigo cultivation on their own account and the trade developed rapidly in Bengal.

It is difficult within the limit of this sketch to enter upon the vexed question of rent, tenancy, and oppression of the ryots by the indigo planters of Bengal. The early history of indigo plantation in Bengal left a stain on the character of the European planters of indigo. The legislation of 1859 enacted to protect the interests of the ryots led to the migration of the industry from Bengal to Behar and the United Provinces. It must, however, be admitted that under the supervision and management of the European planters the quality of the indigo turned out by the Europeans considerably improved and the cultivation and manufacture thereof increased immensely. It was much superior to the dye turned out by the native planters in Guzrat and in S. India where the indigenous industry met with virtual extinction in consequence of the superior competition of the Bengal dye.

From the beginning of the 19th century onward the indigo industry, conducted under European management made rapid and continued progress. The export trade in the dye rose by leaps and bounds. The prosperity of the industry reached its zenith in the year 1895-6. Since 1897 the trade began to decline owing to the influx of cheap chemical dyes from Germany. The chemical dyes threatened

the very existence of the vegetable dyes. The precipitous fall of the indigo trade is indicated in the following table.

Export Of Indigo.
(in Cwts.)

1865	87,010
1885-6	132,495
1895-6	187,337
1905-6	31,186
1913-14	10,939
1919-20	32,687
1926-27	1,588

The diminution of the indigo trade continued uninterrupted till the out-break of the Great War. Owing to the difficulty of obtaining chemical dyes from Germany during the war the cultivation and manufacture of indigo revived to some extent and its trade improved slightly. However, with the reappearance of the German synthetic dyes after the war, and the rediscovery of its manufacture by the English chemists the trade in indigo declined as rapidly as it did develop during the war.

CHAPTER 19.

THE TEA INDUSTRY.

1. A Short History of the Tea Industry.

About the original home of the tea plant opinion differs. Some authorities maintain that the tea plant is a native of China, while others say that the tea plant has been introduced into China from Assam at an early date. But the name of the plant is a Chinese one, which is due to the fact that it was in China that the plant was first cultivated. The opinion of Dr. Watt on this point is interesting: "There is every reason to believe that, although the habitat of the tea plant may be somewhere on the Assam-Burman and Chinese frontier, the practice of preparing a beverage from its leaves existed from centuries in China before it was known in India. Apparently classical scholars have failed to find any allusion to the plant or to the beverage in the works of the early Sanskrit, Arabic and Persian writers" (Dictionary Of The Econ. Prods., Vol. II, pp. 76-77).

The cultivation of tea in India is of comparatively recent development. It was not even known to the East India Company till 1818 that the plant was a native of Assam. China had a monopoly of the trade until very recent times. England acquired the habit of tea beverage about the last quarter of the 17th century from China, and China was the only source of supply. But realising the danger of depending upon China for her tea supply suggestion for experimental cultivation in India was made by the British Government as early as 1770. No serious attention was, however, paid to the suggestion till 1834. During the time of Lord William Bentick attention was drawn to the matter, and to cultivate the tea plant in India, tea plants, tea seeds, and tea experts were brought from China for the purpose:

The Indian tea industry, therefore, dates from 1835. In that year an experimental garden was established in Assam by the East India Company's Government. But the experiment failed and was sold to the Assam Tea Company in 1840, which was the first private tea concern in India. A fair amount of success has been attained by the Company by the year 1852. Attracted by its success several planters undertook to tea plantation. Gradually tea plantation on experimental and as well as on commercial basis spread over the different parts of the country, i.e., Assam, Bengal, Darjiling, Punjab and S. India. (East India Products, Part I, pp. 13-14, and 36).

However, the industry passed through several ups and downs in the course of its development. The first crisis which threatened the ruin of the industry occurred in 1886, as a result of reckless extension of cultivation and overproduction. The crisis was followed by a period of depression which lasted for about five years. Lessons learnt from these untoward events set the industry on a sound footing in about 1871. From 1871 to 1895 the records of the industry may be said to have been one of uninterrupted progress. The great expansion of the industry is reflected in the extension of the area under cultivation, in the improvement made in the method of cultivation and in the manufacture of tea, and in the continued increasing export of the article.

However, since 1895 the tea industry has been suffering from periodic depression from overproduction. The rapid growth of the export trade led to overproduction and plucking of inferior tea, resulting in price deflation after 1895. The depression was accentuated by exchange fluctuation. Remedy has therefore been sought in the formation of large joint-stock companies, in the curtailment of the output, in the improvement in the method of production and in the opening up of new market in Russia. The increased demand for Indian tea by Russia which formerly consumed China tea brought some improvement in the trade in 1906. From 1906 to 1919-20 the tea trade may be said to have enjoyed a period of comparative prosperity and progress.

The Government control of the trade during the latter part of the last Great War has produced satisfactory results, although it encouraged the plucking of inferior tea.

It may be noted that the tea exports which "increased from 289 million lbs. in 1913-14 to 379 million lbs. in 1919-20, the highest on record, declined to less than 286 million lbs. in 1920-21." The diminution is ascribed to the preparation of inferior tea and the loss of the Russian market. The depression in the tea trade continued with temporary fluctuation up to the present. Some significant progress has, however, been made during the five-year period, 1923-24 to 1927-28. The total shipment of tea recorded in 1927-28 amounted to 362 million lbs., a sharp rise since the pre-war year. The present out-look of the trade is hopeful. Within comparatively recent years serious attempts have been made to create new markets by inculcating the habit of tea beverage in the Continental countries of Europe and in America.

2. Creation of New Markets by Advertising Campaign. Future Prospects.

Over-production appears to have become a chronic disease with the tea industry. As production exceeded demand, efforts were made to discover or to create new markets. Recently a wide and expensive advertising campaign has been set on foot by the Indian tea growers with a view to inculcate the habit of tea beverage among the peoples of the Continent of Europe, India, and recently, among the Americans.

It may be noted that the Indian tea industry has an organisation known as the Tea Cess Committee established in 1903. Its sole object is to advertise tea in all countries except the United Kingdom. The money required for the propaganda work is realised from the revenue derived from the Tea Cess imposed by the Act IX of 1903, upon the export of tea from India. The Cess Act is renewed every five years. It levied a uniform duty of $\frac{1}{4}$ pie per lb. of tea exported from India between 1903 and 1921. The duty was raised to six annas per 100 lb. in 1923. The cess yields an

annual revenue of about Rs. 13 lakhs. Most of this sum is spent on advertisement of tea in the Continent of Europe, the United States, and India.

It is too premature to pass judgment upon the value of advertising tea beverages in countries where coffee or tea from China or Japan is the national drink. The question involved here is whether it is possible to change a national habit by advertising. Although the expensive advertising campaign recently carried on in the United States has increased tea consumption in that country it is doubtful whether it will ever be able to displace the habit of coffee beverage by tea beverage.

Nevertheless, the tea propaganda work cannot be said to have been entirely ineffective. The success of the advertising campaign is borne out by the increased sale of Indian tea and a corresponding decrease in the consumption of China and Japan tea in the world market. The consumption of Indian tea has increased greatly in the United Kingdom, Russia, China and the United States. It is believed that tea beverage will become common in the United States and in India, and that there is a considerable room for expansion of the trade in the continent of Europe.

It is worthy of note that the principal tea consuming countries of the world to-day, besides China and Japan, are in order of importance:—the United Kingdom, Russia, the United States, Canada and Australasia. The rate of consumption per head of population is the highest in Australasia, followed by the United Kingdom. In these countries no further expansion of consumption is possible without an increase of population or by an increase in the number of beverages per day. An increase in the consumption of tea has been brought about in Great Britain by the introduction of a cup of afternoon tea. This new idea of afternoon tea beverage is spreading fast in the Continent. Moreover, there is much room for expansion of tea beverage among the coffee drinking peoples of Europe and the United States.

In India and in the near Asiatic countries which are not yet accustomed to any beverage like tea, coffee or cocoa;

there is a large potential market for tea. It is much easier to inculcate the habit of tea drinking among peoples not used to any drinks whatever. The habit is growing fast among the Indians—the army, the gentry and the coolies. It is likely that the habit of tea drinking will grow in India.

3. Foreign Competition and the Rapid Development of the Indian Tea Industry.

The position of the Indian tea industry can best be understood from its relation to other tea growing countries. Tea is cultivated in India, Ceylon, China, Japan and Java, Jamaica, Natal, Madagascar, Brazil and also in the United States. But the foremost tea trading countries are the first five—India, China, Japan, Ceylon and Java. Tea is cultivated on an experimental scale in the United States. The high cost of labour involved in tea cultivation renders the growing of tea on a commercial scale unprofitable in Europe and in the United States.

Until recently the greatest tea producing country in the world was China. She had a practical monopoly of the tea trade until the third quarter of the last century. Even as late as 1866 the bulk of the tea imported into the United Kingdom (about 96 p.c.) was supplied by China, India enjoying only 4 per cent. of the share of the trade. But the time soon arrived when China not only lost her monopoly of the British market, but found it difficult to hold her own against the superior competition of the Indian tea prepared under superior European management in India. In 1890 India and Ceylon captured 52 per cent. and 18 per cent. respectively of the British trade, while the share of China dropped to 30 per cent. Since then China gradually lost her market in the United Kingdom.

The present dimension of the Indian tea industry is summed up by Mr. W. E. Cotton in the following words: "The world demand for tea has been estimated as in the neighbourhood of 725 million lbs. annually, and between 40 and 50 per cent. of this total is supplied by India" (Hand-Book of Commercial Information, p. 203). Messrs.

Whitbeck and Finch in their Economic Geography observe that "In the world's tea exports India contributes 48 per cent., Ceylon 26 per cent., Dutch East Indies 12 per cent., China 8 per cent. and Formosa 6 per cent." (p. 493). It must, however, be remembered that the comparatively small contribution made by China is due to the fact that the major portion of the tea produced by China is consumed within the country. In fact, China is the largest tea consuming country in the world.

The development of the Indian Tea export trade is indicated in the following table.

TEA EXPORT.
(In Million lbs.)

1865	...	...	...	3.75
1875	...	...	...	21.39
1885-6	...	...	...	69.66
1905-6	...	...	...	216.22
1913-14	...	...	...	289.47
1919-20	...	...	...	379.00
1927-28	...	...	...	362.00

It may be noted in passing that the total area under tea in India in 1927 was 752,900 acres. Eighty-one per cent. of the total area under tea in India lies in Assam (in the Brahmaputra and the Surma valleys) Darjeeling and Jalpaiguri (in North Bengal). The elevated region of the Malabar coast in South India contains 15 per cent. of the total.

4. Imitation Tea.

It seems necessary to make a brief reference to the appearance of imitation tea in the Indian market. It has within very recent times been brought to the notice of the public that tea is sometimes adulterated with sea weeds and sold in the market as genuine tea. Recently startling discoveries have been made regarding the sale of imitation tea in the Indian market. It is said that there are many varieties of imitation tea. Some of them may be introduced here in the way of illustration. One of the principal sources

of supply of this tea is the sweepings from tea gardens. The tea sweepings which are purported to be sold for chemical purposes or to be used for chemical purposes are, after chemical treatment, sold in the market as genuine tea. Old tea leaves already brewed, when treated chemically assume the appearance of fresh tea, and these are also being sold in the market. It is said that old or brewed tea when treated with sodium carbonate or salts of iron assume the appearance of genuine fresh tea.

The inroad of the imitation tea upon the Indian market and its success are believed to be due to its comparative cheapness. The comparatively high cost of genuine tea renders it difficult for the poor people to use it as a beverage. But imitation tea has been considered to be injurious to health, and efforts are being made by the Tea Cess Committee to stop the sale of the inferior tea.

CHAPTER 20.

COFFEE AND SPICES.

I. COFFEE.

The use of coffee as a beverage was known to the Arabs as early as the fifteenth century. It was introduced into Europe much earlier than tea. It should be noted that coffee as a beverage is much older than tea. It was in use in France as early as 1640. Shortly afterwards it became a general beverage all over Europe. And even now the "world's production and consumption of coffee is immensely greater than the production and consumption of tea or cacao..." (Resources of The Empire Series, Vol., V, p. 198). It is the principal beverage of the peoples of the continent of Europe and of the Americas. At one time English people used to drink coffee but gave it up in favour of tea.

It is not known when coffee was first introduced into India. According to an Indian tradition it has been introduced into India by a Mahomedan pilgrim from Mecca, who on his return from Mecca brought to Mysore seven seeds with him some two centuries ago. However, the systematic cultivation of coffee dates from 1830. (Select Committee on Sugar and Coffee Planting, Vol, I, 1848). It is now grown chiefly in S. India—Mysore, Coorg and Madras Presidency. It used to be grown extensively in Ceylon where the industry has been ruined by blights in about 1880.

For a number of years the South Indian industry made continuously rapid progress. But in about 1865 the appearance of leaf-blight crippled the industry. Since that time the industry has made little progress as is indicated by the table below. It must, however, be noted that although the quantity of coffee produced in India is com

paratively small, the quality of the Indian product is unsurpassed. It is stated that it fetches higher prices in the world's market than even the best Brazilian coffee.

EXPORT OF COFFEE.

(In Cwts.)

1865	...	...	...	289,176
1885-6	...	...	...	376,702
1895-6	...	...	...	290,902
1905-6	...	...	...	360,182
1913-14	...	...	...	295,900
1919-20	...	...	...	272,561
1926-27	...	...	...	149,775

II. SPICES.

The tropics are the home of spices. Only a few of the spices of minor importance are obtained from the temperate countries—namely, fennel, caraway and mustard. The various Indian spices, (found also in the West Indies and the East Indies) are pepper, chillis, cinnamon, cassia, cloves, ginger, and cardamom. In this country they are all obtained chiefly from S. India. But cassia which is often adulterated with cinnamon, is found extensively in Eastern Bengal, Assam, and in Burma.

India is a large consumer of spices. Immense quantities of spices are consumed within the country. In India spices find multitudinous applications in seasoning and preserving foods and in the preparation of medicines. Some of the spices, especially cinnamon, cardamom and cloves are distilled and the oils expressed are employed in the preparation of soap, perfumery and in confectionary. The principal application of the essential oils expressed from cloves is in the manufacture of eugenol and vanilla and tooth paste. It has a considerable use also in the preparation of soap and perfumery.

The Indian commercial spices in order of their importance are chillis, pepper, ginger, and cardamom. The course of the trade is shown by the statement below.

COFFEE AND SPICES

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EXPORT OF SPICES.

(In Million lbs).

1865	12.15
1885-6	25.42
1905-6	37.70
1913-14	40.23
1919-20	...	...	...	37.19
1926-27	...	...	...	35.96

In the year 1926-27 the export of spices was valued at
Rs 1,55.95 lakhs.

CHAPTER 21.

THE TOBACCO INDUSTRY.

1. Different Varieties of Tobacco and their Uses.

Tobacco thrives well under different climatic conditions. It grows both in the tropics and in the temperate regions. But each type of soil and climate produces a special kind of tobacco. The tobacco leaves of Cuba, Virginia, the Philippines or of Turkey are special products of the soil and climate of the respective countries. The kinds of tobacco grown in different parts of the world are numerous. Some of the well-known ones are *Nicotiana tabacum*, *Nicotiana rustica*, *Nicotiana Persia*, etc. The tobacco mainly grown in India belongs to the family of *Nicotiana tabacum*, but in the drier and colder parts of the north-western India *Nicotiana rustica* and other varieties are also cultivated.

Before proceeding to the next stage in the history of Indian tobacco cultivation it may be interesting to introduce here the main classifications of tobacco based upon climate. Lyde divides tobacco into marine, semi-marine, and continental varieties. The marine tobacco has an excellent aromatic flavour and is cultivated on the sea coasts of Cuba, Sumatra, and Borneo and the Philippines. These varieties are specially suitable for the manufacture of cigar, although they are also used for other purposes. The Havana cigar is considered to be the best in the world. The best cigars come from Cuba. The Havana 'fillers' and the Sumatra 'wrappers' are the distinct products of their respective climate and soil. The semi-marine tobacco is specially utilised in the manufacture of cigarettes. It is grown in the coast lands of Syria, Anatolia, Egypt, Macedonia and in the United States, (Virginia). Turkish and Egyptian tobaccos owe their value to the aromatic smell they possess. The Continental tobacco is so-called because it is grown in the

interior or in the river valleys. (France, Germany, Austria, Czechoslovakia and Russia).

There is however, no clear-cut line of division between marine, semi-marine and continental tobaccos or between their uses. Some varieties are better adapted for certain purposes than others. Certain varieties of American tobacco are employed in the manufacture of cigar, snuff and chewing tobacco, while a large portion of the tobacco grown there is used in the manufacture of cigarettes. Moreover, the quality of tobacco depends not only upon the climate and soil but also upon the method of preparation and manufacture. The aromatic flavour of the Persian or Siraj or Turkish tobacco is due to the preparation or curing of tobacco by fumigation. Indian tobacco is inferior in quality owing to the defective method of preparation and also to the Indian demand for strong and pungent or inferior tobacco.

2. The Development of Tobacco Cultivation in India.

Tobacco is an exotic product introduced into India by the Portuguese. "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 wisemen 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 India Company in 1829, when some Maryland and Virginia seed was sent out, with a paper by Captain Basil Hall, describing the Virginia 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" (Statement of the Moral And Material Progress of India 1872-73, p. 43. Vide also, East

India Products, Part I, Report On Tobacco by J. E. O'Connor, pp. 1 and 218).

All the different varieties of tobacco mentioned above have been experimented in India. The seeds from the United States, Manila, Cuba, Sumatra, Persia and Turkey have been imported and tried successfully in the different agricultural farms of India. It is believed that the climate of India is congenial to the growth of tobacco. The American variety is grown in South India, the Turkish variety in Northern India and the Cuban and Sumatran varieties in Burma and Bengal.

The Burmese tobacco is specially valued for the manufacture of cigars. The Madras tobacco is utilised in the manufacture of cigar, snuff and for coarse cigarettes. In Bengal and in Northern India the demand for local tobacco is for hooka or narghillé and also for snuff. The Bengal tobacco, especially, the Poola variety of Rangpur is of superior quality, and Bengal is now the chief tobacco producing province in India. The next important tobacco growing province in India is the Madras Presidency, although tobacco is also grown largely in the Bombay Presidency. In fact Bengal and Madras together cover half of the total area sown with tobacco in India. It is worthy of note that on an average a little over a million acres are cropped with tobacco in India.

At one time Madras tobacco was considered to be the best in India, and even now Madras is the chief manufacturing center of indigenous tobacco. But the tobacco produced in Madras is of inferior quality owing to the local demand for strong and coarse tobacco. The same is, perhaps true, to a more or less extent, of all Indian tobacco. There is a preference for strong and pungent tobacco in India. Although India stands second only after the United States in the production of tobacco among the tobacco producing countries of the world, the bulk of the Indian tobacco is of inferior quality being suitable for hooka and biris and for coarse cigarettes. The main defects of Indian tobacco are carelessness in cultivation and the defective method of curing tobacco leaf. Apart from the small demand by the

upper classes who prefer foreign tobacco, the bulk of the Indian demand consists chiefly of coarse tobacco.

Nevertheless, the demand for tobacco in the form of cigarette and for finer tobacco by the enlightened individuals has been increasing rapidly since this century, especially since after the Great War. The hooka is getting old-fashioned and out of fashion because of the various inconveniences which the hooka method of smoking involves. It is being displaced by cigarettes and cigars especially in the large cities. Between 65 and 70 per cent. of the total value of the imported tobacco now-a-days consists of cigarettes. The hot climate of the country is unfavourable to pipe-smoking to which hooka is preferred. Over two crores of rupees worth of imported tobacco are annually consumed in India. The Imperial Tobacco Committee in their Tobacco Report observe that the annual consumption of cigarettes in India is now about 6,500 million compared with under 1,000 million before the War. In addition to the importation of cigarettes, tobacco and cigars, a large quantity of Virginian tobacco is imported annually for the manufacture of cigarettes in India. It may be noted in passing that both cigars and cigarettes are subjected to very heavy import duties, 75 per cent. ad valorem for cigars and perhaps 50 per cent. for cigarettes.

The question of the heavy imports of foreign tobacco naturally calls for a retrospection of the history of the tobacco cultivation in India. Since 1786 repeated efforts have been made by the East India Company to improve the quality of tobacco leaf and to perfect the process of curing and manufacturing tobacco. Moreover, the necessity of producing a tobacco leaf suitable for the manufacture of cigarettes was early felt, and repeated experiments made for the purpose. But the early experiments made to acclimatise the American tobacco in India did not meet with desired results. Numerous selections have been made at Pusa and at other agricultural stations and new plants have been evolved. Recent attempts made to produce a cross between American tobacco and the best of the Pusa types (No. 28) yielded some successful results. But even the best Pusa No. 28 "possesses a disagreeable flavour which makes it unsuitable for use in any but the lowest grade of cigarette"

(Bulletin No. 187, Agricultural Research Institute, Pusa, 1928). Recent experiments at Pusa with the best American tobaccos, Adock and White Barley have proved quite a success in Behar and in Madras (Vide p. 18).

Attempts are being made to acclimatise the exotic plants or to produce by hybridization new plants for the production of leaves suitable for the manufacture of cigars and cigarettes in Bengal, Bombay, Madras and Burma. "The acclimatisation of exotic cigar and cigarette tobacco and the improvement of the local races by selection are in progress at Barrirhat in Bengal. The cigar varieties imported from Sumatra and Manila and grown on the farm have shown that cheroot tobacco of quite high quality can be produced in Bengal." (Review Of Agricultural Operations In India, by Dr. D. Clouston, 1927-28, p. 35). The present aim of the Department of Agriculture at Pusa is to develop a tobacco leaf with colour, flavour and texture of the Virginian type which may be suitable for the production of cigarette within the country as well as for export. The ultimate object is, of course, to do away with foreign tobacco in order to save the enormous amount of money which goes out yearly in the purchase of foreign tobacco and to encourage the export of Indian tobacco. The statement below shows the position of the Indian tobacco trade.

	Export	Import	Area under cultivation.
	In lbs.	In lbs.	In acres.
1878-79			399,164
1889-90			393,074
1895-96	10,087,234	2,572,328	
1897-98			1,048,439
1905-6	14,272,042	5,511,205	
1909-10			1,013,352
1913-14	30,023,326	2,457,690	1,007,710
1919-20	30,876,725	5,788,622	1,011,231
1926-27	29,793,613	10,205,154	1,055,410

It may be noted that the bulk of the tobacco export consists mainly (over 95 p.c. of unmanufactured tobacco, while the import consists chiefly of manufactured tobacco.

In foreign countries Indian tobacco is mainly used in mixing with foreign tobacco leaf of superior quality employed in the preparation of pipe tobacco. But the export of unmanufactured tobacco from India has steadily declined. "Owing to the increasing consumption of cigarettes", says Dr. Clouston, "at the expense of pipe tobacco and cigars the world's demand of Indian coarse leaf is steadily on the decline: only 28 million pounds of unmanufactured tobacco are exported in 1927-28 as against 29 in 1926-27, 37 in 1925-26 and 43 in 1924-25."

CHAPTER 22.

THE SUGAR INDUSTRY.

1. The Early History of the Indian Sugar Industry.

According to the Hindu mythology sugar cane was created by the sage, Bhishwa Mitra "to serve as heavenly food in the temporary paradise which was organised by him for the sake of Raja Trishunku". It makes no difference whether one believes in the mythological origin of sugar-cane or not, but none can deny the fact of the existence of sugar cane in India from the earliest antiquity. It is believed that India is the original home of sugar cane. From India it was taken by the Arabs who introduced it into the Mediterranean countries.

However, the early history of the Indian sugar trade is wrapped in obscurity. Knowledge of the trade practically begins from the days of the East India Company. During the days of the Company's rule sugar-cane used to be cultivated in various parts of the country and gur or raw sugar was manufactured by the cultivators themselves. The old method of cultivation and preparation still persists. Large quantities of raw sugar or gur used to be exported annually from India to England where the raw material was refined into sugar before consumption. During the Company's rule an important sugar trade between India and England developed and continued growing till the West Indian sugar came into competition with the Indian sugar.

In this connection the history of the West Indian sugar industry is important, because of the serious competition which subsisted between the Indian industry and the West Indian industry. It may be noted that until the discovery of sugar from beet-root and from other sources cane sugar produced in the tropics was the sole source of sugar consumed in Europe. The sugar cane was introduced by the

Portuguese and by the Spaniards in their countries in the 15th century. The Spaniards undertook its cultivation in the West Indies and in the American colonies. In the West Indies the Spaniards, the Dutch, the French and the English fostered the development of the cane sugar industry in their respective colonies under a system of slave labour i.e. Negro slaves. The climate of the West Indies offered almost an ideal condition for the cultivation of cane sugar and the industry made the most extra-ordinary progress under European enterprise and supervision.

Indian sugar was inferior in quality to West Indian sugar, and it was thought that the climate and soil of Mauritius is admirably suited for the cultivation of sugar. No serious efforts were, therefore, made to promote the cultivation of sugar in India. All the efforts and energies of the British settlers, were, therefore, directed to the encouragement of the West Indian sugar industry. And in order to protect the West Indian sugar in its earlier stages against Indian competition trade restrictions were imposed from time to time upon the importation of Indian sugar into England. Consequently the Indian sugar trade with England which fluctuated considerably was relatively small. But the most prosperous period of the Indian sugar trade was between 1836 and 1847 when the trade was mainly confined to export only. The prosperity during this period was due to the equalisation of duties in 1836 upon Indian and West Indian sugars, and the decline of the industry in the West Indies during this period. (Select Committee On Sugar And Coffee Planting, 1848, Vol. I, pp. 27, 52). The statement below shows the development of the Indian sugar trade.

	Export quantity in 00000 cwts.	Import quantity in 00000 cwts.		Export quantity in 00000 cwts.	Import quantity in 00000 cwts.
833-34	·18		1885-86	13·31	11·71
840-41	1·37		1895-96	10·63	27·30
846-47	1·66		1905-09	2·56	82·71
865	4·77	2·13	1913-14	1·91	179·37
875	5·59	3·93	1919-20	3·28	96·39
			1926-27	·45	182·27

The import of foreign sugar into India, began somewhere around 1850, but it did not assume importance or dimensions till 1885-86. It may be noted that during the decade between 1882-3 and 1891-2 the annual export of Indian sugar to England amounted to 1.45 million cwts., and the import of foreign sugar into India 1.5 million cwts., that is to say, export and import were almost equal in amount. Since then, the import of foreign sugar gradually increased, and in 1896 there was a sharp rise in the import and a corresponding fall in the export of sugar. The reason which accounted for the new situation was the development of the new beet-sugar industry in Europe and the influx of cheap beet sugar into the Indian market which changed entirely the character of the Indian sugar trade.

2. The History of the Beet-sugar Industry.

The history of the beet-sugar industry is interesting and instructive. Upto the close of the 19th. century all the European countries had been drawing their main supplies of sugar upon the West Indies and the East Indies, India and China. But the West Indian sugar industry from which the European supply was chiefly drawn received serious set-backs from the Napoleonic Wars and the Continental systems, the Berlin and the Milan decrees. These restrictions cut off the cane sugar trade with the Continent of Europe. Attempts were, therefore, made to obtain sugar from other sources, especially from grapes and beet.

As early as 1747 a German scientist discovered that the beet-root contained sugar and that the sugar extracted from it might be manufactured into sugar for general consumption. Now, the Napoleonic Wars gave a great spurt to the beet-sugar industry, both in France and in Germany. The French industry did not thrive so well as did the beet-trade in Germany. The climate and soil of Germany were found to be specially favourable to the cultivation of beet-sugar. But the fall of Napoleon in 1814, and the abolition of the Continental system rendered it difficult for the beet-sugar trade to hold its own against the cheap cane-sugar which began to flow into the markets of the Continental countries after the removal of the Napoleonic trade restrictions. How-

ever, an industry developed with such care and labour and sacrifice was not to be allowed to decay. Special measures were therefore, adopted to encourage the beet sugar industry in many of the Continental countries. These measures included (1) a bounty on exports of sugar, (2) an internal duty on sugar to promote the bounty or to recoup it, and (3) a prohibitive import duty to exclude the importation of foreign sugar.

'By this artificial method,' says Mr. Chisholm, somewhere in his Handbook of Commercial Geography, "the production of beet-sugar was stimulated to a degree in excess of that corresponding to the geographical conditions. The price of the sugar in the world market was exceedingly lowered, and the foreigners largely benefited, while the sugar consumers and tax-payers of the bounty-giving countries suffered from high prices."

3. The Decline of the Indian Sugar Trade.

The importation of foreign sugar into India began sometime before 1850. Since this time the importation of this article increased slowly but steadily. The Hindus and the Mahomedans entertained considerable religious prejudices against refined sugar owing to the fact that the foreign sugar was believed to be refined with animal charcoal, that is, of cows and pigs. Naturally they preferred indigenous sugar which was free from "impurities" or from "unholy materials". But the time soon arrived when these prejudices had to be cast off in favour of refined sugar. The home production of Indian sugar was not adequate for the increasing need of the growing population. Moreover, the comparatively high prices of indigenous sugar and the comparatively low prices of foreign sugar tended to alter the conditions of the trade. Foreign refined sugar was offered "at temptingly low prices." (The World's Cane Sugar Industry by H. C. P. Geerlings) in the Indian market for the

Indian consumers to refuse. The Indian manufacturers of sweet-meats soon discovered that the white colour of the imported sugar give better results than the indigenous sugar. Gradually the habit of white sugar spread among the educated classes for domestic use, and the import of re-

finer sugar rose by leaps and bounds. Nevertheless, the consumption of raw sugar or gur produced within the country is far in excess of the consumption of imported refined sugar, the ratio must lie somewhere between 3:1 or 4:1.

Until 1890-91, the bulk of the imported sugar (over 2 million tons) came from Mauritius, China, Java and the Straits. The influx of beet-sugar into India also began in 1890, but the quantity imported in that year was small. In 1895-6 the import of beet sugar suddenly increased. The share of the principal countries was as follows: 1,571,993 cwts. from Mauritius, 718,218 cwts. from Germany, 109,998 cwts. from Java, 4,934 cwts. from Austro-Hungary, and small quantities from other countries. It will be seen that the cane-sugar trade still enjoyed an immense priority over its competitor, beet-sugar, in the percentage share of the trade with India. And more than half of the sugar imported came from Mauritius.

It was not until 1897-8 that the import trade in beet-sugar assumed an enormous dimension. In that year the share of Germany rose to 1,203,309 cwts., of Austro-Hungary to 945,745 cwts., while the share of Mauritius dropped to 1,406,047 cwts, the last-named country still enjoying a considerable priority. In the following year the distribution of the trade underwent a peculiar transformation. In 1898-9 the importation from Germany dropped to 413,971 cwts., while the importation from Austro-Hungary and from Mauritius rose to 1,063,737 and 1,793,607 cwts., respectively. Thus, beet sugar was gaining ground rather too fast in India.

This situation alarmed the sugar-refiners of Mauritius and also of India. They approached the Government of India with a view to induce it to take action against the importation of bounty-fed beet sugar. In March 1899, the Government took action on the same line as was taken then by the United States, "by imposing, in addition to the ordinary rate of import duty (5 p.c.), a duty equivalent to the bounties granted to the exporters of beet-sugar in the countries where it was produced. The imposition of this duty was followed by an immediate and considerable reduc-

tion" (Review Of The Trade Of India in 1899-1900, pp.4-5) in the importation of Austrian and German sugar into India.

It was, however, found out afterwards that the counter-vailing duties imposed upon the import of beet sugar into India in 1899, did not cover the whole of the bounty which protected it. They afforded inadequate protection to the cane-sugar industry of Mauritius. The importation of beet sugar in the year 1901-2, broke all past records, exceeding the enormous imports of 1897-8. The distribution of the trade among the chief competitors showed that the import from Austro-Hungary rose to 2,257,928 cwts., while the imports from Germany and Mauritius were 577,139 cwts., and 1,759,203 cwts. respectively. The beet-sugar gained an immense preponderance over the cane sugar industry of Mauritius. In order to protect the cane sugar of Mauritius the duties were increased in 1903 in accordance with the resolutions adopted by the International Convention relative to the bounties on sugar. (Vide Article IV).

In this Convention it was resolved that all bounties in the production of sugar should be abolished or counter-vailing duties should be imposed. The counter-vailing duties imposed by the Government of India on the bounty-fed sugar produced the desired results. The import of beet sugar gradually declined and became practically insignificant by 1912. Prior to 1912 the counter-vailing duties were gradually removed as the parties to the Convention abolished their sugar bounties.

4. The Present Condition of the Sugar Industry.

The restrictive measures imposed upon the white sugar of Europe, however, did not diminish the volume of Indian sugar import, nor helped to develop the Indian sugar industry. The Indian demand for sugar was much in excess of domestic supply. Moreover, the introduction of white sugar into India has created a new demand for a considerable quantity of refined sugar which could not be locally produced. Under such circumstances the importation of a large quantity of foreign sugar, beet or cane, appeared to be absolutely necessary. Therefore, the share of the

trade lost by beet-sugar naturally went over to the cane sugar of foreign countries. With the decline of beet-sugar import there went on a simultaneous increase in the importation of foreign cane sugar.

The bulk of the sugar import now-a-days comes from Java. The total imports of sugar in 1924-25 amounted to Rs. 20,90,24,000 or in round figures, Rs. 21 crores. In that year Java's contribution was Rs. 15.2 crores or over 71 per cent. and Mauritius's Rs. 3.6 crores or over 17 per cent. of total import values.

Although India produces an immense quantity of sugar or gur the Indian organisation of the industry is extremely primitive. In India each grower is practically self-sufficient. He himself represents the grower as well as the manufacturer of raw sugar or gur, and whatever amounts he produces is either consumed by his family or if any surplus left it is sold in the local bazar. Moreover, a considerable portion of the cane planted is consumed in chewing. The superiority of the beet sugar industry of Europe or of the cane sugar industry of Java or of Mauritius over the Indian industry lies in the superior organisation and the application of the scientific method of production. In these foreign countries the different estates or farms are connected with a large sugar factory.

The Indian method of manufacture in general is primitive. The defects of the method of manufacture as pursued in the United Provinces, the most important sugar producing province of India are summed up by Mr. A. C. Chatterji in the following words:

“(1) In most eastern districts..... the old stone mill is still used for pressing the cane. I believe in the Northern parts of the Gorakpur division wooden mills are most in vogue. These mills do not extract as much juice as an efficient iron mill does.

“(2) Even where iron mills are employed they are usually supplied by men with very small capital and no organising power. The mills are as a rule inefficient and get out of order. It has been estimated that good mills would increase the juice extracted by almost one half over large areas.

“(3) Where juice is boiled down into gur by the cultivator, he follows most wasteful and primitive methods. As no lime is added to the juice the proportion of crystals obtained is correspondingly small, and modern sugar refineries consequently pay only a low price for such sugar.” (Notes On The Industries Of The United Provinces, 1908, pp. 91-92).

The process of manufacture is in general, wasteful and expensive and the product is of inferior quality. But the sugar or ‘chini’ turned out by the primitive tools “commands a higher price because it is believed to be free from any objectionable contamination, and also on account of the prevailing idea that it is much sweeter, weight for weight, than imported sugar.” (Vide p. 92).

5. The Evolution of some Improved Varieties of Sugar Cane and the Future Out-look of the Industry.

It has been estimated that an immense area, exceeding 3 million acres, practically half of the world's acreage under sugar, is put under cultivation with sugar in India. But the yield per acre is ridiculously small. The out-turn per acre for the year 1922 was 27 tons for the East Indies (Java and Madura), 12 tons for Mauritius, 13 tons for Porto Rico, 10 tons for Argentina, and only 1.1 tons for India. The low yield per acre in India is due to the fact that the indigenous cane grown in Northern India which contains the most important sugar tracts of the country, is poor in sugar contents. On this particular point the Report Of The Sugar Committee (1920) observes: “whilst cane sugar from other countries yields on the average 90 per cent. of the refined sugar, gur does not yield more than 50 per cent. of refined sugar, the rest being molasses and waste.” (p. 7).

With a view to improve the quality of sugar cane the Government of India established in the year 1912 the Imperial Cane Breeding Station at Coimbatore. The Coimbatore variety evolved by hybridisation is considered to be of excellent quality. It is immensely superior to the indigenous sugar-cane. And it has already gained reputation even in Cuba where Crystalina and other varieties are

grown. This new variety is introduced in the last-named country, and it is largely cultivated in Northern India on a large scale.

The extension of cultivation of the Coimbatore cane is likely to bring a new era in the history of the Indian sugar industry. High hopes are entertained with respect to the possibility of increasing the manufacture of white sugar from it in India. In 1919-20 the amount of white sugar manufactured with this raw material amounted to 375,746 maunds, and in 1926-27 the out-put rose to 819,920 maunds.

In the year 1927-28 there were twenty-six sugar factories in India which made sugar direct from cane. Eleven of these are situated in Behar and Orissa, ten in the United Provinces, two in Bombay, two in Madras and one in Burma. The total production of sugar by these factories rose from 17,16,426 maunds or 62,941 tons in 1926-27 to 18,45,752 maunds or 67,684 tons in 1927-28.

CHAPTER 23.

THE OIL SEED INDUSTRY.

The oil seeds are one of the principal sources of vegetable oils, oil-cakes and fertilisers. Some of the most important vegetable oils are extracted from oil seeds.

India is, perhaps, the largest oil-seed producing country in the world. An immense area is devoted to the cultivation of oilseeds in India. Some idea of the magnitude of the industry can be gained when it is realised that over 14 million acres or 5.4 per cent. of the total cultivated area are annually employed under oleaginous crops. The trade returns show that the industry has made enormous progress during the course of the last sixty or seventy years. The statement below shows the course of the oil-seed trade.

Statistics of Export (In million cwts.)		Extension of Cultivation (In million acres)	
1865	33	1878-79	5.1
1885-6	17.3	1897-98	12.56
1905-6	17.57	1913-14	14.65
1913-14	31.65	1926-27	15.0
1919-20	16.49		
1926-27	16.75		

Numerous varieties of oil-seeds are grown in India. It will not perhaps be out of place to give a short description of each of the principal oil seeds.

1. Linseed (*Linum usitatissimum*, tisi, masina). It is obtained from the flax plant which also yields a fibre, (flax fibre). The flax fibre yielded by the Indian plant is not so valuable as that obtained from the flax plant of the temperate countries. The linseed yields about 28 per cent. of oil. The seed is cultivated widely in India. It may, however, be noted in passing that Argentina is the largest linseed growing country in the world. The three great linseed-growing countries of the world are Argentina, India and the United States, although it is also grown largely in Russia.

2. Rape and Mustard Seeds. These include three classes of seeds, viz., (1) *Brassica Campestris* (Indian colza, sarsa, swet sarisa), (2) *Brassica Juncea* (Indian mustard), and (3) *Brassica Napusvar* (Indian rape).

The Indian colza contains about 33 per cent. of oil, the Indian rape from 32 to 40 per cent., and the Indian mustard from 21 to 28 per cent., of oil. The colza and mustard are largely used as condiment and spices in India. India is the largest producer of these seeds in the world, and nearly one-sixth of the area sown with oleaginous crops is devoted to the cultivation of these seeds.

3. Dhabla Sarisa. (*Eruca sativa*). The seed contains from 20 to 30 per cent. of oil. It is known in commercial language under the name of jamba. The seeds are used as an adulterant for other oil seeds.

4. Sesamum or Til (*Sesamum Indicum*). It is a valuable article of commerce. The seed yields from 35 to 36 per cent. of oil. In oil contents it is the richest of all seeds. There are three varieties of this seed, the white, the brown and the black. In India til is largely used in domestic consumption.

5. Ground-nut (*Archis Hypogea*). Ground-nut known also as pea-nut or earth-nut (*china badam*) is another important industrial product. It contains about 40 per cent. of oil. There has been a general progress in the extension of cultivation of this seed during the last 10 or 12 years.

6. Castor Seed (*Racinus communis*). India is the principal source of supply of this seed. The seed yields from 30 to 32 per cent. of oil. The acreage sown with this seed is comparatively small averaging a little over 50,000 acres annually.

7. Cotton Seed (*Gossypium Sps.*, kapas). The cotton-seed oil industry of India has not acquired that much importance as it ought to have done. It is a very valuable industrial product in the United States. The average annual output of this seed in the States is about 5 million tons, of which more than 75 per cent. is crushed into oils. The total annual yield of this oil exceeds 1000 million pounds in the

United States; besides more than 3 million tons of cotton seed cake and other important by-products are obtained from the crushed seeds. In India very little oil is manufactured from the seed. The seed is employed to feed cattle, but a very large quantity of the article is exported to foreign countries.

8. Minor Oil Seeds. There is a number of minor oil seeds, namely, poppy seed, nigger seed, hijli badan, &c. Poppy seed yields an edible oil. The seed itself is cooked and eaten as a food. The largest producers of poppy seed are India and Russia. Nigger seed (*Guizotta abyssinica sarguja*) contains from 23 to 30 per cent. of oil. It is not an important oil seed. Mahua seed (*Bassia latifolia*) yields an oil. Hijli-badam (*Anacardium occidentale*) gives two oils. One, the finer obtained from the kernel, is practically equivalent to almond oil, and the other is obtained from the shell of the nut. The roasted nuts are as good as almonds. The safflower seed (*Carthamus tinctorius*, kusum) yields a valuable oil. The seed contains from 15 to 20 per cent. of oil. The Kanaja seed (*Pongamia globra* or *Galedupa Indica*) contains 20 per cent. of oil. The Radish seed (*Raphamu sativa*, mula) yields a sweet oil. Soy bean is extensively grown in India (Eastern Bengal, C. P. and Burma). The beans are used as dal or roasted and ground into satu.

Although a large portion of the oil-seeds is consumed within the country, a large surplus is also left for export. The oil-seeds constitute one of the principal articles of Indian foreign trade. The oil seed trade occupies the 4th place in order of priority among exports. The volume and value of the trade fluctuate considerably from year to year. In recent years there has been a general tendency towards increased production and exportation of oil seeds. Over 80 per cent. of the total export value is covered by the three principal seeds, viz., linseed, rape, and mustard and ground-nut. The fourth place is taken over by castor seed of which India is the principal, though not, the only, source of supply.

Before we close this chapter a brief reference may be made to the oil industry and oil-cakes. It is a well-known fact that oil-cakes are employed as fertilisers for soils and

for feeding cattle. The best oil-cake for milch cattle is obtained from til (sesamum) seed. The linseed cake is regarded as one of the best cakes suited for cattle food. The groundnut cake is very rich in albuminoids and is valuable as a cattle fodder. Both the green plants and cakes of the dhobla sarisa (white mustard) are prized as nutritious cattle food. The sarguja cake is appreciated, as cattle food and as a manure for sugar-cane. The castor-cake is used for manuring sugar-cane and as a prophylactic against white ants.

It now remains to make a brief reference to the Indian oil industry. Although India produces in commercial quantities a greater variety of oil-seeds than any other country in the world her oil-industry (from seeds) has not yet attained that importance which it ought to have done. Roughly India produces 3.5 million tons of oil-seeds annually, and about a third of this vast amount is annually exported, the remainder being used as food for men and fodder for animals, as fertilisers, and for manufacturing oils. It has been declared to be a fact that a considerable portion of the oil-seeds, e.g. cotton seed, is wasted in feeding cattle or otherwise. In the United States millions of gallons of oils are derived from cotton seeds, and the cake utilised for fertilising purposes. It has recently been suggested and rightly too that measures should be adopted by Government to restrict the exportation of oil-seeds, and special efforts be made to develop the oil industry.

On this particular question the majority of the members of the Taxation Enquiry Committee (1924-1925) observed:—

“ It is important in the interests of Indian agriculture to encourage the use of fertilisers, and to increase the supply of a valuable nourishing food for cattle, whose condition is generally regarded as deteriorating, and.....the most suitable method of doing so is to impose an export duty which would have the effect of encouraging the crushing of oil-seeds in India and of cheapening the cost of oil-cakes and other forms of manure to the Indian cultivator.” (p. 132).

Since manures are essential to the cultivation of improved crops (e.g. tobacco, sugar-cane, wheat, etc.) the extension of the oil industry within the country appears to be more desirable than the extension of the cultivation of oil-seeds which now cover over 16 million acres a year.

CHAPTER 24.

FOOD GRAINS.

1. Extension of Cultivation of Food Crops and Growth of Population.

Food grains are the foundation of economic life, for they furnish some of the vital needs or primary needs of life. Upon the production and consumption of food-grains depends the nourishment of life itself. Broadly speaking agriculture provides the primary needs of life, while manufacture mainly supplies the secondary or the artificial needs of conventional life. Agriculture is by far the most important industry of India, and it is the mainstay of the bulk of its inhabitants. During the period under consideration there has been a tremendous increase in crop production in India, and there has also been a corresponding increase in the exportation of food-grains. It is also worthy of note that concurrently with the development of agriculture the country has been increasingly industrialised and commercialised.

It has been admitted that the information available regarding the production of food-grains or agricultural products in general is imperfect. The Agricultural Statistics of India supply us with the area under cultivation, and not with the quantity of agricultural produce. The Estimates of Area and Yield of Principal Crops in India published annually by the Government are based more or less upon guesses. However, the figures supplied by these statistics afford some clue to the development of agriculture. But the more accurate index to the trade is supplied by the trade returns. The tables below prepared from Agricultural Statistics and Trade Statistics show how rapid a progression has been made in crop production and in the export trade.

	Area under cultivation (In million acres.)		Export (In million cwts.)
1878-79	110.19	1865	19.47
1897-98	182.7	1885-86	49.37
1905-6	183.6	1905-6	67.18
1913-14	191.57	1913-14	83.85
1924-25	200.2	1919-20	17.55
		1926-27	48.58

It will be seen from the above tables that the growth and progress of agricultural staples has been rapid and continuous. Notwithstanding temporary vicissitudes caused by the vagaries of monsoons, there has been a remarkable progress in the production of food crops. In the course of the last fifty or sixty years the area under cultivation of these products may roughly be said to have increased by more than one and a half, and exports of food-grains have trebled. But by what proportion population has increased during the same period is difficult to determine in the absence of statistics. In 1891 the population of British India was censused at 198.74 millions, in 1901 at 231.25 millions, in 1911 at 243.93 millions and in 1921 at 247 millions. In all probability the population of India has increased during the course of the last sixty years by a figure which must lie somewhere between 60 and 80 millions.

The figures show among other things that food production has been in due proportion to the absolute growth of population. During the course of the last 25 years (1900-1925), population has increased approximately by 16 millions, the area under food crop cultivation by 20 million acres, and the per capita holding has risen from .8 acre to .9 acre. This per capita holding which must be regarded as too small for the decent living of an individual indicates that there is already a pressure of population upon the soil. Moreover the enormous expansion of the exportation of food-grains must be considered to be producing a depressing effect upon the mass of the people. It is also worthy of note that the disproportionate inflation which has recently taken place in the prices of agricultural produce and manufactures is injurious to the best interests of the cultivators.

2. The Acreage Distribution of Food Crops.

It will be interesting to give a short description of the numerous food crops grown in the country. In the tables given below the figures refer to the principal food-grains, namely, rice, wheat, jowar, gram, bajra, barley, maize and pulse. In the year 1924-25 the gross area cultivated was about 260 million acres. Of the total cultivated area food-crops covered 210,654,000 acres or 81 per cent. or grain crops 77.2 per cent., and non-food crops about 48,787,000 acres or

19 per cent. The figures show that an enormous area is devoted to the cultivation of food crops.

The table below shows the distribution of acreage under the several food-crops grown in India in the year 1924-25.

	In millions acres	Percentage of the the total area
Food Crops :—		
Rice	79	30.3
Wheat	25	9.6
Jowar	22	8.4
Gram	17	6.8
Bajra	12	4.6
Barley	7	2.6
Maize	5	1.9
Total Food grains	167	64.2
Miscellaneous food crops:		
Fruits and vegetables	5	1.9
Ragi	4	1.5
Sugar-cane	3	1.1
Other food crops	32	12.3
Total Food Crops	210	81

3. RICE.

(1) Varieties of Indian Rice and the Extent of its Cultivation.

Rice is the principal food stuff of the bulk of the people of India as well as of the greater part of Asia. Numerous varieties of rice are cultivated in India. The varieties are, in fact, too numerous to admit of enumeration or of detail description here, and they grow under widely different climatic conditions. Thus, there are 'deep-water paddies', 'drought-resisting paddies', 'flood-resisting paddies', 'paddies' growing on highly saline lands', 'upland or hilly paddies'.

'wild paddies', &c. But the conditions suitable for the cultivation of the bulk of the Indian paddies require great heat and abundant moisture. Consequently they are generally grown on the river valleys where the plants could be kept immersed in water as long as desired.

Rice is generally regarded as a winter crop. But two other varieties of rice of small importance, viz., autumn rice and summer rice are also grown in some parts, especially in Bengal. Rice is cultivated to a large or small extent all over India. Between 30 and 35 million tons of rice under as large an area as 78 to 80 million acres are annually produced in the country. Rice covers by far the largest sown area of India, covering over 30 per cent. of the total sown area. Most of the rice produced in India is consumed within the country. Only a small portion of the vast production enters into the export trade. The table below shows the extraordinary development of the export trade in this article. The trade in rice grew by leaps and bounds since after the opening of the railways which made possible the cheap carriage of bulky goods to the ports for shipment.

Statistics of Rice Export.

(In million cwts.)

1865	18.03
1885-6	28.22
1905-6	46.04
1913-14	49.00
1919-20	13.20
1926-27	41.14

2. Some Commercial terms of Rice.

It will not be out of place to explain some of the ordinary terms used in connection with the rice trade. It should be noted that the commercial rice includes 'husked rice,' 'cargo rice', 'white rice', or 'polished' and "glazed rice." The husked rice or the "cargo rice" is the grain obtained after the removal of the outer husk of the paddy. When the bran or the inner-coating of the husked rice is cleaned, it is then called "white rice" and when white rice is further cleaned by 'polishing and glazing, it is, then known as polished rice' or 'glazed rice' respectively. Highly polished and

glazed rices are produced especially for the European markets. All the processes of cleaning—from husking to polishing, are now being done in Burma, before export, but glazing is also done in Europe. It may be noted that the bulk of the rice exported from India is obtained from Burma and Bengal.

(3) Nature of Export and Foreign Competition.

Indian rice in the Indian market has to compete with other food-grains, namely, wheat, barley, jowar, bajra, maize etc. But the principal competition is between one variety of rice with another. Thus, Burma rice or Patna rice is regarded in Bengal to be inferior to the Bengal rice. But in the European market and in the markets of Eastern Asia Indian rice comes into competition with foreign rices and with many other substances used either as subsidiary food (e.g. potatoe, rye, etc.) or as industrial products. The chief competitors of Indian rice are those of Siam, Indo-China, Japan and China. Each of these foreign rices is valued for the special properties which it possesses. For many purposes Indian rice is considered to be superior to the others. And India is, perhaps, the largest rice-exporting country in the world, sending her rice to many European and Asiatic countries.

Within very recent times the rice trade of India has taken a new turn. There are indications showing that the export trade in Burma rice, especially in 'table rice', is threatened with serious competition from the countries of Southern Europe (Spain, Italy, Greece, and warmer districts of France) as well as from Siam and Indo-China. The trade lost by Burma in the course of five months of 1928-29, is estimated at Rs. five and half crores, and the loss of Bengal at Rs. 63 lakhs, the total loss for India as a whole being Rs. 6 crores. It may be noted that a large number of European and Asiatic countries are consumers of Indian rice. The principal European and Asiatic consumers of Indian rice are Germany, Holland, the United Kingdom, Arabia, Aden, Ceylon the Malay States, China, Japan and Egypt. The recent drop in the export of rice to the continental countries of Europe is due to the cultivation of rice in the countries of Southern Europe where table rice is being produced in increased quantities. The Continental consumers of Indian rice are now

securing a portion of their supplies from these countries and also from Siam and Indo-China.

The recent diminution in the purchase of Indian rice by the countries of eastern Asia is ascribed to the increased cultivation of rice in Siam and Indo-China, and exportation therefrom to Ceylon, the Malay States, China, Japan, countries which were formerly important customers of India. The decrease in the case of China and Japan in the course of the first five months is very serious. China took Rs. 56,53,644 against Rs. 1,46,95,758, and Japan only Rs. 7,94,902 against Rs. 1,91,29,901.

There is reason to believe that Japan's action in minimising its purchase of Indian rice is prompted by a desire to retaliate the Indian import duties recently imposed upon Japanese yarns. But the reason why Ceylon is showing a preference to Siam and Indo-China rice is that the Chettiers or the famous bankers of Ceylon find investment in Saigon more remunerative than in Burma, and also seem to derive some advantages in regard to income tax. This accounts for the transfer of Ceylon's interest from Indian rice to Indo-China rice. (The Statesman, Oct. 9, 1928).

4. WHEAT.

1. The Extent of Wheat Cultivation In India.

The next important food grain after rice is wheat. It is the most important food-stuff of the peoples of the cold countries. It forms the staple food of northern India, and it is also largely eaten by the people of the eastern and southern India.

In India wheat is grown mostly in the drier parts as a rabi (spring) crop, being sown between October and December, and harvested between March and May. Between 20 and 25 million acres of land are annually given to the cultivation of wheat in India. It is mostly cultivated in Northern India. Out of the total out-turn of 9.7 million tons in the year 1923-24, 6.6 million tons or over 68 per cent. of the crops were produced in the two provinces of the Punjab and the United Provinces.

In the world's production of wheat India occupies the

fourth place. The principal wheat producing countries of the world in order of importance are Russia, the United States, Canada, India, France, Argentina and Italy. Although India is one of the foremost wheat producing countries of the world her quality of wheat is in general of inferior quality and does not command good prices in the world's market. But improved varieties of wheat evolved by the Department of Agriculture are now grown in the Punjab, in the United Provinces and elsewhere.

Another matter of importance to be noted in this connection is the yield of wheat per acre. The yield of wheat per acre in India compares unfavourably with that of any of the European countries except, perhaps, Russia. This low yield is ascribed to the unscientific method of cultivation. The average yield of wheat per acre is larger in the old countries, that is, in the European countries except Russia, where the method of cultivation is scientific and intensive—than in the new countries, that is, the United States, Argentina, Brazil, Canada, Australia, and elsewhere in the New World. The following statement shows the per acre yield of wheat in the various countries.

Average Yield Per Acre

(In bushels.)

United Kingdom	...	...	...	25
Germany	...	...	...	27
France	...	...	...	17
Italy	...	...	...	17
Hungary	...	...	...	17
Roumania	...	...	...	16
India	...	...	...	10
United States	...	...	...	14
Canada	...	...	...	16
Australia	...	...	...	16
Argentine	...	...	...	13

2. Importance of the Export Trade of Wheat.

India was one of the largest wheat exporting countries of the world. Although the major portion of the wheat produced in India is consumed, within the country, she still does have a small surplus left for export to Europe where the demand for wheat is growing with the growing population.

It is estimated that between 16 and 17 million tons of wheat are imported annually by Europe. The greater part of this vast quantity is supplied by Russia, the United States, Canada, Australia, Argentina, and India. India's contribution is said to amount to 4 per cent. of the total European demand.

A brief reference to the development of the export trade in wheat may now be made. It may be noted that the export trade in Indian wheat began early in the last century. But it was not until the last quarter of the last century that the trade assumed volume and importance. The opening up of the railways gave a great impetus to the wheat trade and to the extension of wheat cultivation. The rapid extension of the trade and its decline are indicated by the table below.

Statistics of Wheat Export.

(In million cwts.)

1865	.146
1885-86	21.06
1905-6	18.75
1813-14	24.00
1919-20	21.13
1926-27	4.69

5. MINOR FOOD CROPS.

There is a large number of minor food crops, especially grams and pulses which, enter into the foreign trade of India. They are jowar, barja, barley, maize, gram, pulses, etc., which constitute important subsidiary food grains. Jowar ranks next in importance to wheat as a food grain. Jowar and barja are largely used in the Bombay and Madras Presidencies, while maize, gram and barley are largely consumed by the Punjab, the United provinces, the Berar, and Behar and Orissa. Pulses constitute one of the chief articles of food for all classes of people in India. Most of the minor food grains enumerated above are very largely consumed within the country. Comparatively a small fraction of the total production is exported to foreign countries. Nevertheless, the export values of these minor food crops when added together amount to crores of rupees. Thus, in the year 1923-24 the total export value of these crops, except rice and wheat amounted to Rs. 5.7 crores.

BOOK III.

DEVELOPMENT OF THE FOREST INDUSTRIES.

TIMBER AND FUEL.

CHAPTER 25.

1. Introduction.

Forest covers a vast area in India. In 1924-25 British India had about 229,896, square miles or about 21 per cent. of the total area of 10,999,972 square miles, under forests scattered all over the country. The greater part of the forest areas are owned and controlled by the Government, and they are a very large source of revenue to the State. In the year 1924-25 the gross revenue derived by the State from this source amounted to Rs. 5,67,48,761, and after deducting the working charges which amounted to Rs. 3,53,23,406, the net surplus of revenue left to the State was Rs. 2,14,25,345.

The necessity of protecting the forest resources of the State against their indiscriminate destruction has been early recognised by the State, and laws were enacted for their protection, and measures were adopted for the development of the forest resources. "The first attempt made in India to protect the forests from destruction," says Mr. R. S. Pearson, F.L.S. in his Commercial Guide to the Forest Economic Products Of India, "were commenced nearly a century ago in Madras, where the first serious attempts to increase the area under teak, by forming plantations, were made some 80 years ago, by a Civilian of the name of Conolly, who started the famous Nilumbur plantations on the Malabar coast. It was not, however, until 1856 that Lord Dalhousie laid down a definite policy with the view of affording more widespread protection to the valuable forests both in India and Burma, and it is due to his wise forethought that these valuable forests have in a great measure been saved from ultimate destruction."

The protective measures adopted by the State have not always been an unmixed blessing. They produced serious effects upon the indigenous iron smelting industry and even upon the European Companies which, in the early days, used to draw their supplies of fuel from the forest. Moreover, the growing scarcity of timber and fuel and their consequent rise in prices is being felt in almost all parts of India. The scarcity of fuel cannot be ascribed to the dearth of wood in India but to its exportation as well as to the preservation policy adopted by government against possible deforestation which may result from ruthless destruction. Moreover, there are extensive forest areas still untouched in India.

2. Timber.

The forests of India contain all kinds of trees—alpine, temperate and tropical trees. The higher altitudes of the Himalays are covered with alpine forests, and the base with tropical forests, while there is a temperate region in between, which is covered with temperate trees. The forest products of India obtained from trees and from other sources are divided into two classes: Timber and Fuel or Principal Products, and Minor Products which include a large number of products of forest origin. The minor group includes such articles as bamboo, sabai grass, munji grass, wood pulp, for the manufacture of paper and matches, tanning and dyeing materials, turpentine, lac, rosin, oils and other substances, which yield a very large revenue to the State. In the year 1924-25 the total value of minor products amounted to Rs. 1,37,13,591.

It will not be out of place to describe briefly some of the important forest products. To begin with timber we notice that of all the forest products of India it is the most important individual article of commerce. It is obtained from a very large number of trees: teak, sal, padauk, iron-wood, red sanders, sandal wood, rose-wood, sisoo, semul, black-wood, ebony, spruce, hemlock, fir, pine, poplar and other trees. Of timbers teak is of the highest value and importance. It is used for ship-building and for construction in general. It is hard and durable and contains an oil which preserves iron from rust. It is chiefly obtained from Burma, the Western Ghats and Assam. In Burma teak is found in many of the forest covered mountains. The rivers

Irawati and Kyendum running between the forest covered mountain ranges help to carry the timber to the ports for export. These natural facilities of transport rendered Burma the main source of supply of teak for export. Burma alone supplies over 95 per cent. of the total export of teak, valued at Rs. 1.3 crores in 1923-24.

Sal is considered to be the next important timber. It is suitable for "all grades of casks and cooperage, scantling and beams for building work, and carpentry work of all sorts" (A Note On the Working Qualities of Some Common Indian Timbers by H. E. Kinns. Forest Bulletin, No. 66.) It is very durable, and the heart-wood is practically free from borer attack.

Other equally valuable and important timbers are Andaman padauk, satin-wood, black-wood, cedar, amaltas, sisoo, laurel-wood, haldu, babul, etc. They are suitable for high class furniture, joinery, panellings, spokes, mallets, and tool bodies for wood-workers' tools, ornamental work, boat-building, railway carriages and for other purposes. Some of these timbers (satin-wood, padauk, sisoo) are not liable to insect or fungus attack. Sisoo has the reputation of hardening with age. The semul timber has, in addition to its general properties, the virtue of extreme durability under water. For this reason it has been used for sewage pipes and is free from white-ant attacks.

The timber obtained from cedar is useful for medium grade furniture, cigar boxes and for other purposes. Cheaper grades of furniture, match-brandings, panelling, warper bobbins for jute mills, and brush wood—are made from kanju (papi), bhalaun, pine, and kaura (dhudi). The catch tree (Acacia catechu) is suitable for the manufacture of hand-tools and tool handles. It is an excellent timber for wheel spokes and hubs of wheels. Carriage and waggon shafts, wheel spokes, carriage building, motor lorry under-framings and nibs are made from the timber of dhaura. Kusum is also used for somewhat similar purposes and maple for kitchen bake-house fitments, and also for all classes of turnery, cotton tubes and boats. The moru oak is suitable for making high grade light ale casks, beer and wine casks.

A very important wood is that obtained from the Sandal Wood tree of S. India. It is considered to be one of the most valuable trees of the world. The principal uses of the wood as summed up by Mr. Pearson in his Commercial Guide to the Forest Economic Products of India may be noted:

“The wood is used for a variety of purposes, the most important of which are of an ornamental nature. It is used in making carved boxes, frames, walking sticks, handles, pen-holders and other similar articles. It is on this wood that the finest Indian carving is executed. In Mysore, Madras and North Kanara, at Kumpta, the art is extensively cultivated and very beautiful carved sandal-wood work is obtainable. Gamble says that the wood exported to China is used in making coffins for rich people. It is also used by Parsees in their religious fire ceremonies, by Hindus when burning their dead, in performing rites in their temples, and for making caste marks. The saw dust is used to scent clothes and stuffing pin-cushions, and the bark is chewed by low caste people as a substitute for betel leaf. If is from the chips of sandal wood that large quantities of oil are distilled” (pp. 89-90).

It is practically impossible to enumerate the varieties of timber and their various uses and applications to domestic and industrial life in this brief sketch. The few instances enumerated above give some ideas of the several uses to which timber is put.

The export trade in timber consists chiefly of teak, followed by sal, deodar, sisoo, black-wood and, sandal wood. The teak trade had had a continuous development up till 1895-96 after which the export trade in this valuable article has been on the decline owing to the increasing demand for teak and its application in India. Concurrently with the enormous export of timber from India there has also developed an import trade in this class of articles. Large quantities of cheap timber and some teak are imported annually from Europe, America and Australia.

The following statement indicates the development of the teak and timber trade:

	Export	Import
	Timber	Teak
	In cubic tons	In cubic tons
1868	16,632	
1875	42,868	
7885-86	50,098	
1895-96	63,516	
1905-06	52,768	71,676
1913-14	50,737	96,148
1924-25	47,455	42,331

The export figures for the years 1905-6, 1913-14 and for 1924-25 represent teak wood, while the import figures for 1905-6 stand for teak, and the figures for 1913-14 and 1924-25 for timber. In the last named year the total value of exports of wood and manufactures thereof amounted to Rs. 1.4 crores, and the import amounted to Rs. 58.74 lakhs.

The tenth Report of the Imperial Economic Committee (1928) on "the preparing for markets and marketing of timber" comments upon the neglect of the Government of India to exploit the vast timber resources of the country.

"There is a notoriously world scarcity of timbers especially in soft-woods, which may develop into famine conditions. America has admittedly squandered a great portion of her original forest wealth, and is now engaged in a labourious process of re-forestation, Canada and Scandinavia are being laid under contribution, but India has vast areas that have hardly been touched. Because of the increasing demand for newsprint and artificial silk the value of the imports of wood-pulp into Britain has increased by nearly fifty per cent. in four years." (From The Statesmen, Jan. 9th, 1929).

The Imperial Economic Committee points out that the whole of this quantity can be supplied by India. It also recognises the difficulty of accessibility to certain areas, but it considers that it is not an insuperable one. The forests are capable of yielding a larger amount of revenue than they

do at present, and may relieve to a great extent, the people of the burden of taxation.

3. Fuel.

It may be observed that a very important use of wood which cannot be over-looked is fuel. But the use of fuel for industrial purposes and for railways has been displaced by coal fuel. However, the majority of the indigenous hand industries still depend upon charcoal fuel. Moreover, wood fuel for domestic use is almost an universal necessity in India. The exploitation and application of coal as a source of power for railways and machine industries commenced sometimes during the 2nd half of the 19th century, and its use has since become widespread. But coal as a domestic fuel appears to be making little headway. The application of coal fuel in substitution for wood fuel is extending rather too slowly. The growing tendency in some parts especially in the cities, to substitute wood by coal has come about as a result of the growing scarcity of wood fuel and its consequent high prices. It should however, be noted that the widespread use of coal for cooking purposes is hindered by the difficulty of obtaining a cheap grate as well as by the prejudices which exist against the use of coal. The Royal Commission On Agriculture (1928) observed that the Indians are too slow to change their old ways of doing things. But it is also certain that so long as wood remains comparatively cheap it will continue to be the principal form of fuel for domestic use in the country.

CHAPTER 26.

SOME TANNING AND DYEING MATERIALS.

1. Tanning Agents of Vegetable Origin.

The vegetable tanning materials are obtained from the bark fibre, seed-pods or fruits, and leaves of trees. Bark tannings are obtained from numerous trees, such for examples as babul bark (*Acacia arabica*), sal bark (*Shorea robusta*) turwad or avaram (*Cassia auriculata*), wattles, cutch or khair (*Acacia catechu*), "iron wood" (*Hopea parviflora*), mangroves and from many other barks obtained from trees.

Babul bark is considered to be the most important of all tanning agents in Northern India, and is extensively employed by Indian tanners. The bark is generally obtained from felled trees in Government forest areas where regular cutting of timber trees takes place annually. The Tanner's Cassia or Tarwar bark (*Cassia auriculata*) is also a very important tanning agent being employed largely by tanners in South and West India. It is especially valuable for heavy hides. The tan penetrates into the hides more readily than most other tans. But it gives the best result when used in conjunction with other tans. It is said that it imparts a buff colour to the leather. The *Cassia fistula* bark also yields a tan, though inferior to tanner's cassia, is extremely used for tanning purposes. The barks of many other trees— mangrove, sal, blue-gum tree, and other trees, yield valuable tanning agents.

The tan extracts obtained from seeds or fruits of forest trees are of considerable importance to commerce. They yield a larger revenue to the State than bark tanning materials do. One of the principal tanning agents and also a dyeing agent is myrobalan, the seed-pod or nut of *Terminalia chebula* (harra). The *Terminalia chebula* is found throughout India and Burma. Its fruits, that is, myrobalans, yield a black tan.

> The seeds of the Indian myrobalans contain as high as 50 per cent. of tannin, while those of the Burma varieties yield about 25 per cent. of tannins only. The Burma myrobalans are inferior to the Indian in tannin strength, colour, and having non-tanning agents in excess. The excess of non-tannins retard the penetration of tannin into the hides and reduces the total yield of leather (Vide Forest Bulletin No. 32, pp. 1-4).

The tanning agents derived from myrobalans are extensively employed in India and in Europe for tanning hides and skins. But when used alone they produce spongy leather. They give satisfactory results when they are used in admixture with the extracts of babul bark, mangrove bark, minosa bark, hemlock bark, chestnut, gambier and other barks—all of which yield some tans. Such mixed tannages improve the quality of the leather in colour, pliability and softness.

Myrobalans are an important article of commerce. They are largely exported either as whole nuts or as crushed nuts to Europe. The Europeans, especially the Britishers prefer to have the whole nuts. The crushed nuts are often of inferior quality, being liable to adulteration. Within comparatively recent times factories have been established for extracting the tannin contents from myrobalans, and an yearly increasing quantity of myrobalan extracts is exported from India. In the year 1926-27 exports of myrobalans from India amounted to 1,377,633 cwts., valued at Rs. 81,54,302. It may be noted that the volume of exports of myrobalans has tended to decline within recent years owing to the increased exports of the myrobalan extracts. The export of myrobalan extracts rose from 32,559 cwts. in 1920-21, to 60,888 cwts. in 1923-24 but it dropped to 38,156 cwts in 1926-27 (valued at Rs. 4.83 lakhs).

Besides myrobalans there are other tanning agents obtained from fruits or seed-pods. Divi divi is an important, tanning agent obtained from the seed of *Caesalpinia coriaria*, a tree grown in S. India. The seeds contain about 50 per cent. of tannins of superior quality. It is largely employed in the Madras tanning industry. But it is stated to have fallen into disfavour recently with the tanners. An

important tanning and dyeing agent is derived from the seeds of the babul tree. It is considered to be more important as a dyeing agent than as a tanning agent, for it is said to impart a good colour to the leather. There are many other trees from the seeds of which tannins are extracted and employed by the local tanners.

Besides fruits and barks the leaves of certain trees are employed locally by tanners for tanning and dyeing purposes. Sumach is one of the agents falling under this group. It yields a brighter colour than myrobalans, and is employed in tanning finer leather. But it is much more expensive than myrobalans, and the industry is not well-developed in India. Its application is not so extensive in India as myrobalans or babul bark tans. Regarding its comparative importance as a tanning agent Mr. Puran Singh in a "Note On Indian Sumach" observes, "Sumach must not be considered a tanning material capable of such general and extensive application in tanning industries as the Indian Babul Bark, as it like myrobalans tans too soft, but it is certainly an important auxiliary tannin, which can, by admixture, improve the tanning properties of such harsh tanning barks as Sal and Sain, and as such, its extensive application will open one more field whence the Indian tanner may draw his tanning materials."

Among other trees the leaves of which are used for tanning purposes, the Emblic myrobalan and Anogeissus latifolia (Dhaura tree) may be mentioned as important.

The gums and hearts of certain trees also yield tanning and dyeing agents. The blue-gum tree yields a tanning and a dyeing agent. The cutch or kathera obtained from the heart-wood of Acacia catechu by boiling the chips is employed both for tanning and dyeing purposes. It acts as a preservative to fishing nets dyed with this agent.

2. Dyeing Agents.

Dyes or colouring matters are derived from three sources: vegetable, animal and chemical. In India we are concerned primarily with vegetable and animal dyes. The chemical dyes are not yet developed to any extent in

India. The two important animal dyes are obtained from insects, lac and cochineal.

The varieties of vegetable dyes and the sources from which they are obtained are so numerous that a detail description of them in a brief sketch like this will be out of place. However, a few important ones may be considered here for the sake of illustration. It must, however, be remembered that the value of vegetable dyes has declined considerably since the introduction of German chemical dyes into the country. Only a few of the vegetable dyes have still been able to maintain some of their former importance.

Vegetable dyes are produced from the roots, bark, heartwood, fruit, leaves and flowers of trees and shrubs. Almost all colours are obtainable from them. But in their preparation chemical substances are not infrequently employed to obtain the desired results.

The red colouring principles are derived from various sources. One of the principal sources of red and orange colour is safflower (kusum). It is largely used in India in dyeing textiles. But its importance has declined since the appearance of synthetic dyes upon the Indian market. The red dye known as "Kamelia" derived from the fruit glands of a tree is used for colouring silks. The seeds of *Bixa orellana* yield a red dye known as "Ornatto dye" employed in dyeing silks. The flowers of the Dhak trees (*Polas tree*, *Butea frondosa*) yields also a yellow dye used in dyeing textiles. Yellow dyes are also produced from the flowers of a number of other forest trees.

Dyes are also obtained from the bark, wood and root of many trees. Some of the barks, discussed in the last section, yield black and brown dyes as well as tans. The roots of some trees also yield red and yellow dyes (e.g. *Berberis aristata*, *Punica granatum*). The wood of the sander tree yields a red dye, and that of the Jack tree (*Antocarpus intigrifolia*) a yellow dye—both the dyes being used in dyeing textiles. Madder yields a brilliant red dye. It is now obtained by chemical processes from anthracene. An expensive red dye is produced from saffron.

Its high prices prohibit its application as a dye in India where it is valued more as a medicine than as a dye. A valuable red dye extracted from Sappou wood is largely used in calico printing and in dyeing silks and straw plaits (Watt). Annato, a reddish yellow dye obtained from the pulp of a tree is used in dyeing silk in Burma. Yellow dyes are also produced from turmeric, gambage, pomegrenate rind, myrobalans, Cidrela toona, Bhutba frondosa, nyctanthus and from other trees. Mangstein, pepul, myrobalans and other trees yield black dyes. Indigo is the source of vegetable blue dye. There are numerous trees from which dyes are derived or extracted.

Different grades and shades of colours are produced by mixing different agents and chemical substances. Safflower treated with alkali gives a pink and crimson colour. Combined with turmeric it produces a reddish yellow colour, and with myrobalans a brown colour. Various shades of brown and grey colours are obtained by admixture in various proportions of myrobalans, turmeric, pomegrenate rind and ferrous sulphate. Indigo combined with turmeric, pomegrenate rind and other materials yield green colours. Blue-black is also a combination of indigo, ferrous sulphate and other substances. Babul dye treated with chemical substances yields greys and blacks. In conjunction with other agents myrobalans yield blue-black, brown or yellow dyes depending upon the proportions of the other substances used.

Among animal dyes cochineal may be considered here. Carmine or cochineal dye employed in dyeing silks and in calico-printing is a crimson red colour. It is obtained from an insect of the same name. The insect is a native of Mexico introduced into Bengal in 1795. In India there are also indigneous species yielding this dye. The cochineal dye is practically displaced by chemical dyes.

It may here be noted that the total value of exports of tanning and dyeing materials amounted to over Rs. 1.17 crores in 1926-27.

3. Chemical Dyes.

The use of vegetable dyes has considerably diminished

since the influx of chemical dyes from the Continent of Europe. The two important groups of chemical dyes are the 'aniline' and the 'alizarine.' The active principle of the former is indigo, and that of the latter is madder or "Turkey red." Before the discovery and introduction of synthetic dyes into the world's market these two dyes used to be obtained entirely from vegetables. The dyeing industries have, however, been revolutionised by the chemical dyes. Alizarine is now obtained chemically from anthracene, and aniline from coal-tar products. Almost all grades and shades of colours are now produced on a commercial scale from these two sources.

CHAPTER 27.

TURPENTINE, ROSIN, RESIN AND GUMS.

I. THE TURPENTINE INDUSTRY.

1. The Nature of Turpentine Oil.

Pure turpentine oil is a colourless, volatile liquid, but when exposed to air it becomes slightly resinified and assumes an amber colour. It has a peculiar odour the strength and sharpness of which depends upon its age. It is soluble in ether, chloroform, carbon, bisulphide, benzene, petroleum, acetic acid and in fatty oils. But it is practically insoluble in dilute alcohol.

The pure turpentine oil of commerce is obtained by distillation of crude turpentines or oleo-resin exudations derived by tapping pine, fir and other coniferous trees. The oleo-resin substance is a solution of resin and a volatile oil (turpentine oil). The oil or the spirit of turpentine is separated from the resin by steam distillation or by other processes. The resin when purified and strained is known as rosin.

The turpentine oil is produced in many countries of Europe and America. But the best varieties of turpentine are obtained from the American and French pine trees. The United States of America is the largest exporter of turpentine oil. The Indian turpentine and rosin industry is of comparatively recent development, and India depends largely for her turpentine requirements upon foreign countries.

2. The Chief Sources of Indian Turpentine Oil.

The potential resources of turpentine in India and in Burma are believed to be considerable. The oil is obtained from a number of trees of which the principal ones are the *Pinus Longifolia*, *Pinus Khasya*, *P. Merkusii*, *P. Excelsa*,

and *Boswellia Serrata*. At Present Indian turpentine is mainly drawn from the *Pinus Longifolia*. The attempt to manufacture turpentine from the other trees has been more or less experimental.

The crude oleo-resin of *Pinus Longifolia* yields from 18 per cent. to 22 per cent. of oil, and 60 per cent. of resin. The quantity of turpentine obtained varies according to the method of preparation. Apart from sylvestrene the oil from *Pinus Longifolia* contains a greater amount of high boiling terpenes than the American and French oils which wholly consist of pinene. The peculiar odour of the Indian oil is due to the presence of sylvestrene, and its low drying quality is due to the presence of high terpenes. The drying quality of the Indian oil is also ascribed to the decomposition of colophony. The presence of colophony may be reduced by redistillation which however, renders the oil comparatively expensive. (Vide The Indian Forest Records Vol. IV, Part I, pp. 12, 52).

There are, however, other sources from which a better quality of turpentine is obtainable. The oils obtained from the *Pinus Khasya* and *Pinus Mercusii* of Burma are of very high quality and may be employed for all purposes for which the American and the French oils are used. But the oil from the *Pinus Khasya* of Assam is somewhat inferior in quality. It is classified among the second grade American oils. It is believed that the pine resources of Burma are likely to be of great commercial value in future.

Successful experiments for the production of turpentine oil from the other two trees have been carried on in the United Provinces and the Punjab. The turpentine oil produced from *Pinus Excelsa* of the United Provinces and the Punjab is of good quality. And if redistilled, it is believed that, it will not suffer by comparison with the best American and French oils. But as compared with *Pinus Longifolia* the forests of *Pinus Excelsa* are limited in extent. (Forest Bulletin No. 24). Another turpentine oil of superior quality is that obtained from the *Boswellia Serrata*. The oil consists mainly of dextro-pinene. It is "as good as the best American and French oils of turpentine and its uses

are the same as those of the latter," (The Indian Forest Records, Vol. VI, Part VI, p. 31).

To reiterate, the exploitation of turpentine oil from sources other than those of the *Pinus Longifolia* has been more or less experimental.

3. The Development of the Turpentine Oil Industry.

The turpentine oil industry of India is of comparatively recent development. The first experimental work carried on for this purpose was started by the Forest college at Dehra Dun in about 1890. Experiments conducted for a period of five years established the belief that turpentine and rosin could be produced in fair amount from the *Pinus Longifolia*. Since that time the industry has made considerable progress. The distillation is carried on under the Forest Department in the United Provinces (Bhowali, Barailly and Kalsi) and in the Punjab (at Jallow).

However, the production of oil carried on in these Government distilleries is not adequate for the domestic needs, not to mention of export. But the industry is of growing importance, and promises a great future. Since the installation of the Government distilleries the production of turpentine oil has been steadily increasing, with a corresponding decrease in the import of foreign oils. The statement below shows the course of the trade.

Import In gallons	Production in Gov. Distilleries (In gallons)			Grand total In gallons
	Bhowally	Jallow	Total In gallons	
1905 ...	6,130	...	6,130	
1909 ...	22,200	...	22,200	
1912-13 270,127	47,308	12,941	60,249	330,376
1919-20 111,917	81,448	70,974	152,422	264,339
1927-28			3,92,845	

With the development of railways and industries the demand for turpentine and resin is increasing rapidly. It

is evident, therefore, that unless all the better sources of supply which may supersede the best grade American and French oils, are fully exploited, India will have to depend for the superior grade oils and resins upon the foreign sources of supply. It is believed, however that, if all the available sources of turpentine and resin are exploited to their full extent, India may have a surplus left even for export. The future prospects of the industry therefore, appear to be promising.

There is "evident that the area under pine forests in the United States is gradually being reduced and the production is declining. Further, the cost of production there has risen, owing largely to the increased cost of labour. The price of American rosin and turpentine is, therefore, likely to remain high for sometime, and there will consequently be a good market for the Indian products at high prices. (Report on Lac, Turpentine and Rosin, p. 40).

4. Uses and Substitutes of Turpentine.

Turpentine oil is very largely used in the manufacture of paints, varnishes and lacquers and in pharmaceutical preparations. Owing to its solvent powers it readily dissolves fats, resins and cautchouc. Mixed with resin it forms varnishes. Varnishes are in fact, preparations of the solutions of turpentine and resin. Of Course, oil varnishes contain linseed oils or other drying oils in addition to resin and turpentine. Enamel paints are also made of drying oils and resin, pigments and volatile oils. Lacquer varnishes are preparations of shellac dissolved in alcohol. In short, turpentine is one of the chief constituents of paints and varnishes. In India turpentine finds its chief application in the railways.

The rising prices of turpentine oils in recent years have led to the discovery of cheap substitutes. A number of substitutes produced from coal-tar distillation or from mineral oils have made their appearance in the market. Their successful application to the paint, varnish and enamel industries has been made possible by their solvent character. They are found to be useful for most of the purposes for which genuine turpentine oils are employed. To what

extent they have been able to replace turpentine oils cannot be precisely determined. But it appears that their introduction has put a check to further increase in turpentine prices. However, there are indications showing that the import of turpentine substitutes into India is on the decline. In the year 1919-20 the amount of turpentine substitute imported was 2,836 cwts. valued at Rs. 97,580, but in 1923-24 the quantity imported dropped to 1,661 cwts. valued at Rs. 58,546 *.

II. ROSIN.

1. Nature and Sources of Rosin.

Rosin is a purified form of resin. The resin industry is closely associated with the turpentine industry. Both turpentine and rosin are obtained from the same source and practically in the same way i.e. by distillation. Both are products of oleo-resin, "a substance which exudes when incisions are made on the bark of coniferous trees." When the spirit of turpentine is removed from the oleo-resin by steam distillation, resin is left as a residue or by-product. On purification and straining it is transformed into rosin of commerce.

Rosin is a transparent or translucent substance, and in colour it varies from amber to a dark brown. Commercially it is classified into various grades. For our purpose they may be broadly divided into "Black Rosin" which includes the dark coloured varieties, and the "White Rosin" which includes the comparatively light coloured varieties. (For details vide The Indian Forest Records Vol. IV, Part I, p. 77). Indian rosin is of dark colour. It is generally inferior to American rosin, and is therefore, unsuitable for many of the purposes for which American rosin is employed.

The quality of the rosin depends upon its colour and lustre. These principal properties vary with the trees from which rosin is produced and also with the method of preparation. A great deal depends upon the temperature employed in the distillation of the crude material. The dark colour of the *Pinus Longifolia* rosin is due to the high temperature required for the separation of turpentine from the oleo-resinous substances. The *Boswellia* resin is some-

what similar in physical (though not in chemical) properties to pine resin. But the resin obtained from *P. Khasya* and *P. Excelsa* is of light colour. The better quality of this product is ascribed to the comparatively low temperature required in distillation. The quality of the oleo-resins varies also with the seasons of tapping and collection.

In France and in America great care is taken in classifying the crude resin into different grades according to the season of the year in which the trees are tapped and the successive number of annual tappings. The spring and summer collections give resin of higher and light coloured grades and again the collections from the "Virgin Dips" (i.e. from trees tapped for the first time) yield the so-called "Window Glass" and "Water White" grades of rosin and those from the "YELLOW DIPS" (i.e. from trees tapped in successive years) give dark coloured varieties." (Vide pp. 76-77).

Now a word may be said about clarifying rosins. Various experiments have been made to clarify Indian rosins by chemical processes. Among these the "sun-light" process and the "alum process" are considered to be the best and cheapest. The sun-light method which consists in bleaching the rosin by exposing it to the sun-light for about ten days— is slow and tedious. The method of clarifying rosin with alum has been successfully experimented and it is considered to be the best and cheapest.

2. The Development of the Rosin Industry.

Rosin and turpentine are allied industries. The oleo-resin from which rosin and turpentine are produced by distillation is obtained by tapping pine and other trees of which *Pinus Longifolia*, found in the outer Himalayan regions — from Afganistan to Bhutan — is the most important single source. The oleo-resin is carried to one of the Government distilleries for distillation. The production of rosin is now carried on in a commercial scale in the factories in the United Provinces and the Punjab. The statement below indicates the steady progress of the rosin industry.

IMPORT In cwts.	PRODUCTION IN INDIA In cwts.			Grand Total In cwts.
	Bhowalli	Jallo	Total	
1912-13 61,017	15,141	5,403	20,544	81,561
1916-17 18,368	32,002	11,729	43,731	62,099
1919-20 13,906	31,183	18,894	50,077	53,983
927-28 ...			1,14,865	...

The above table indicates, among other things that ere long India will be able to supply her own needs. It was hoped that Bareilly factory alone would be able to supply 59,000 cwts., of rosin in 1919. But the "Conservator in charge of resin operations considers that, as the rosin is light amber in colour, it could not entirely replace the red American rosin". (Report On Lac, Turpentine and Rosin, pp. 32-33). However, as the above statement shows the out-put has increased six times in the course of the last 8 years.

III. RESINS AND GUMS.

Before concluding this chapter a brief reference should be made to resins and gums. It will not be out of place to draw a distinction between resins and rosins. Both rosin and resin are used practically for many similar purposes. But rosin is by far the most important commercial product. It is used in the manufacture of paper, cheap soap and varnishes, in the manufacture of linoleum, in sealing wax, printing ink and as an officinal. Resin is also used in the manufacture of linoleum, varnishes, in painting enamels and in lacquer work.

Gum is also used for many of the purposes for which resin is employed. But although gum resembles resin in appearance and in origin it differs greatly from the latter in chemical properties. Resin differs considerably in chemical behaviour from gums. Resin is insoluble in water, while gum dissolves in water. Resin is soluble or at least partially

soluble in ether, alcohol and turpentine, but gums are insoluble in alcohol and in turpentine. Resin burns and melts under fire, while gums char.

Turning to the origin of resins and gums we find that they are solid or semi-solid substances obtained from the exudations of various trees. The only resin obtained from animal source is lac. Resin of vegetable origin differs greatly in chemical composition and utility. Its quality depends upon the kinds of trees from which it is obtained. Mr. R. S. Pearson, the Imperial Forest Economist at Dehra Dun divides resins into two classes:—

“(i) Pine-resins and (ii) Resins from broad-leaved species. The former are chiefly obtained from the Chir, *Pinus Longifolia*, the Kail, *Pinus Excelsa*, and the East Himalaya and Burma pine, *Pinus Khasya*, from which on distillation the resin yields rosin or colophony and turpentine. Resins from broad-leaved species are sometimes called “dammar,” though the truer dammar comes from a coniferous not found in India. They are obtained from such species as *Hopea Odorata*, *Shorea Robusta* (Sal), *Vateria Indica* (the Indian Copal tree).....and are used for varnish, chaulking boots and shoes, for burning as incense and in medicine.” (Commercial Guide to the Forest Economic Products of India, p. 136).

The number of trees from which resin is derived is enumerable. Besides resin obtained from the trunk of living trees, it is also obtained from the stump of dead trees known as “fossil resin.” Fossil resin produces more durable varnish than resins from living trees. So it is a more valuable commercial product.

Gum is also derived from the exudations of trees. The chemical composition of gum varies with the trees from which it is obtained. Gum is obtained from a large number of trees, and it has many valuable uses. The “Indian Gum Arabic” obtained from the babul tree (*Acacia arabica*) is an important commercial gum. It is used in calico-printing, in sizing paper, for fixing paint and white-wash, and as a mucilage. The “Gum Kino” is a dark red resin extensively collected and exported to Europe. It is a valuable astring-

ent and is used in India as an ointment in cases of horn-diseases of cattle. The "Bengal Kino" yields a red gum which is also used as an astringent. The Simul gum is used as a medicine, and the Semla as a mucilage and in sizing cloth and paper. Kathera or kath (*Acacia catechu*) is a sweet gum used largely with pan in India. The Mohin gum from *Odina Wodier* and Dhatura gum from *Anogeissus latifolia* are extensively collected and employed in sizing cloth, paper and as medicines. *Boswellia Serrata* gum or Gogul gum is burnt as incense.

Gums are obtained and obtainable from many other trees. Their commercial importance is indicated in the following statement:—

Gums and Resins

	EXPORT		IMPORT	
	Quantity in cwts.	Value in Rs.	Quantity in cwts	Value in Rs.
1915-16	23,850	5,01,000	112,735	162,080
1919-20	37,386	15,61,000	201,889	48,77,000
19. 6 27	50,975	14,27,219	...	---

CHAPTER 28.

THE LAC INDUSTRY.

1. Nature and Importance of Lac.

“Lac resin is one of the most important resins of commerce, and owes this position partly to properties (such as high resistance to the action of air and moisture, adhesiveness and high electrical resistance, which it shares with all resins, but chiefly to the fact that its ready solubility in alcohol and its low melting point render it easy of application” (Imperial Institute. Indian Trade Inquiry. Report On Lac, Turpentine and Resin, 1922, p. 17). India has a practical monopoly of this industry. Her contribution to the world's supply amounts to 95 per cent. Small quantities chiefly in the form of stick-lac are also exported from Siam and Indo-China to foreign countries.

Lac is a resinous substance secreted by certain insects living on trees. In its crude state known as crude lac it consists of resin (about 66 to 80 p. c.), a red colouring matter (6 to 10 p. c.), lac wax (4 to 6 p. c.), vegetable gluten (2 to 5 p. c.) and of some other impurities. Seed-lac of commerce is a substance having the form or shape of grains. It is produced by breaking up, sifting and washing crude lac. Round pieces of lac produced by melting seed lac are known as button lac of commerce.

Shellac is an important product of lac. It is obtained by melting and filtering the seed lac, and by washing away as much of the colouring matter as possible. The melted substance when consolidated into flakes is known as shellac. It still contains lac, resin, some colouring matter, wax and some impurities. When treated with caustic soda it is converted by hydrolysis into a liquid shellac. By mixing it with ordinary shellac one can obtain plastic masses of lac of any desired degree of softness. Shellac is used for making varnishes. But for finer grades of varnishes white shellac is employed. Bleached or white shellac is prepared

by chlorine bleaching process and also by other chemical processes:

Lac dye is the colouring matter contained in the crude lac. It is separated by means of flushing and washing the ground and sifted lac with water. Its commercial value has declined since the advent of aniline dyes in the market.

Lac resin is the resinous substance of lac. It is separated from the dry crushed lac by treating it with petroleum and other substance which remove the wax and the colouring matter. It is a powder of light brown colour. Lac wax, like lac dye, is a by-product of lac. It is separated from the dried crude lac or shellac by chemical processes. It is a harder and more resinous substance than bee's wax and possesses a pleasant aromatic odour. It is useful for making castings and taking impressions of coins. Forest Bulletin No. 7, p. 6).

2. Commercial method of Preparing Lac.

The method of manufacture employed in the production of commercial lac is unscientific. The "preparation of lac resin is essentially a small scale industry, carried on by single families. It is not surprising, therefore, that the methods pursued are laborious and antiquated, and that adulteration of resin is common. There are a few larger factories, controlled in some cases by British firms, and in these machinery has been installed; but even in these factories for the most part the primitive methods of the Indian worker are merely imitated and quickened by machinery, and have not been materially superseded." (Imperial Institute. Indian Trade Inquiry. Reports On Lac, Turpentine and Resins, p. 16). Perhaps, the method followed by the Lac Research Institute at Ranchi is up-to-date.

3. Chief Uses of Lac and Lac Substitutes.

Lac has multitudinous applications in industrial life. But it finds its chief applications in the preparation of paints and varnishes for the ornamentation of wooden and metallic articles, and in the manufacture of gramophone records. About half of the demand for lac arises from the gramophone manufactures. It is also used in the manufacture of bangles and toys. Its other uses include its application as a binding

agent for mica (micanate), and for articles of paper, as a lacquer for metal, as an electrical insulating agent, and in stiffening felt and straw hats and for crepe.

It should be noted that various chemical processes have been discovered in Europe to produce shellac substitutes. Artificial lac is already in the market. It is a synthetic product. There are conflicting opinions as to the value and importance of synthetic lac. Some maintain that it is superior to the natural article and producible at a much lower price, and that it is likely to ruin the natural industry, while others say that the synthetic product contains much shellac and that it takes a much longer time to manufacture records from the synthetic lac than from shellac, and that the advent of the artificial lac need not be seriously considered.

4. The Development of the Lac Industry.

It is a well-known fact that lac being a forest product its annual production fluctuates from year to year. Nevertheless, the development of the industry has been one of continued progress, as the statement below indicates.

Export of Lac (of all kinds)

Year	In Owts.
1865	72,542
1875	68,264
1885-86	154,100
1895-96	202,817
1905-6	274,455
1913-14	339,161
1919-20	375,706
1926-27	592,030

The export of lac in 1926-27 was valued at Rs. 5.47 crores.

CHAPTER 29.

THE RUBBER INDUSTRY.

Rubber known also as cautchouc or India-rubber was in use in various parts of America before it became known to the Europeans. In 1493 when Columbus was at Hayti he observed the children playing with rubber-balls which bounce better than the wind balls with which the Spanish children used to play in Spain. Rubber was subsequently introduced into Europe by the Spaniards. But the use of rubber did not become generally known till the first quarter of the 19th century. During the earlier part of the 19th century it was chiefly used as ink-eraser. The next important use to which rubber was put was in the manufacture of water-proof. But water-proofs made in those days were defective in more than one way. In the absence of the knowledge of the process of vulcanising the water-proofs made of rubber became sticky in summer and brittle in winter. Towards the middle of the 19th century the vulcanising process—that is, the process of hardening or solidifying rubber to the desired consistency by treating it with sulphur, was discovered in America, and the use of rubber became more general.

However, it was not until the advent of the motor car industry that the rubber industry assumed its modern dimensions. Prior to the motor industry the rubber industry was practically insignificant. Rubber is now one of the principal commercial products. In commercial importance it now vies with coal, iron or petrol. The demand for each of these products has concurrently increased with the demand for rubber. The motor car industry is an index to the development of the rubber industry. The automobile trade of the United States alone consumes 75 per cent. of the world's total production of rubber. Apart from its use in the automobile industry rubber is now employed in manufacture of cycle tires, perambulators, soles of shoes, electrical, surgical and medical apparatus.

The world's supply of rubber comes from Brazil, Malay Peninsula, Sumatra, Java, India, Ceylon, Burma and Africa. But the rubbers obtained from Malay, Sumatra, Java, Ceylon and Burma account for from 70 to 75 per cent. of the total acreage planted with rubber in the world's rubber growing countries. Most of this supply is controlled by British capital. India's contribution to the total world's supply is small, being only 2 per cent. of the world's total annual out-put, and Burma is the chief source of supply.

The number of trees which are capable of yielding rubber is enumerable, and most of these have at some time or other been growing naturally in many of the forests of the tropical countries: A number of rubber trees is indigenous to the Indian forests. The most important of these is the *Ficus elastica* found in Assam, Burma, in the Himalayan region and in S. India. Attempts have been made from time to time to cultivate rubber in S. India, Bengal, Assam and in Burma, and several exotic trees—Para, Ceara, Castilloa and others, have been introduced into the country. The Para rubber tree known as *Hevea brasiliensis* which used to grow wild in the Amazonian river valley of Brazil is considered now to be the best in quality. It has been introduced and cultivated in several parts of the rubber-growing world. In India the only region where it has been successfully grown is Burma.

The rubber obtained from the Indian trees is of inferior quality. The experiments carried on with the Para rubber in India proper have not yet met with any degree of success. The yield of rubber from the indigenous trees and from the exotic trees is lower than that obtained from any other rubber-growing country of Asia or America. The low yield is ascribed to the soil conditions of India (proper) and to the prevalence of diseases known as "leaf-fall" among the trees. The various attempts made to grow rubber on a commercial scale in Assam and in S. India have met only with partial success. The only place where the rubber industry has shown promise of success is Burma where Para rubber is grown. In Burma the yield is much greater and the quality is better than that obtained in India.

However, the Indian industry is growing steadily. In the table below is indicated the development of the crude

rubber industry. It may be noted that the bulk of the rubber about 90 p. c. grown in India is Para rubber. More than half of the total area is in S. India and the other half is in Burma mainly, although a small acreage is devoted to the cultivation of rubber in Assam and in Bengal. The major portion of the rubber grown in India is exported in raw condition to the United Kingdom and to the United States.

Statistics of Rubber Export.

	Quantity in cwts.	Value in Rs.
1905-6	5,582	12,82,125
1913-14	23,264	78,67,290
1919-20	112,491	1,6877,000
1926 27	205,408	2,60,14,317

Indian import consists mainly of manufactured rubber.

It is worthy of note that within comparatively recent times some three rubber manufacturing firms have been set up in Bombay, Calcutta (Tallygunj) and at Tatanagar. The one working at the last-named place under European management is doing fairly well, but the one started at Bombay to manufacture rubber tyres under Indian management is not doing well owing to foreign competition, especially American competition, want of technical knowledge and capital.

BOOK IV.

Development of Some of the Factors of Production.

CHAPTER 30.

AGRICULTURAL ORGANIZATION AND AGRICULTURAL DEVELOPMENT.

1. The Nature of the Agricultural Organisation.

Like manufacturing industry agriculture is also supposed to pass through many stages or phases of evolution or development. These stages may be divided into family farming, communal-village farming, feudal farming, market farming or commercial farming. Of course these divisions are more or less arbitrary, for one passes insensibly into the other. Now, under the family system agriculture used to be carried on mainly for the production of food crops for consumption by the family. In family or communal economy exchange of products was practically unknown.

In zemindary economy, however, the unit of a farm is also represented by a family, but production under this arrangement is carried on not only for the satisfaction of the cultivators themselves, but also for supplying the needs of the rest of the community not engaged in tilling. The systems of land tenures prevalent in India were in such a way arranged as to cause a regular distribution of crops among all the "servants" of the village organisation or feudal organisation. The practice of direct buying and selling was limited by this arrangement. Every one was assured of provisions from his land or from his property in land under the zamindari feudal regime. Under this arrangement little trade in agricultural produce was carried on with the out-side world. Feudal or village economy was self-sufficient.

The third stage of agricultural development is characterised by commercial farming or market farming. In this stage agriculture is carried on mainly for the sale of agricultural produce. Under this system the market covers a wider

area than the village, and the system involves a national and also international economy. The most important feature of this stage is that a clear-cut distinction is drawn between production and consumption, which appears, rather vaguely under the village economy or family economy.

However,, it is not always easy to draw a line of demarcation between a family farming, communal farming, feudal farming and commercial farming. They exist side by side in India even to-day. During the pre-British days agriculture under the old regime used to be carried on for the satisfaction of the needs of the local people. But since the development of commercial intercourse between India and Europe agriculture has been commercialised with practically little change in the land systems, in the land organisation and in tillage.

The passage of the self-sufficient family or village economy into the national economy and also into international economy started somewhere in the middle of the 19th century. The growing demands for agricultural produce by the peoples of Europe tended to extend tillage and foreign trade.. During the hundred years from the middle of the 18th century down to the middle of the 19th century the foreign trade of India consisted mainly in the exportation of textile fabrics, spices, pepper, saltpeter, indigo, tea, raw silk and some raw cotton. The inadequacy of inland transport facilities and heavy freight charges for transmarine commerce impeded the development of trade in the bulky raw materials and food grains. But after the introduction of railways and the opening of the Suez Canal (1869) during the second half of the 19th century the export trade in Indian agricultural produce assumed huge proportions and went on increasing by leaps and bounds year after year. The introduction of cheap, rapid and improved means of communication and the establishment of commercial intercourse with Europe under the British rule brought about great changes in the agricultural development of the country.

2. Efforts at Agricultural Development.

Besides improved means of transport many other things combined to bring the new agricultural system into

existence. Since the days of the East India Company various efforts were made by the company to develop sericulture, the cultivation of tea, indigo, hemp, cotton, tobacco, wheat, rice and other crops. The company advanced capital to farmers, offered prizes or rewards to intelligent persons for growing special crops. During the second half of the 19th century a number of model farms and experimental stations were established for the propagation of technical knowledge and experience acquired by these institutions among the agriculturists.

By the close of the 19th century every large province of India had a department of agriculture. "In every large province of India an Agricultural Department has been organised which is charged with the duty of supervising the maintenance of village records of land tenures, rent, produce, and land transfers and with the work of organising and directing state undertakings for the furtherance of agriculture, and for the improvement of stock. The Agricultural Department also kept the public and the Government informed concerning the condition and out-turns of the crops, the range of prices, and the approach of dearth or famine in any particular tract." (Statement of the Moral and Material Progress of India, 1894-95, p. 90).

At present, that is, in 1926-27, there are 197 agricultural stations organised for the promotion of agriculture. Some of these institutions have agricultural schools and colleges intended for the theoretical and practical training of the students of agriculture. The total number of agricultural schools and colleges are 8, of which 7 are governmental and the 8th is conducted by Mr. Higgin Bottom, the head of an American Missionary Society (Allahabad).

The work of the Agricultural Department covers a wide field. It consists mainly in developing improved crops, in improving methods of agriculture, in demonstrating these to the cultivator for his adoption; and in finding out means for fighting the insect pests. Fairs and exhibitions of agricultural produce, manures and agricultural machineries are often held under the direction of the Department of Agriculture for the demonstration and education of the cultivators.

“There are three methods of obtaining articles superior to those ordinarily grown either in respect of yield, quality or suitability to special condition of environment. These are selection, hybridization and acclimatisation.” (The Report Of the Royal Commission On Agriculture in India, 1928). As a result of the researches and experiments carried on by the agricultural stations new and exotic varieties of crops and vegetables (cotton, silk-worms, tobacco, hemp, flax, wheat, rice, oil-seeds, tea, coffee, rubber, &c.) have been acclimatised to the conditions of India, and hybrids have been evolved by the crossing of the indigenous and the foreign varieties. By the introduction of cheap fertilisers the productive power of the land has in many cases been increased, while the selection and distribution of improved varieties of seeds of cotton, rice, wheat, jute, sugar-cane &c., have in some cases greatly increased the yield per-acre. In addition to this, extensive irrigation work carried on by the Government has immensely increased the area under tillage and improved the out-turn of crops.

Signs of progress are, thus, visible in almost all directions of Indian agriculture, and the Indian cultivator is improving his methods. Dr. Clouston in his Review of Agricultural Operations in India 1926-27, observes: “The increased value resulting from the introduction of the improved varieties of all kinds of crops is reckoned to be in the neighbourhood of 10½ crores of rupees or about ten times the net expenditure on all activities of the Imperial and Provincial Departments.” However, the progress so far made indicates only a promising beginning. The opinion of the Royal Commission On Agriculture in India on this point deserves attention:

“It may be said that the main success of the agricultural departments has been in the direction of the introduction of improved varieties of crops and in this branch of its work it has been eagerly assisted by the cultivator. It is estimated that nearly 9,000,000 acres are under improved varieties of different crops. It is true that this only represents a small fraction of the total area under these crops, but even so, it can be claimed that a substantial beginning has been made. The crops in which the greatest advance has been made are cotton, wheat, rice, groundnut, and jute.

but there is still very great scope for further work, especially in regard to millets, pulses and oil-seeds."

It is worthy of note that 8.8 million acres sown under improved crops represent only 3.5 per cent. of the total sown area which is about 260 million acres.

Returning to the main subject under discussion we notice that the activity of the departments of agriculture has not been confined only to research, education and to crop improvement only but extended to other work of great economic value to farming in general. "But crop improvement" says Dr. Clouston, "is but one of the many lines of work to which our departments of agriculture are giving attention. The introduction of improved agricultural improvements and cattle, of effecting methods of checking crop pests and diseases, and of more intensive methods of cultivation generally, is each adding directly its quota to the increased profits reaped by the cultivator."

However, agriculture has not received as much encouragement from the Government as it ought to have done. In the opinion of the same writer, Dr. Clouston, the amount of money expended yearly on agriculture is quite inadequate for a vast country like India. Dr. Clouston observes:

"Out of a revenue of nearly 90 crores of rupees the Provincial Governments are spending a little more than 1 per cent. on the development of India's basic industry, while the net expenditure borne by the Central Government is only 0.07 per cent. of the total revenue."

"In the United States of America where only 30 per cent. of the population is engaged on the land as against over 70 per cent. in British India, the amount spent on its agricultural department works out to 6 annas per acre of land under cultivation or approximately 8 times as much as India spends per acre.....It would appear that in America the Federal and the States Departments are spending about 11 times as much on the development of agriculture as is being spent by the Imperial and Provincial Departments of Agriculture in this country.....In Japan—a comparatively small country with a population of only 59 millions the total expenditure budgeted for 1927-28 is 49½

million yens which is about five times the gross expenditure incurred by all agricultural departments in India last year."

The problems concerning the improvement of agriculture have been closely studied by the Royal Commission On Agriculture. It is needless to reiterate the problems which have been discussed elsewhere. We may however, sum up here the chief recommendations of the Royal commission On Agriculture. These recommendations mainly deal with

- (1) The Establishment of an Imperial Council of Agricultural Research with a fund of Rs. 50 lakhs.
- (2) Organisation of Land Mortgage Banks with the assistance of Government in the form of guarantee on the interest on the debentures for the Extension and Improvement of Co-operative Organisation.
- (3) Consolidations of agricultural holdings and intensification or diversification of agriculture.
- (4) Evolution of a number of tools and machinery suitable to the Indian condition of agriculture. and,
- (5) Introduction of compulsory primary education among both men and women—the education or the literacy of women being considered indispensable.

3. Influence of Social Institutions upon Agriculture.

Before we close this chapter it seems necessary to make a brief reference to the influence of social customs upon agriculture in India. It is a note-worthy fact that agriculture has received no genuine encouragement from the landlords or from the higher classes or castes in general except in verbal criticism. The Indian bourgeoisie has quite an aversion for agricultural pursuits. The agricultural industry, like the weaving and spinning, pottery and smelting, tanning and shoe-making, still remains an occupation of the lower classes. Under the influence of the western scientific education introduced into the industrial life of India, many of the Indian industries (just mentioned) have lost their low "caste-status," and have become honourable trades.

Many a trade formerly regarded as ignoble has now become not only noble but nobler. A trade carried on in a native method is ignoble and contemptible but when carried on in an improved western way it becomes noble and is at once ranked among the "high caste." Thus, hand tanning or the village blacksmith's trade is a low caste occupation, but the trade of a mechanic or of an engineer is an honourable trade. The "caste" of the plantations industries,—tea, coffee, rubber has risen above the ordinary level of the caste attached to the agricultural trades of the peasants. The reason for this is not far to seek. Agriculture or farming or tilling the soil is looked down with contempt by the snobbish bourgeoisie who believes that it is the occupation of the vulgar. Honour and family tradition demands that we, "the enlightened" should live a life of leisure, while the peasants and serfs produce wealth for our spiritual luxury.

One of the fundamental reasons for agricultural progress in England and in America has been, perhaps, the co-operation and co-laboration of the tillers and nobles in agricultural work. Education is, of course, an essential requisite for agricultural progress, but no matter how widely elementary education is diffused among the unreflective peasants of India, no great advancement in agriculture can be achieved without the co-operation of the intelligent and educated classes. It is much easier for the intelligent classes to understand and to apply the improved methods to tillage than it would be for the peasants to do. Regarding the knowledge required for scientific farming Professor Carver says:

"Closely associated with the use of efficient tools and implements is the possession by the farmer himself of thorough scientific knowledge of agriculture. To be thoroughly equipped, scientific farming probably requires a higher education.....Such a farmer must obviously know something of botany, zoology, chemistry, physics and survey, and some specific and difficult branches of these sciences he must know extremely well". (T. N. Carver: Principles Of Rural Economics, pp. 199-200).

It will not, perhaps, be out of place to introduce here my own experience of farm life in America. On the Pacific

Coast of America there are about 2600 Indian (mostly Punjabis) labourers, mostly engaged in agriculture and in Lumber Factories. Experience showed that the method of agriculture to which these Indians were used to in India were not suitable to the American conditions. Yet the Punjabis, who have practically no education except a few lines of Urdu or Gurumukhi only, have come out successful farmers in the States. The reason for this is that they simply imitate the method followed by the American agriculturists who are as literate as the Punjabis themselves.

CHAPTER 31.

LAND ORGANISATION.

1. The Nature of the Indian Land Systems.

In India land is not only the fundamental means of support for the majority of the people, but it is also the principal source of wealth and acquisitiveness. The princes, the nawabs, the titular rajas and zamindars or landlords derive their income chiefly from land rents. Likewise, the bulk of the people being cultivators draw their livelihood from the produce of the soil.

The systems of land-holding in India are complex and they form by themselves a vast field for independent study. It is not, however, essential for our purpose to enter into the numerous details of the land tenures. There are three main classifications of lands based upon the ownership of property, namely, (1) the landlord estates, (2) the village estates, and (3) the raywatary lands.

The land-lord estates refer to the lands held by landlords or revenue-farmers or tributary chiefs. The term 'zamindar' (lit. land-holder) stands for a class of land-lords. It has been variously applied to different classes and types of land-lords. The rajas or chiefs paying tributes are called zamindars. The great Rajput chiefs are known as zamindars. The Bengal zamindars, the Oudh talukdars, the Madras landlords, the Suberakars of Orissa (though not designated as zamindars), are all revenue farmers. Until recently the tributary zamindars and the revenue-farmers exercised almost absolute control, like the mediaeval feudal chief, over the under-holders. The degree of actual power which they exercised over their subjects with regard to revenue and administration varied with the wealth, respectability, and influence of each chief. (Land Systems of British India By B. H. Baden Powell, Vol. I, p. 507).

Although the territorial and administrative power of the landlords has been abolished by the British Government the

old tradition of raja-proja (king-and-subject) relation between the landlords and the tenants still persists. The zamindari regime is more or less feudal or semi-feudal in character.

Another peculiar characteristic of the landlord estates is that they are divided into a hierarchical system of land rights possessed by a number of individuals in the same lands. At the top of the system stands the landlord. Below him there may be a number of sub-land-lords or, sub-tenure holders followed by numerous tenants. The extreme sub-ifeudation of land rights is especially true of Bengal, but it exists in all other parts of India where the landlord system or the revenue farming system prevails. The proprietary rights of the zamindars are hereditary, alienable and transferable by sale, mortgage and by bequest. But their ownership is by no means unlimited and absolute. All the subordinate holders down to the ryots have the same security of tenures against the upper-holders which the landlords have against the government.

In the hierarchical system the landlord owns the superior property right, the sub-landlord, the intermediate property right, and the tenant, the tenant's rights. It is needless to say that the bulk of the cultivators are tenants. The cultivation of the land is generally done by the tenants or by ryots. The rest of the party are what Alfred Marshall calls "sleeping partners," enjoying the fruits of the soil by reasons of their legal and customary rights. The land-lord system involves a most inequitable distribution not only of land-values but of other social values as well, which often accompany the feudal or semi-feudal land regime. Neither is the faculty theory of distribution nor is the labour or the productivity theory of distribution, nor the need theory of distribution, applicable to the superior proprietary rights of the landlords and even of the sub-landlords.

The important features of the Village Estates are "that there is an individual, or a family (or a group of ancestrally connected families), which has the claim to be superior to other cultivating land-holders and in fact to be the owner or landlord of the entire area within the ring-fence of the village boundary. And the proprietary body may consist of twenty or fifty or more co-sharers, usually of common

descent. The landlord village may or may not contain a subordinate tenant body. Sometimes the co-sharers themselves cultivate estates." (Baden Powell: Land Revenue in British India, pp. 71, 73).

The Rywatary lands are held directly by the Government and let out on long leases to the cultivators. The essential features of this system are that the land-holder, may always, "by giving a notice at a proper time, relinquish any field or a definite part of his holding, and thus, escape the revenue liability." But it must not be supposed that this is analogous to an annual lease, for the Government cannot terminate the ryot's holdings for any cause whatever except failure to pay the rent. The holding is inheritable and transferable.

The subject matter of land rents is extremely complex. There are two systems of laws in force with regard to the rent settlement. They are the temporary settlement laws and the permanent settlement laws. The former are applicable to all lands of India except those lands of Bengal and Madras Presidency, Behar and Orissa, Assam, the U. P. and Ajmere-Marwar, which are subject to the permanent settlement laws. Under the temporary settlement laws the rents of lands are liable to periodic reassessment, while the land-rents under the permanent settlement laws are fixed in perpetuity.

It is difficult, within the limit of this sketch, to give a complete description of the rents and land settlement. For fuller details reference may be made to the settlement reports. To mention another point as having a bearing upon the economic and social life of the people may not be irrelevant. It will be evident from what has been stated above that the land systems of India are characterised by uniqueness and differences rather than by generalness or commonness and uniformity. The various types and grades of land rights involved in the sub-infeudations of lands and the local and historical differences exhibited by land-tenures indicate the absence of typicality or universality. So complicated and ununiform are the land-tenures that it is practically impossible for a man to have a complete knowledge of the land tenures of Bengal only.

The fundamental characteristics of property in land are inheritance, transferability by sale or mortgage, and unlimited ownership. The first principle is well-established in India where everything tends to be hereditary. But the complicated systems of land tenures and the backward social and industrial conditions of the people, salami and nazar restrict the freedom of contract by sale. The third characteristic, unlimited individual ownership is practically absent from the Indian land systems. Indian land systems lack that universality, uniformity or equality of property which constitutes an important part of free individuality. Under the Indian land regime, especially under the landlord regime, individuality is defined not in terms of rights but in terms of status. The bulk of the cultivators have a semi-serf like position which restrict the growth of free individuality.

2. The Effects of Land Tenure upon Agriculture.

Although it is difficult to say what sort of land tenure existing in the modern European and American worlds is the most favourable to the advancement of agriculture, it is a well-known fact that efficient agriculture is not compatible with zamindari or rayotwary land regime. It has often been stated that the attempts to convert the Bengal zamindars into English landlords have proved a total failure. In India "zamindari" has never been agricultural in character but territorial in character, and although the semi-feudal, or the semi-sovereign power of the landlords has been abolished by the British Government Zamindari still remains non-agricultural in character and preserves most of its old (feudal) relics. It is none the business of the landlord to look after agriculture which is the trade of the "subjects". Under such circumstances agriculture has been left to the ignorant cultivators who continued the "time-immemorial" method of cultivation. Consequently agriculture underwent very little change towards advancement till very recent times."

The English systems of land tenures and the method of agriculture are in sharp contrast with the Indian methods, because of the agrarian and agricultural revolutions which had taken place in the British system of land tenure and in the methods of agriculture and of their absence in the Indian

systems. It is not possible within this brief compass to go into the details of the agricultural transformation which had taken place in England. But the modern development of British agriculture is traceable to the Agrarian Revolution and the Emancipation of the serfs, the measures adopted by Elizabeth towards agricultural improvement, and to the Agricultural Revolution of the 18th century: During these periods the systems of land tenures and the methods of agriculture underwent a radical change which built the basis of the modern English agriculture. The pioneers of the new methods of English agriculture were men like Mr. Coke or Lord Townsend, Lord Lowell, and especially Young Arthur. The success of English agriculture was the results of the efforts of the English landlords. Agriculture was carried on during this period by all classes of people, high born or low born. But in India agriculture is looked down upon by the landlords.

The systems of land tenures have undergone a radical transformation since the disappearance of feudalism from Europe. This transformation has proven once and for all that serfdom is not promotive of agricultural progress. However, the history of English agriculture shows that agriculture carried on under a system of tenancy is superior to that carried on under a system of individual ownership. The reason for this is that land is dear in England owing to the social prestige attached to the country lands or country estates. The experience in the United States, on the other hand, proves that ownership, as a rule, is the best adapted to progressive agriculture, although the tenancy system is spreading also in that country. The success of American agriculture is due not so much to the ownership of land as to the fecundity of the virgin soil and the application of machinery to agriculture. But the most efficient agriculture is carried on under the tenancy system and under a system of peasant proprietorship in some of the continental countries of Europe.

Ownership or fixity of tenure by itself cannot, therefore be regarded as a sufficient cause for agricultural advancement. It is the application of the improved methods of agriculture which count a great deal. The chief reasons which account for the progression of agriculture in Europe are the

spread of agricultural education among the farmers, development of agricultural co-operation and of the efficient methods of marketing, as well as of the application of chemistry and better methods of agriculture. However, in spite of the excellent agricultural methods prevalent in many of the European countries, the economic conditions of the European farmers are not a whit better than those of the farmers of the United States and of Canada. The continental farmers are generally in debt. Their per capita income and their standard of living are much below those of the American farmers. The reason for this is the comparative cheapness of land in America. But land is cheap also in India and in many other Asiatic countries, yet the conditions of the farmers are no better than those of the English or of the Americans.

The economic conditions of the farmer depend as much upon the improved method of agriculture and tenancy as upon the abundance of lands or upon the size of the holdings. The size of the holding is an important factor both for production and distribution of land values. Good farming, though not the very best farming, often goes with large farms because of the large-scale economies derivable from the application of machinery and artificial manures, etc. The law of increasing returns and diminishing cost applies to agriculture as they do to industries in general, although the limit of profitable application of increasing doses of capital and labour is reached earlier in agriculture than in manufactures. The one acre plot is less profitable than, say, the 25 acre plot, evidently because of the advantages of the large-scale economies. It will not pay to employ a tractor or an improved plough or a horse, and other improved implements and stocks for tilling an one acre plot. They will cost more than the land will yield. They are applicable with profits to comparatively large farms.

It is not easy to indicate the size of a profitable or economic farm, because the size of the farm varies with (1) the kinds of crops raised, (2) the kind of capital and labour employed, and (3) the standard of living of the cultivators. It may, however, be suggested that the size of the farm should be such as to occupy the labour of the whole family plus that of a few hired hands, and the produce of the soil must not only be sufficient for the maintenance of the whole

family for the year but should also leave a considerable surplus for the 'rainy' days. The size of such a farm cannot be less than 10 acres for growing food grains in India.

Turning now to India we notice that land in this country is divided into tiny plots, the size of which varies from one to eight acres. The income derived from the tiny plots cultivated with primitive implements is hardly enough to support a family. Moreover the subdivision of land after the death of the owner keeps on reducing the size of the holding from generation to generation with depressing effects upon the condition of the agriculturists. The following excerpts selected from the Report Of the Royal Commission On Agriculture In India, relating to the sub-division and fragmentation of holdings and the possibility of their consolidation under co-operative arrangement—deserve attention:

“A serious obstacle to agricultural improvement is, in some provinces, caused by the sub-division and fragmentation of holdings. Sub-division is chiefly due to the laws of inheritance customary among the Hindus and Mahomedans which enjoins a succession to immovable property among all the heirs usually in equal shares. Fragmentation is, in the main, due not to the laws of inheritance but to the method by which the law as to the division of property among the heirs is carried into effect. The problem is being attacked by the co-operative movement in the Punjab, where some striking results have been achieved, and by legislation in Central Provinces. The latter is also proposed in Bombay.”

“Where the soil is of uniform quality or where the differences are not great, fragmentation is an evil of the first magnitude.”

“The only measure that appears to promise relief from the evils arising from fragmentation of the right-holders' holdings is the process known as consolidation of holdings.

“Some very striking results have been achieved on these lines in the Punjab through the agency of the Co-operative Department.

“The work being done in the Punjab should not be regarded as unsuited for the adoption elsewhere without very careful and persistent energy into the local difficulties.”

It is difficult to see how the principle of consolidation which has proved successful in the Punjab could be successfully applied to the zamindari land systems of Bengal, for example. In the Punjab and in the North-Western Provinces the land organisation is based upon co-operative or communal principles, whereas the zamindari regime is semi-feudalistic and individualistic. Moreover, the recommendation does not touch upon the real problem at issue. The consolidation of holdings by co-operative arrangement suggested is only a palliative and not a remedy for the solution of the problems of the agriculturists. Consolidation, even if it turns out successful, cannot increase the per capita holding of the tiller, and therefore, it cannot cause any substantial change in his economic conditions. A substantial increase in the income of the family can be effected by an increase in the per capita holding and by the application of the improved methods of agriculture.

CHAPTER 32.

THE DEVELOPMENT OF CO-OPERATION IN INDIA.

1. Co-operation, New and Old.

"From the commencement of human society co-operation has been common in the sense of two or more persons uniting to attain an end which each was unable to effect singly. As society grew, crowds were coerced into acting together by king or chief, who took the profit". (G.J. Holyoake: History of co-operation, p. 4).

The real spirit of co-operation is not, however, force or coercion but mutual consent. The idea of equality and independence lies at the root of true co-operation, and co-operation means association of persons formed by mutual consent for the attainment of some common benefit. Co-operation in the sense of collective action of a group of persons for common good existed in ancient and mediaval times. Thus, Mr. Nasses has shown," says, Mrs. Catherine Webb, "that there existed agricultural communities in Europe in the middle ages, and that there was a co-operative use of land in England which it would be deemed improper to propose now. It is now that Greek sailors in the Levant, American sailors engaged in the whole fisheries and China trade, the Chinese traders in Manila, the Cornwall lead miners of Flintshire and Cumberland, have long been either equal or partial participators in profits."

Common interests as the basis of Co-operation also existed in ancient India and still exist in those villages of Northern India where land is held in common by the villagers. Regarding the communal holdings of land in ancient India the late professor Rhys Davids said: As a general rule the great field was divided into plots corresponding in number to that of the heads of the houses in the villages; each

* Reference may be made to the excellent work "Co-operative Movement in India" by Prof. Panchan Das Mukherji.

family took the produce of its share. But there was no such proprietary rights as against the community, as we are accustomed to in England" (Rhys Davids: *The Buddhist India*, p. 46).

The Hindu caste guilds were co-operative in principle. Even the term "caste" implies and involves in a very narrow and restricted sense community of interest. But the term 'caste community' is a narrow and exclusive group. The term 'caste' is vague and meaningless, for none of the existing castes may be said to be based upon common interests. Each caste is sub-divided into so many sub-castes that they are in fact mutually exclusive to one another, and 'caste' practically comes to mean a few families interrelated by marriage ties. Caste system is based not so much upon common interests as upon conflicts of interests. It involves a disintegrating force rather than a co-operative basis. It is individualistic rather than social, for the ultimate basis of the caste individual is karma, a personal force.

Modern co-operation has somewhat different meaning and significance. It involves a national economy rather than a self-sufficient village economy or family economy. The new co-operative movement of Europe has arisen as a result of the new competitive industrial system brought into existence by the Industrial Revolution in Europe. In its successive stages of development modern co-operation has come to stand for co-operation in production, co-operation in distribution, co-operation in exchange or marketing of commodities, co-operation in consumption or consumers' co-operation. The fundamental object of them all is the appropriation by the members of a group of the whole profits resulting from such collective action by the elimination of some middlemen — capitalist, shop-keeper, money-lender, agent or broker or jobber, who, taking advantage of the absence of organisation among the several competing units, is enabled to make an "unearned" income or profit.

Co-operation of the type described above, never existed in India. There are various reasons which account for the absence of co-operative spirit among the Indians. The individualistic and anti-ethical philosophy of the Hindus, and the social institutions based upon caste and feudalism are among the chief causes. Village economy and feudal

polity are not compatible with co-operation. The one-village-one-caste economy is the antithesis of co-operation. Co-operation implies mutual association, which in turn means equality, independence and individual liberty, while feudalism and castism stands for servitude and despotism.

In Europe the co-operative movement is an off-shoot of the industrial and political transformation which underwent during the 18th and 19th centuries. During this period the political life of England changed from feudalism to limited monarchy, and this latter to democracy, and finally the growth of democracy brought in its trail many changes which generated the ideals of socialism and communism. With the transformation of political and economic life the old conceptions of status were displaced by the modern conceptions of rights and responsibility and equality. Modern organised life involves social conscience and social will, and it stands for common enterprise and common good instead of one Man's right of the feudal regime. Now, co-operation is indispensably bound up with this whole movement.

Now, in India the State never developed from plurality of rajas or feudal chiefs to one legal State. The relation between the king and the feudal chiefs was that of sovereign and subjects. The feudal chiefs were really the 'people' of the king, and, the people the "creatures" of the chiefs. The people had no voice in the government, taxation or in legislation which had been revealed once for all by the hypersensuous "seers of truths" since time immemorial. Nor did the people enslaved by religio-social customs care for self-government. They were used to, and content with, from time immemorial, despotic rule. Consequently social conscience, social will, common enterprise, and common responsibility never developed. To put the same thing in another way. The modern ideas of equality, rights and responsibility never developed in the political, social and economic life of the people. Consequently co-operation which involves the motives for individual rights, as well as community's rights, community of interests and common good, did not evolve.

The modern development of co-operation in India has come as a result of the introduction of the British or Euro-

pean political and industrial systems. It is not a natural growth from, nor a descendant of, the indigenous institutions. And because the existing co-operative institutions are exotic they do not seem to be moved and guided by the same co-operative spirit as they do in the occident.

2. Poverty and Indebtedness of the Cultivators.

To reiterate, the term "co-operation in an economic sense means collective action of a group of persons" for the attainment of some common end. The links which bind the members together are common interests. Common interests or things and ideas in which a number of persons are interested involve both self-interests and community interests. They are, therefore, the basis of mutual faith and co-operation and collective action involving common good as well as individual good.

All co-operative organisations are based upon the same general principles and have practically the same end in view, although they differ greatly in detail. The object of co-operative credit societies in which we are mainly interested here is to provide cheap capital to its members. This is achieved by the accumulation of the little savings of the members and investing them for productive purposes. Capital is the result of abstinence and savings, and savings results from thrift. But the development of capital depends upon credit or faith, thrift, and upon investment of a part of the savings at least in tools and implements or in other things for productive purposes.

In India until very recently and to a considerable extent even now, thrift and savings were practically unknown. Whatever savings were made by thrift were either buried under-ground or were invested in ornaments. Both these practices still prevail over the whole of India. Capital in the true sense of the term did hardly exist, for capital implies a flow, or a flux of tangible and intangible economic goods or instruments of production employed for productive purposes. What actually existed in India was savings made by individuals for the "rainy" days or dormant or potential consumption capital, and not productive capital. However, India is believed to be an immense store of potential capital. The transformation of potential capital into moving or flow-

ing and productive capital arises from the circulation and investment of money capital in productive processes.

The great hinderances to the transformation of potential capital or savings into actual or productive capital are held to be (1) insecurity of life, (2) want of forethought, and (3) want of education. The first hinderance, 'insecurity of life' practically vanished since the establishment of the British rule in India. Invasion, plunder and hereditary brigandage may now be considered to be things of the past. It cannot, therefore, be reasonably contended that insecurity of life is the principal impediment to the formation and organisation of capital in India. The real cause is the absence of forethought, ignorance, absence of mutual faith, and the prevalence of individualism and fatalism among the bulk of the people. The existing poverty and indebtedness among the bulk of the peasants must be sought in the actual social institutions of the Hindus.

Over 73 per cent., representing over 231 millions of souls, of the total population of India, depend mainly for living upon agriculture. And the majority of the agriculturists are poor peasants living from hand to mouth. Their individual family income derived from their petty holdings is barely enough for a family. This poverty or miserable condition is further intensified by the absence of forethought, thrift and unproductive expenditure made by borrowing money at usurious rates, from the usurers. Instead of accumulating savings by thrift and using them for productive purposes, money is freely borrowed at extortionate rates from the money-lenders for performing marriage, funeral and other rites enjoined by religious injunctions. "The annual drain for interest makes heavy inroad" says Mr. Ewbank, "on the cultivator's profits and this seems to be steadily increasing. In many cases the interest charges amount to a crushing burden, and as the money lender is too often the shop-keeper, and the purchaser of the produce, the borrower becomes hopelessly entangled in the vicious system of shop credit" (Indian Co-operative Studies, 1920, p. 34).

Both social and economic causes lie at the root of poverty and indebtedness of the cultivator. Poverty generates in-

debtedness, and indebtedness poverty. And poverty merges into famine and scarcity owing to the natural causes like bad rains and floods inflicting an immense amount of distress and suffering to the people. This state of things led the Government and European philanthropists to devise some means for improving the economic conditions of the agriculturists of India. It was believed by these leading thinkers that the condition of the peasants might be improved by the introduction into India of co-operative credit societies which proved so successful in the Continental countries of Europe. Mr. F. A. Nicholson who made a special study of the development of the co-operative movement in Europe and of the possibility of applying these principles to the Indian conditions published his report in 1895-6 in which he suggested the organisation of co-operative societies in India for improving rural credit.

Although a few societies were formed under the old company law in the United Provinces and the Punjab no serious efforts were, however, made in this direction until the visitation of some terrible famines towards the beginning of this new century, which awakened the Government of Lord Curzon to the seriousness of the problem. A Committee under Sir Edward Law was, therefore, appointed by the Government to investigate the matter. The Report of the Committee recommended the institution of Co-operative Credit Societies in India.

3. The Development of Co-operative Societies in India.

In accordance with the recommendation of the Sir Edward Law's Committee an Act known as the Co-operative Credit Societies Act, "to encourage thrift, self-help and co-operation among the agriculturists, artisans and persons of limited means—" was passed in 1904. The Act permitted the formation of rural and urban Co-operative Societies by a group of ten or more persons living in the same village or town and belonging to the same class or caste, subject to the sanction of the Registrar, Co-operative Credit Societies. A clear-cut distinction was drawn by this act between the rural and urban Societies. The liability of a member of a rural society was fixed to be unlimited, while that of a member of an urban society was to be limited. The profits of a rural society were not to be distributed among members

as dividends, but to be carried to a reserve fund. A bonus, however, might be paid to the members after the reserve fund requirements have been fulfilled. In the case of an urban society one-fourth of the profits had to be carried to the reserve fund, and the surplus had to be divided as dividends among members.

For the promotion of co-operation among the agricultural classes of India certain concessions were granted by the Government. These concessions consisted of exemption from income tax, stamp tax and registration fees, and free auditing of the accounts of the registered societies. Advances were also made by the Government in the form of loans to the support of the Co-operative Societies. The practice of advancing loans by government to the Co-operative Societies has, however, practically ceased in recent years.

Now, the bulk of the capital of the society was derived from three sources: (1) deposits from the richer members of the society, (2) loans from non-members, i.e. from friends and sympathisers, and (3) loans from other co-operative societies. Out of the fund thus created by the joint credit of the members of the society loans are made, at moderate interests, to members only. Loans are also made to other societies under special permission of the Registrar.

The practical effect of the passage of the Act of 1904 was a rapid development of Co-operative Societies throughout the country. However, the speedy development of the new idea brought new problems, and the Act of 1904 was found to be inadequate and even defective in certain points. The Act made no provision for the creation nor for the protection of the non-credit societies and central societies which were already in existence. To meet the new needs, the new Co-operative Societies Act was passed in 1912.

The new Act which is still in force permitted the formation of non-credit societies, unions, central agencies and central banks on the basis of limited liability; removed the arbitrary distinction between rural and urban societies, and made several other changes regarding the efficient management and control of the societies. The state aids and concessions provided by the Act of 1904, viz., free auditing of account and exemption from income tax, stamp duties and registration fees, were reaffirmed by the new Act.

The effect of the passage of this Act on Co-operative movement in India was marvellous. It led to an extraordinary development of Co-operative Credit Societies both agricultural and non-agricultural. It will not be out of place to give a brief description of some of these societies.

(1) Agricultural Societies. The term 'agricultural societies, embrace a number of societies which are directly or indirectly connected with the development of agriculture. The fundamental idea involved in the pure agricultural societies known also as the primary societies is to create credit or capital by the joint credit and joint responsibility of a society formed of a number of cultivators. The idea of borrowing, that is, creating capital, by the joint action of an association and, then, loaning it out to its members was, first, conceived and developed in Germany, and the association came to be known as "Raiffeisen" after the name of its originator. The principles of Raiffeisen and Schulze-Delitzsche originated in Germany were introduced into India. The Schulze-Delitzsche principle was generally applied to non-agricultural societies of unlimited liability both in Europe and in India. In India the majority of the agricultural societies are based upon the Raiffeisen principle of unlimited liability. According to this arrangement the members are jointly and severally responsible for any default on the part of a borrower. But in Europe loans made by the Raiffeisen societies are to be employed for productive purposes only, while in India loans are also made by such societies for unproductive purposes. However, loans obtained by a member are generally employed for productive purposes, namely, for the payment of old debts, for the purchase of seeds, tools and implements, manures and other agricultural requisites.

Recently independent societies have also been established for the co-operative purchase and sale of seeds, manures, tools and agricultural implements. Moreover, there is a number of societies which are agricultural in nature or are allied to agriculture has also been formed for the advancement of agriculture. Among these the following are worthy of note—societies formed on the co-operative principle for irrigation and for reclamation; the co-operative agricultural associations started to run model farms; the

co-operative societies established for sinking and repairing wells, and for clearing silts; 'dharamangolas' or grain societies which receive deposits of grains and hold in stock paddies and other grains as insurance against famines or other emergencies, and make loans of grains to members.

(2) Urban Societies. The object of the urban societies is to encourage thrift, economy and savings among the small artisans, landless labourers, salary-receivers and wage-earners living in towns. The urban societies generally based upon the Schulze-Delitzsche system of unlimited liability are generally divided into three classes, viz., (1) the people's banks or middle-class banks, (2) the employees' banks and, (3) the communal or caste societies.

The peoples' banks are banks made up of members who belong to the middle class of the community. They make advances to their own members as well as to rural societies and also to other urban societies. Many of these institutions, especially the larger ones resemble joint-stock banks, and are not run on strictly co-operative principles. The employees's societies may be sub-divided into three sub-groups or classes:

- (i) Society composed of Government employees of a particular locality;
 - (ii) Societies made up of quasi-government employees, e. g. Railways;
 - (iii) Societies composed of workers of a private office.
- (Vide the article on Urban Societies by Professor J. C. Coyajee in the Indian Co-operative Studies edited by R. B. Ewbank, p. 100).

The main purpose of these banks is to encourage thrift among the workers and employees. The communal or caste societies are based on the principle of communal or caste bonds. The typical examples of these societies are those associations formed of scavengers or of depressed classes or depressed castes in the Madras Presidency. The main object of these associations is to save the poor people from the clutches of the money-lenders by redeeming their debts to the usurers.

Urban societies, have so far made very little progress as compared with the rural credit societies. The needs for and the benefits of, the urban societies as summed up by Professor Coyaji are worth quoting:

“But, perhaps, no other country stands in such great needs of urban banks as India. The slow and halting ground of joint-stock banking in India has left large areas of the country vacant in which urban banks can introduce financial facilities.....The recent Indian Industrial Commission has shown that outside the presidency towns, Indian capital is unorganised, and that the smaller business men and industrialists find very great difficulties in obtaining financial facilities. Urban banks can serve an important purpose in organising capital in our cities.....There are many small scale industries which India yet possesses but which may be without the initial help which urban banks might afford... Finally the great problems of bringing out and of utilising hoarded wealth, of reducing the wasteful use of metallic money, and accustoming the people in India to the use of metallic money, and accustoming the people in India to the credit notes” (Vide pp. 93-94).

(3) Miscellaneous Societies—Agricultural and Non-agricultural.

There has recently come into existence a number of urban and rural societies organised by artisans and small industrialists and business men for the purpose of co-operative production, purchase and sale. Co-operative societies of hand-loom weavers, manufacturers of brass-wares, carpenters, dyers, potters, blacksmiths and other pliers of cottage industries may be cited as examples of industrial co-operation. The Royal Commission On Agriculture (1928) recommends the organisation of rural industries on co-operative basis. The Commission observes: “The development of village industries on co-operative basis is essential if they are to survive increasing competition. The competition of organising them on such basis should receive the attention of the departments of co-operation and industries in all educational and co-operative organisations are the only means by which the smaller industries can hold their own in the intensive competition of modern times.

Besides agricultural co-operation there has sprung up a number of miscellaneous associations. Of these the co-operative milk societies, the cattle insurance societies, the housing and building associations, the co-operative cotton jute and paddy associations—are worthy of consideration. It may, however be noted that most of the associations grouped here under "miscellaneous" societies are more or less on an experimental stage. It is evident that the future prospect of cottage industries—the charka and the hand-looms is dubious. There is however, ample scope for developing co-operative sale and marketing associations which are of fundamental importance to the agricultural communities

(4) Marketing Associations.

The associations formed on the co-operative principles for marketing agricultural products deserve further consideration, especially because of their great importance to the immense agricultural population of India. The object of these associations is to eliminate the middlemen with a view to secure better prices and larger profits to the cultivators. The marketing of the agricultural produce in India is chiefly done by, as is known to all students of economics, hordes of agents who take away a large share of the cultivators's profits. "With the extraordinary development of foreign trade in agricultural produce" says a contemporary writer, "there has come into existence through the operation of the exporters in the Burmese rice area, the Punjab wheat area, the Khandesh cotton districts and the Bengal jute districts a class of speculators, middlemen, for an efficient system of market organisation for marketing the crops to the ports for shipment."

In the marketing of jute a number of middlemen intervene between the cultivators and the exporters. Regarding the complicated processes of marketing Mr. J. S. M. Ward in the Resources Of The Empire Series (Vol. III., pp. 82-83) remarks: "The cultivator usually sells his jute to a petty dealer, who has received advances from a broker on the understanding that he gets as much jute as he can from the dealer. This is probably incredible, owing to the holdings being very small and the peasants quite unable

to carry the finance of even a small crop. The broker sells to the big buyer who is either the representative of a larger exporting firm or mill, baler, or another broker, but whatever his normal capacity he usually does the preliminary sorting, grading, and bulking....."

The marketing of paddy and rice, oil-seeds etc., is also performed by a number of middlemen who intervene between the cultivator and the shippers. Generally, though not always, one of the agents—the dealer, broker or shipper—advances money to the cultivator before his crops are harvested. The cultivator being indebted to the agent is compelled to sell his crops at the price dictated by him.

The marketing of cotton follows the same general rule. Thus, Mr. Chunilal B. Metha, editor of *Cotton And Finance* (April, 1926) says that "In India towards the end of the monsoon some of the big foreign shippers advance money even before the commencement of picking and virtually the grower becomes a debtor to the moneyed shipper and is practically compelled to sell his goods to the creditor at the price he dictates even though he could obtain better price provided he is given credit. American experience chiefly shows that a member of the co-operative society gets better prices in the long run as compared to a non-member."

It is impossible for the individual cultivator to secure a better or fair price without the co-operation of the other cultivators. With his individual bargaining he is always at a disadvantage in a "war" with the agent. To save the growers from the hands of the brokers a number of co-operative organisation for facilitating the marketing of agricultural produce has recently been established. The co-operative jute-sale societies of Bengal, the cotton-sale societies of the Bombay Presidency, and the paddy societies of Burma may be cited for examples.

These societies established for the sale of agricultural products have proven to be quite a success. The few societies established for the marketing of jute in Bengal have been recently federated into a Central Society at Calcutta. The co-operative Cotton Sale Associations have been increasing in number since their establishment in 1918. Their number has increased from 4 in 1918 to 31 in 1926-27 and

doing marketing business to the extent of some sixty lakhs of rupees. However, this represents only a small beginning. The relative position of the co-operative cotton sale is insignificant. "It is regrettable," says Mr. C. B. Metha, "that co-operative marketing of cotton in India has made but an infinitely small beginning and the influence exercised by the societies, to be frank, is not in any way so marked as to maintain prices in the interest of the growers." (5) Central Banks.

With the extraordinary development of the primary societies the necessity of financing these institutions became evident, and, therefore, a number of district banks or taluka banks have been brought into existence after the passage of the Act of 1912. Banks of this type, were, however, in existence before the passage of the Act of 1912. The Act facilitated the formation of systematic and uniform institutions, although they differ greatly in their constitution. The Sir Edward Maclagan Committee's Report (1915) shows that there were three main types of central banks in existence; (1) Banks with individuals as their share-holders (2) banks with societies as their share-holders, and, (3) banks with share-holders composed of individuals and societies.

The banks under class (1) are more or less like joint-stock companies carried on for the sake of profits and dividends. They are generally managed and controlled by a staff of officers who are not in touch with the agriculturists. The object of co-operative credit societies is the development and improvement of credit. Credit, not profits, is the basis of co-operation. Since these banks are not run on strictly co-operative principles, the Maclagan Committee wished that they should go out of existence. The Committee appreciated the class (2) banks, and recommended their encouragement and development, because they are co-operative in principle. The Committee also advocated the organisation of the class (3) banks because they appeared to satisfy the peculiar Indian conditions.

The distinction between these three classes of banks will now be made clear. The functions of the central banks as well as their constitution differ widely in different parts of

the country. Some central banks have capital stock which they lend to the primary societies, while others having no capital are organised for the supervision over the primary societies. These central banks undertake the organisation of new societies and not infrequently take up the work of inspection, education and carry on propaganda work. They recommend and assess loans to be made to the primary societies. There are two broad classifications of these banks, namely, the Supervisional Unions and Guaranteeing Unions.

The Supervisional Banks are simply federations of primary societies or unions. The other class of central banks known as the Guaranteeing Unions is also a federation of primary societies or unions. The guaranteeing union has no capital, and consequently it does not go into the banking business. The main functions of the guaranteeing union are "mutual supervision, assessment of credit and recovery or loans." The MacLagan Committee recommended the formation of the guaranteeing union on the Burma model.

The institution of central banks in India has proven to be very valuable to Indian commerce, industry and agriculture. Their work has been of special value to those regions where joint stock banks do not exist. Recent statistics show a somewhat rapid growth of central banks. In the year 1916-17 the total number of central banks was 256 with a membership of 71,799, the number of central banks rose to 1,804 with a membership of 200,263 in 1924,25. This figure must not, however, be considered too large for a population of 270 millions.

The need for the central banking institutions has been keenly felt by the enlightened communities. But a need is not a genuine one unless it is felt by the people. The difficulty of organising central banks in India has been held to be the prevailing illiteracy and ignorance of the people. Mr. R. B. Ewbank says that "In many parts of the country the cultivators are, as a general rule, so illiterate and ignorant of affairs, and the number of intelligent men so small that it would be quite hopeless to expect to find capable and trustworthy managing committee men to carry on the work of each local union."

Another difficulty which stands as a barrier to the development of central banking organisation on the co-

operative principle is the absence of democratic spirit among the people. The main defects of the existing central banks except those of the Punjab are that they are not run on co-operative or democratic principles. "As a recent writer of Behar and Orissa has observed" says Mr. Ewbank: "with our societies a strong hand from without is absolutely necessary at present stage. What we require is a benevolent despot anxious to train his subjects to early Home Rule." But despot like God is seldom willing to give up his omnipotent power to his "creatures."

(6) Provincial Banks.

The urging need of assisting and financing the co-operative movement in India led to the establishment of provincial Banks or Apex Banks, comprised generally of central banks or district banks. There is an apex bank in each of the principal provinces of India. These banks differ greatly in their constitution and function. Some are run on co-operative principles (e.g. the Bengal Provincial Co-operative Federation), while others (the Bombay Central Co-operative Bank and the Madras Central Bank) are not true types. Their chief function consists in making loans to central banks and to other co-operative societies, and even to primary societies (especially in the Punjab and Burma) which lie within their own provinces.

The table below shows the number of Provincial Banks (1925-26).

No. of banks	Number of members		
	Individuals	Societies	
Madras	1	187	61
Bombay	1	821	574
Bengal	1	.....	136
Behar & Orissa	1	24	62
Punjab	1		7,180
Burma	1	242	2,488
Central Prov. & Berar	1	18	2,188
Assam	1	30	31

(7) Land Mortgage Banks.

It may be noted that one of the main recommendations of the Royal Commission On Agriculture In India (1928), has been for the institution of land mortgage banks. The Commission observes :

“The question of land mortgage banks has come into prominence within recent years. It has become apparent that village credit societies are not suitable agencies for the grant of long term loans, and that this class of business should not be mixed up with the short term credit which it is the function of the village society to provide..... The Act (1912) already provide for land mortgage credit and we consider that for the present they should be utilised for the formation of land mortgage banks and that no special legislation is required to establish such banks. With regard to the assistance by Government to land mortgage banks we do not recommend that Government should subscribe to debentures but we consider that a guarantee of interest on the debentures would be a suitable form of assistance.”

4. General Progress of Co-operation in India.

So far we have dealt with the details of Co-operation. It now remains to make a brief reference to the general progress of the co-operative movement in India.

The principal impediment to the development of the habits of thrift, credit or faith and banking is insecurity of life. Insecurity of life and also ignorance lead to the habit of hoarding. And a habit once formed becomes hereditary, instinctive and natural, and therefore, unchangeable. The people of India have been accustomed to the habit of hoarding since ages. But a habit or long-established customs are likely to change with the change of environment (i.e. political, economic and industrial). Human nature changes with the influx of new things and new ideas. Such a change has been taking place in the Indian co-operative organisation and in almost all aspects of economic life in India.

The co-operative movement is one of the new ideas introduced into India from Europe. The introduction of the principles and practice of co-operation has been slowly but steadily breaking down the predilection for hoarding wealth. Statistical information goes to show that a large portion of the potential capital or hoarded wealth has been steadily

flowing out into the vaults of the co-operative banks. The institution of co-operative banks has already "allured crores of rupees into the open from the hiding places." The enormous increase in the number of co-operative banks and in the volume of deposits, which has recently been taking place, testifies to the fact that the habit of hoarding is slowly dying out in India.

The table below shows the extraordinary development of co-operative societies in India.

Statistics of Co-operative Societies for All-India.

	No. of Societies		Number of Members.		Working Capital Rs. in lakhs	
	Aver. for 4 years 1906-7 to 1909-10	1925-29	Aver. for 4 years 1906-7 to 1909-10	1925-26	Aver. for 4 years 1906-7 to 1909 10	1925-26
Central banks including Provincial banks,	17	567	1,987	197,930		
Supervising and Guaranteeing Unions		1,406		31,205		
Agricultural Societies including cattle insurance societies	1,713	71,140	107,643	2,327,899		
Non-agricultural societies	196	7,069	54,267	730,126		
Total ...	1,926	80,182	151,910	3,058,025	68.12	57,60.00

The table above indicates that a preponderantly large proportion of the co-operative societies is agricultural, and a very large proportion of the volume of deposits is drawn from the rural areas. "So far little progress has been

made" observes the Royal Commission On Agriculture (1928), "with non-credit societies as compared with the credit societies. This is natural as advance in other directions is difficult until the burden of rural debt has been definitely lifted from the shoulders of the cultivators." Commenting on the quality of co-operative societies in India the Commission observes: "Success in co-operation cannot, however, be gauged by figures and our enquiries have shown that progress has not been uniform in all provinces, and that increase in numbers has not always been accompanied by improvement in quality. The reason for this would appear to be that, while societies have been registered freely, there has been a lack of patient and persistent education of the members in the principles and meaning of co-operation by teachers competent to perform their task efficiently under adequate supervision."

The success of co-operation depends upon strict adherence to the principles of co-operation—that is to say, upon punctuality of repayment and upon meting out equal treatment to all. These principles are not, however, strictly observed by the societies. It has been frequently brought to the notice of the public that the practice of unpunctuality and irregularity in repayment of loans, favouritism and dishonesty and the taking of 'benami' loans are some of the common phenomena of co-operative associations, especially of the agricultural credit societies. Reasons and excuses brought forward for the bad and irregular repayment of debts are failure of crops due to bad rains, insect pests and poor prices—factors over which man has little control.

Another important point to be noted in this connection is the absence of education among the agricultural population. It has been recognised by those interested in co-operation that any scheme for sound co-operation must be preceded by some education of the people concerned. The Royal Commission On Agriculture emphasises upon the importance of primary education both for male and female and observes that "so far as the great mass of the agricultural population is concerned, primary education and the attainment of literacy are the main considerations."

5. General Benefits of Co-operation.

It now remains to make a brief reference to the chief benefits conferred by co-operative societies upon the agriculturists and industrialists. It is superfluous to state that co-operation has conferred great benefits upon the agriculturists. Since its introduction into India in 1904 it has been teaching them the principles and advantages of co-operation and collective action and the defects or the evils and disadvantages of individualism or of non-co-operation. Knowledge of the advantages of co-operation has stimulated the desire to practise thrift, economy and savings, and to employ these savings formerly buried under-ground or invested in arts, for productive purposes. Growth of co-operation has tended to organise capital, to cheapen credit, to reduce the rates of interest and it is expected that in future co-operative organisation will save the cultivators and the small artisans from the ruthless clutches of the money-lenders.

It is rather premature to say beforehand the extent to which co-operation has counteracted, or will in future obviate, the evil effects of famine, or scarcity. Famine and pestilence, though diminished in their recurrence, still do havoc all over India. It appears that the character of the famine has changed and that their recurrence has diminished or decreased. Famines of the dreadful character which repeatedly visited the country during the last century and towards the beginning of this century have not recurred. Moreover, famines are the result of miscellaneous causes, poverty, unchecked multiplication of population, "improvident" marriages, and uncontrolled natural phenomena. The remedy lies in a radical change in the social, political and economic life of the people. Co-operation may indeed, mitigate, to a certain extent, indebtedness and poverty but its chief function has so far been only for the redemption of the cultivator from the burden of usury, which is more or less a negative good rather than a positive gain.

CHAPTER 33.

INDUSTRIAL ORGANISATION.

1. The Family System.

Ashley in his Economic History states: "Economic historians have traced four stages in the development of industry, which it is now very generally the custom to describe as the Family, the Guild, the Domestic and the Factory Systems." The first three are typical of the mediæval economic organisation, while the fourth, the factory system is a product of the Industrial Revolution of the 18th century. In modern India we have all the four forms of economic organisation. But the family, the guild and the domestic systems which existed in India are typically Indian in origin, and they bear considerable resemblance to those of mediæval England. But the fourth, the factory system, is an innovation from Europe.

Now, the family system represented a self-sufficient family economy in which the producers and the consumers were the members of the family or the tribe itself. Production was carried on for the satisfaction of the family needs, and under this system no clear-cut distinction was drawn between production, consumption and distribution. Until recently this system existed in many parts of India and played an important part in the economic life of the people. In fact the family system lingered on much longer in some parts of India than in others. In Assam it formed an integral part of the economic life of the people. Thus, writing in 1897 Mr. Sammon said:

"Throughout the Brahmaputra valley weaving is not a profession, nor it strictly speaking an industry. It is carried on by women and girls alone, but by those of every family, rich or poor, high caste or low. Weaving among the Assamese forms a part of a girl's education and a part of a woman's ordinary household duties. The women of the family are expected to make their own clothes and those of

men as well. In former days they certainly did so, but now a change is coming over the country." (Monograph On The Cotton Fabrics Of Assam By S. F. Sammon).

Again, the same writer observes :

"For while weaving as an art, a household duty or a pastime is looked upon with high respect, weaving as a means of livelihood is considered derogatory to almost every class of people."

The "charka" or the hand-spinning and hand-weaving industry which the Mahatma Gandhi made strenuous efforts to revive is a reflection of the old institutions. The fundamental idea which underlies the charka industry is the same as that embodied in the self-sufficient family economy (with respect to cotton or textile industry).

2. The Domestic System.

The guild system which flourished for ages in India is practically dead. The domestic system had been until recently the foundation of the Indian business organisation. The fundamental distinction between the family and the domestic systems lies in the fact that there is no exchange of products under family economy, while under the domestic system which is more or less a business organisation things produced are exchanged for profits or gain. In domestic economy the distinction between production and distribution is not clearly drawn. Nearly all the industries which are purely Indian, that is to say, uninfluenced by European ideas, are carried on even to-day on the domestic basis. To give a few instances. The industries connected with brass and copper utensils, gold and silver wares, wood and stone carving, furniture, &c., are all domestic in character. And a very large portion of the textile, iron, dyeing and tanning industries, sugar and oil industries are domestic. Domestic system may be said to be the predominant feature of the indigenous industrial organisation.

The handicraft of the domestic system is, however, characterised, at least, by two or three phases or stages of development. Under the domestic system pure and simple the work is carried on in the homes of the artisans who may

employ, besides, his family some hired hands—apprentices and skilled artisans. The articles turned out are sold in the local market. The village black-smith, the brass and copper smiths, the silver and gold smiths and the weavers may be cited as representatives of the system under the village organisation. The peculiar characteristic of this system is that no middleman intervenes between the producers or artisans and the consumers.

There is, however, another phase of the domestic system which is characterised by a middleman or a capitalist. It may be illustrated by the textile industry and by the Dacca silver-ware industry. Under this system a middleman or a capitalist supplies the capital or the raw material to the workers or artisans who are bound to sell the finished products to the middleman. The middleman may be a merchant or a capitalist who takes the risk of the trade and pays stipulated wages to the workers who have no shares in the trade.

Though for many purposes the classification between the simple domestic system and the capitalistic domestic system seems to be a logical necessity, it must be understood, however, that the lines of division between them are by no means sharp and that there is a gradual passage from one to the other. The jugs and the tantis (weavers) make cloths with yarns purchased from poor widows or buy machine-made yarns of Indian or foreign origin, or they themselves may make, as they used to do formerly, the yarns from cotton purchased in the market. In most cases the weaver buys the yarns from some mahajans (money-lenders or dealers) on credit to whom he is bound to sell the finished product at the market whole-sale prices or at the prices dictated by the mahajans. The interest charged on the loan varies from 12 per cent. to 35 or 50 per cent. or even more. So after the deduction of the interest the net profits left varies from 12 annas to a rupee a day. Owing to the scarcity of capital the bulk of the weavers are indebted to the money-lenders, merchants or dealers.

This semi-capitalistic method of production is, perhaps, of foreign origin. It seems that it has been introduced into India by the East India Company. The European system in a modified form now exists almost all over India.

The introduction of this system which arose as a result of the increasing demands for Indian merchandise by the Europeans gradually ruined or at least disintegrated the family system which prevailed to a small or great extent all over India before the introduction of the improved means of communication.

Prior to the establishment of the British rule in India, and also during the earlier days of the British rule there had been in existence another type of domestic industry patronised by kings and princes or feudal chieftains. The Fourth Report From The Select Committee On The Affairs Of The East India Company observes that "The manufactures of the finer and more valuable fabrics of India have always been produced by advances from the Government or Individuals, for whose behoof those fabrics are manufactured." The weavers received advances of money, and often free grant of land from the rulling princes, chiefs or king for the supply of fabrics suitable to the distinction of rank and to the taste of these exalted persons. Thus, Mr. N. N. Banerji remarks:

"Many of the weaver castes were specially appointed by Rajas and other respectable persons as their weavers, and they were then never in lack of money. Some, e.g., in the Hill States of Orissa supplied clothes to the Chiefs of these States and their families, and enjoyed jaigirs for the same, and in some of the Gurjats they enjoy such jaigirs even to the present day for weaving services....." (Monograph On The Cotton Fabrics of Bengal, 1898).

Mr. S. F. Sammon in his Monograph On The Cotton Fabrics Of Assam says that "in the days of their prime these weaving castes did not supply the masses with their cloths. They were engaged rather in weaving the finer fabrics required by the Royal family and others of high castes. These Royal weavers received a grant of rent-free land and other favours in return for their services. They, rarely, if ever, sold the products of their looms."

There is evidence to show that during the Mahomedan rule and during the early British rule as well, each king or prince or feudal chief had his own weavers whose duty it was

to manufacture clothings for the use of the royal and noble families. They specialised in the production of fine and super-fine fabrics. The wearing of these aristocratic garments used by the exalted personages was forbidden to the common people. For example, the wearing of the pat-silk fabrics was the monopoly privilege of the privileged classes—kings and nobles, during the rule of the Ahom kings in Assam. Until very recently and even now, the wearing of high-caste garments, by the low castes and even by the middle caste were not tolerated by the privileged classes. With the establishment of the British rule in India, however, and with the influx of western ideas of democracy the old distinction of rank or 'caste' attached to clothes, shoes, horse-riding or using palanquins—are disappearing.

3. The Factory System.

The factory system is an innovation from the occident. It involves the capitalistic or the round-about method of production. Under this system the work is generally but not always done by persons who have no property in the product they turn out or in the tools or machines they use in the manufacturing processes. The capitalistic method of production requires sometimes the investment of an immense amount of capital and the employment of a comparatively large number of workers or wage-earners congregated in one or more buildings, and supervised and controlled by a staff of hired officers. This method of industrial organisation is closely associated with, and it depends upon, other forms of large-scale business organisation, namely, the financial houses, or banking organisation, and organisation of the means of transports, and marketing organisation. There is a close correlation between them. Wherever capitalism exists, there already exists modern method of banking organisation and modern facilities of transport and of exchange or marketing. Just in the same way, the domestic economy and money-lending and human and animal transport are co-existent and co-relative.

The factory system or the capitalistic method of production and large-scale business organisation in general came into existence in India during the second half of the 19th century. This system brought about great changes in the

method of production and also, to a less extent in distribution, in the improvement of the technical skill of the workers, in the development of the means of communication, in the shifting and growth of population and growth of modern towns and municipalities, and in the passing away of the dominance of the old domestic system and even, in some cases in the destruction of the handicrafts. The new system affected more or less many trades. On the one hand, it circumscribed the scope of many of the old domestic industries, while on the other hand it created entirely new demands which never existed before. It brought about an enormous expansion in the production and consumption of enumerable new articles of varied qualities and kinds.

4. The Competition between the Domestic System and the Factory System.

The effect of the competition of the factory system upon the domestic system has already been dwelt upon. However, the subject will be treated here somewhat differently. It is worthy of note that there are good many indigenous hand industries which are practically unaffected by the factory system or by the machine. The typical examples of these are the industries connected with potteries or earthen wares, brass-wares, silver-wares, jewellery, stone-works, boat-building, carpentry, &c. These industries still survive because, first, they satisfy some of the customary or traditional needs bound up with the local social customs of the people, and secondly, because, the market for these being local and un-uniform they could not be produced profitably by machine processes.

There is a large number of other industries in which competition between the hand-tools and the machine may be said to be practically non-existent, simply because the hand-industry is too primitive to satisfy the modern needs of life. In fact there is little competition, for example, between certain classes of native hand-made paper and machine-made paper and between native hand-made glass and the machine-made glass wares (except perhaps the bangle industry). The modern demand for paper, glass, jute, matches, tobacco, drugs, cosmetics, chemicals, iron and steel manufactures, leather goods and a host of other things—

cannot all be supplied by the primitive hand tools. Consequently the hand industries died a natural death or on the verge of extinction. The hand-paper industry, for example is virtually extinct, not simply because it could not withstand the superior machine competition, but mainly because it could not satisfy the modern needs of life.

The same is true to a considerable extent of the glass industry. The things and ideas like glass jars, bottles, mirrors, scientific instruments, optical glasses, etc., turned out by machines—represent new demands created by the influx of western ideas. The modern soap provides another conspicuous example of a luxury practically novel to the peoples of India. Only the manufacture of very crude washing soap and its use was known to the Indians. The modern safety matches represent still another example of a new idea imported from the accident. Soap, paper, glasses, matches, cigarettes, leather goods, printing, news-paper, &c., represent practically new industries which stand upon new demands and upon modern western methods of production.

There are still other industries in which the conditions are somewhat different. In some industries the hand-tools produce special kinds of products which satisfy the customary needs of the people, while the machine industry supplies new needs or different needs. It is evident that in an industry in which the hand-tools turn out one class of products and the machine turns out another class of products there can be little competition between the two aspects of the same industry. They may be regarded to some extent, as complementary to one another. The iron and steel industries, for examples, are engaged in the production of pig iron, steel, mill-works, machinery, railway materials, scientific apparatus and other articles which represent entirely new demands, while the blacksmiths of the traditional village organisation turn out crude implements and tools, ploughs, cutlery, &c. It is not always possible, however, to draw a line of demarcation between competitive and non-competitive industries. There has been a genuine competition going on, for examples, between hand-made hardwares and cutlery and machine-made or imported hardwares and cutlery. Similarly there is a real

competition between certain classes of hand-textiles and machine-textiles.

Moreover, it is evident everywhere that the way in which the machines and improved tools are invading all fields of production the time may soon come when there will be left very few hand industries unless the latter are organised on the European principles. In the struggle between the primitive hand-tools or domestic industry and the machine or factory industry, between man-power and steam-power, the latter have, of course, gained ground over the former, obviously because of the advantage of large-scale economies of the machine processes. Unless the handicraft of the domestic system is improved on European lines it will be difficult for the remaining hand-industries to maintain their own position against the superior competition of machinery and improved tools. There are indications, however, that as industrialism spreads the tendency will be to multiply the number of small factories and it is probable that a somewhat radical transformation, like that which has taken place in Japan, will also take place in the Indian hand-industries.

5. The Caste Organisation.

The peculiar characteristic of the domestic economy in India is that it is associated with (especially among the Hindus) the caste or hereditary occupation. Of course, many trades, cotton trades, for examples, are carried on by many castes, and both by the Hindus and by the Mahomedans. Nevertheless, there is such a thing as, a weaving caste, or weaving castes in India, no matter how many local differences there may exist between them. The fact that these and other trades—pottery, jewellery, brass, copper, iron, silver, gold, and the multitudes of other arts and trades involve some castes—cannot be denied.

Now it is evident that these trades involve caste-like division of labour, and many of the trades and mercantile professions are regarded by the "spiritualists" as low and menial, while some are looked down upon with so much contempt as to be untouchable. The leather industry is a case in point. In the leather industry there is an immense

field for expansion. There is a large and growing demand for leather goods in India; which cannot be satisfied by the primitive method followed by the chamars and muchis, caste-servants of the old village economy. These castes cannot, however, be blamed for their ignorance and backward conditions. The Hindu religion and castes are primarily responsible for the low and untouchable position of these castes. It is now known to all concerned that the development of the leather industry like other industries requires technical skill, capital and organising ability. The untouchable muchis and chamars deprived since ages of the opportunity of education and of other privileges, cannot be expected to possess the requisite qualifications for the improvement of the industry.

Most of the Indian industries from the cottons down to the leather—have been the caste occupations of those who occupy relatively low position in the social scale of the Hindus. The development of these industries on scientific lines needs a kind of knowledge or education or reflective mind which these people cannot, according to the social customs of the country, be expected to have. The caste laws and customs have destroyed their reflective faculty. To fit the julahas, tantis, and jugis (weavers), the lohars (blacksmiths) the glass-blowers, paper-makers, and the muchis (shoe-makers) to the modern industrial system a different kind of education and social startification like that of England or of America seems to be essential. But such a transformation is not feasible under the existing social conditions. The only classes of Indians found to be fit for the modern industries are the privileged classes or the high and the middle castes. The opportunity afforded by the new industries of earning very large income forced these high castes to cast off their caste pride in favor of these industries.

Thus, it is money, the almighty rupee, which drove a large number of the high castes to the trades of the low castes. This movement of the high castes from their "high" caste occupation or profession to the trades of the low castes and untouchables prove among other things that the caste efficiency which the "spiritualists" pretend to take so much pride in sham and spurious. The caste division of labour lacks in many cases the principles of higher efficiency and evolu-

tion as is evidenced by the glass, paper, matches, soap, sugar oil and by many other industries.

Modern economic regime demands much more intelligence than the caste economy in which merit or skill consists in imitation. Imitation and repetition of forefather's merit is all that is required in most of the Indian domestic industries. Invention and discoveries are the product of thinking, whereas repetition is the result of imitation. In imitation there is no novelty. In modern economy every art or science exists for the object—for the art or science itself. The object is to develop the art to perfection (which is endless) through the principle of division of labour and specialisation of function. Consequently the skill in or knowledge of, every art has had tremendous development in the occident. In the domestic-caste economy, however, every art, the higher textiles for examples, existed for the Rajas and gods, and not for the common people. The artisan transmitted his skill to the descendants, and the tendency was, and even now is, to keep every special skill or knowledge a secret personal property of the possessor of the skill. The secret is jealously guarded lest others would learn it and excel him or equal him. The result has been to check the development of the art itself which in many cases perished with the death of the artisan.

Human beings are not equal in ability. Individuals possess different qualities to perform different functions in the social organisation. Every society, therefore, has specialised classes. Specialisation is the basic principle of division of labour in modern economic organisation. Evolution or higher efficiency depends upon differentiation, and differentiation in modern economy stands for specialisation of distinct parts or functions. Division and specialisation removes competition and is the basis of efficiency in production. Division of labour and differentiation of function is essential to the development of the higher and more complex types of economic organisation.

The caste economy also involves some sort of a division of labour and a crude sort of a specialisation of trade. And it is alleged that in caste economy the division of labour is based upon differentiation and specialisation of distinct trades (not parts of a trade). But in reality the division

of humanity into castes is based upon karma of the individuals. In the evolution of modern western economy it is the differentiation of function which is emphasised, while in caste economy it is the differentiation of the individuals or persons by castes or karma is what is emphasised. A man is rivetted to the pre-existing caste and he is forced to stay where he belongs.

Before we close this chapter a brief reference may be made to the nature of the Hindu organisation. Social organisation in the wider sense of the term is the more or less unconscious expression of the character and ideals of the people. The caste economy, the family economy, the feudal economy, caste guilds, the communal land holdings, partnership or corporate organisation represent so many methods and means adopted by man for adjusting himself to the environment. The types or forms of economic organisation which more or less accurately correspond to the Indian thoughts and ideals are the individual or family economy and partnership economy. Leaving aside the primitive communal land organisations we notice that caste economy or tribal economy is more or less representative of self-interest, while partnership or corporate organisation, especially the latter reflects group interest and common enterprise. The modern corporate organisation which represents a rational compromise between form and matter, between tangibility and relativity, between personality and impersonality, and between individual enterprise and common or group enterprise—is of European origin.

Except communal land holdings, almost all Indian groups, organisations or associations are personal. The influence of personality and of caste seem to be the predominant feature of Indian history. It appears that personal organisation is rooted in self-interest, and it smacks of distrust of human nature, and reflects the working of personal psychology as contrasted with social psychology involved in all impersonal and corporate organisations. A higher form of industrial and commercial development is reached when not the authority of a person but the mutual faith of the individuals in a group, or in other words, common enterprise and common good, are the ruling factors.

CHAPTER 34.

THE DEVELOPMENT OF LABOUR.

1. Meaning of the term 'Labour.'

The term 'labour' in its wider sense signifies work of all kinds, and it includes manual or physical labour, routine-work (mental or physical or both) and intellectual work. But in its restricted sense its application is confined to manual labour only. In Europe and in America manual workers who earn their living by the selling of their labour form a class by themselves. A large section of the manual workers, who do not own any real property and who seldom have any family ties—is known as the proletariat class.

The history of the growth of the labouring class of Europe is long, but interesting and instructive. In a work of this character any detail description of the growth of the labouring classes of Europe or even of England only would be out of the question. However, a brief reference to the growth of labour in England seems to be essential in this connection. During the feudal regime in England every village or manor was economically self-sufficient, and consequently the demand for labour was practically unknown. The development of an independent class of labourers in England had been in operation during the period extending from the 14th century to the 18th. century. The decay of the feudal system and the Agrarian Revolution which followed or accompanied it manumitted the serfs who lost the privilege of maintenance by their lords. The dissolution of the Monasteries rendered a large number of poor people destitute who depended upon their charity. The Industrial Revolution and the Agricultural Revolution of the 18th century which respectively destroyed the hand industries of the small artisans and deprived the small agriculturists of their lands increased the number of manual workers, and led to the growth of a class of landless and homeless workers who earned their living by the sale of their labour.

It is not our purpose here to dwell upon the merits and demerits of these changes, but the point which we want to

establish is that a class of manual workers who depend for their livelihood upon the sale of manual labour developed as the result of some radical transformation in the economic and social life of the people. No such rapid or sweeping change took place in the history of India. Changes of a rather slow and mild and evolutionary character has however, been in operation since after the establishment of the British rule in the country. To ancient or mediaeval India the term 'labour' in the sense in which it is employed in the above discussion was practically unknown. But a kind of labour known as forced labour exacted by the rulers for the construction of canals, roads, tanks, monuments, temples, and edifices was in vogue in ancient and in mediaeval "India." Up to the 19th century the old economic regime of the self-sufficient family and feudal economy and village economy prevailed. Under the old economy the majority of the people were engaged in agriculture, and the agriculturist combined both agricultural and manufacturing pursuits. The demand for hired labour, therefore, did not arise.

2. The Development of Labour in India.

However, the establishment of the British rule in India brought about certain changes in the economic life of the people. These changes which led to the development of a demand for labour and thereby tended to create a class of labourers may be divided into three classes:

- (1) The Decay of the Indian Hand Industries;
- (2) The Development of Plantation Industries; and
- (3) The Introduction of Public Service Utilities or Railways and of Machine-Industries.

We shall take up each of the subjects according to their serial number.

(1) Decay of the Indian Hand-Industries.

The decay of some of the best handicrafts of India, especially of the weaving industries began early in the 19th century. The falling off of demand for Indian textile manufactures in the European markets and the gradual influx of European textile products into India displacing indigenous woven goods threw a large number of the Indian weavers

and spinners out of employment. As early as 1804-5 Mr. Larkins in his Report On the External Commerce of British India (East India Affairs) observed: "It is to be observed that the exports of piece-goods on the public account, have also very considerably decreased during the same period; the consequences are, that the weavers finding no employment for their looms, many of them have been necessitated to quit their homes and seek employment elsewhere; most of them take to the plough, some remain in their own districts, while others imigrate into distant parts of the country."

It is needless to reiterate the causes which led to the decay of the handicrafts since they have already been considered by us in the chapters dealing with textiles, &c. A large section of the population formerly engaged in handicrafts lost their trade as a result of the change in the industrial life of the people and they took to agriculture or started life as day labourers. The deterioration of the hand industries and the movement of the artisans from industries to agriculture and to manual or hired labour continued throughout the 19th century, and the process is still in progress. It is practically impossible, in the absence of statistical data, to determine accurately the number of people diverted from their usual and hereditary occupation. However, the fact that the number thus diverted is large is undeniable.

(2) The Development of the Plantation Industries.

The marked development made in all spheres of economic life under the British rule, and especially in the manufacturing industries and mining industries conducted on modern European methods since the middle of the 19th century led to an yearly increasing demand for labour. The principal Indian industries in which large number of workers are employed are the textile industries, the plantation industries the mining industries and the iron and steel industries. Of these the mining industries, are of comparatively recent development.

The introduction of the new industrial system created an enormous demand for labour, but there was no permanent labour force in the country. Some of those who lost their trade owing to the superior competition of the machine

industry took up work as wage earners under the new system. But the labour supply in India has always been insufficient and inadequate. The complaint of labour shortage is almost universal even to-day. In the earlier days of the new industries the labour force was mainly drawn from the locality where the industry was situated. But with the growth or multiplication of industries (cotton, jute, coal, etc.) the local supply of labour was found inadequate for the growing demand. The local people who had some means of earning their livelihood were usually unwilling to quit their caste or hereditary occupation. Consequently a large part, and in some cases the major portion of the labour supply was drawn from the aborigines or from poorer classes who belong to distant parts of the country. The tea industry may be cited as a typical instance.

The traditional method of recruiting labour in India for the tea industry is known to all Indians. Owing to the absence of a permanent labour force in and around the tea districts the tea planters had to recruit their labour supply through agents or contractors from distant parts. The method employed to allure men and women to sign a contract which might extend over a year or years at stipulated wages was known in those days as the system of indentured labour or "coolie labour." The term "cooly" is a contemptible expression used for some sort of a semi-slave or semi-serf-like labour found in the Asiatic countries. The great bulk of the Indian or Asiatic labour is denominated as cooly labour. Now, the abuses connected with the method of recruiting labour for the industry were numerous. Various tricks and illegal methods were employed by the agents to induce men and women to sign contracts. One of the tricks often employed was to inculcate into the minds of the ignorant men and women the idea of earning easy money with little labour in the tea gardens. Beguiled by the bright prospects of an easy money they signed a contract of servitude. And once the contract was signed the agreement became unavoidable. They were then conveyed or smuggled to the tea gardens for servitude. The method of transporting the coolies from their home to their destination was so imperfect that many died in the way.

The indentured system of labour was practically equivalent to temporary slavery. The coolies could not leave the gardens before the expiry of the period of the contract. About the abuses of the system the late Mr. R. C. Dutt said: "Hateful cases of fraud, coercion, and kidnapping, for securing these labourers, have been revealed in the criminal courts of Bengal, and occasional acts of outrage on the men and women thus recruited have stained the history of tea gardens in Assam" (India In The Victorian Age, p. 352). By the Act of 1865 the planters were empowered to arrest the run-away coolies. They could then be imprisoned for refusing to work. To force them to work unusual practices like beating and flogging were often resorted to. (Vide Nil Darpan by Dinabandhu Mitter).

The evils of the system aroused indignation among the leaders of India. An agitation was soon set on foot to put an end to the system. Appeals and deputation have been made to Government. Finally the question was brought before the Legislative Council in 1901, and an Act known as the Assam Labour Emigration-Act was passed in the same year. However, no great improvement in the condition of labour has been made till 1915. The Act of 1901 was amended by the Assam Labour Emigration (Amendment) Act of 1915. By this Act (of 1915) the system of recruiting labour by contracts was abolished and an Assam labour Board formed for the supervision of recruiting labour by local agents (sardars). The condition of labour in the tea gardens improved as a result of the passage of this Act.

One can hardly deny the benefits derived from this and from other measures adopted by the Government to ameliorate the condition of labour in the Assam tea gardens. However, it must be admitted that the abolition of the indentured system of labour did not raise the status of labour in the tea gardens from that of a cooly to that of a free labourer. The method of recruiting labourers by sardars bears clear testimony to this. The contractual system is defective in many ways. The contract involved large investment of money in the way of advancement to labourers. It also involves heavy expenditure required for the conveyance of the coolies from their distant home districts (Madras Presi-

gency, C. P., U. P., Orissa) to the tea gardens in Assam. The evils of the system lie in the very nature of the contract, which implies absence of the economic freedom of the individual. A breach of contract on the part of the workers who received an advance and signed a contract to work is regarded as a criminal offence punishable by fine and imprisonment (Report Of The Assam Labour Enquiry Committee, 1921-22, p. 75). The tea planters are not, however, subject to the same laws as the labourers. Consequently they possess greater power at their disposal to control the labourers under them than the other industrialists.

It has often been pointed out that the dark side of the condition of labour in the tea gardens has often been exposed, while the other side has not been given proper attention to. One authority recently stated that the "good side must not be forgotten in the emotional convulsion generated by the abuses." The tea industry opened up, cleaned, and reclaimed vast forest areas and waste lands, and converted them into productive tea gardens which yield enormous wealth. Moreover, it helped to settle the country, formerly inhabited largely by wild animals and aboriginals, and gave employment to a vast number of workers.

None can deny that the tea industry has done a great deal in developing the tea districts. But the bulk of the profits derived from the tea gardens go to the capitalists, who, pay only starving wages to the labourers. The evils and abuses connected with the tea industry are many and the conditions of the tea garden coolies are miserable. They are illiterate and ignorant of the ordinary economic laws or of the laws of the freedom of contract. Their ignorance is being taken advantage of by the capitalists who are of superior intelligence.

(3) The introduction of Public Works Department and Machine Industries.

During the second half of the 19th century many other changes took place in the economic life of the people of India. It was during this period that the construction of railways was undertaken and the Public Works Department formed by the Government of Lord Dalhousie. The

construction of railroads, roads, canals and public buildings created a large demand for labour. Attracted by the higher wages offered by these works a large number of the agricultural population took work under them. During the same period a large number of industries also came into existence. Chief among these are the Bengal Jute mills, the Bombay Cotton mills, and the mining industries of Bengal. In the earlier stages of their development when these industries were small the labour force was mainly local. But with the steady progress of industrial activity the demand for labour far exceeded the local supply, and the extra demand was met by labour imported from other parts or from other provinces. The bulk of the labour force consisted of poor agriculturists and artisans, and aboriginals.

It is not always possible to give any specific reason which induced the local people to work as day labourer or forced or induced the people living at great distances to come to the factories or mines for work. To say that they were forced by privation caused by the British rule or by the wholesale destruction of the Indian industries by the cut-throat European competition is a sweeping judgment, for the majority of the Indian labour force is still semi-agricultural, and the aboriginals have no trade at all. There must be many causes, direct and indirect, immediate and remote, which necessitated this movement. One of the reasons often spoken of is that the prospect of earning an income higher than that obtained from agriculture and handicrafts must be at the roots of this movement.

Since the introduction of the public service utilities the general rate of wages in India has gone up, consequently work at the factories must have become more profitable than agriculture or handicrafts. Moreover, the importation from abroad and the production in India of cheaper machine made goods have brought about a diminution in the income-yielding capacity of the handicraft industry. Hand industries with few exceptions have become less and less profitable under the new competitive industrial system. It must also be remembered that the new industries introduced into India also created a large demand for labour which never existed before.

In spite of the general agricultural progress there were certain forces at work which were not favourable to the small-holders of lands or the peasants. The changes introduced into the Indian land systems under the British administration rendered a large number of the people of the country landless, who were forced to seek for other means of livelihood. The multiplication of population and the subdivision of holdings effected by the laws of inheritance from generation to generation, must have reduced the income of the family. The periodic recurrence of famine and scarcity caused by bad rains also drive a large number of the population to the mills, factories, mines and to steamship services.

These are some of the forces which tended to drive the agriculturists and the artisans to seek for employment as day labourers, and thereby tended to develop a class of working people in India. According to the Census of 1921 there were about 46 millions of landless labourers in India, but what percentage of this number is the product of the age-old institutions of the Sudra and of serfdom is difficult to determine. According to the Hindu laws the Sudras were deprived of the privileges of owning landed property. In many parts of India—S. India, the Central Provinces, the United Provinces, and Orissa, there is a large number of serfs, slaves, servants and aboriginals who do not own lands.

The Indian working class however, differs widely from the European and American working classes. First of all we must note that there is practically no permanent labour force nor a proletariat class in India. The average Indian labourer has a home in some distant village where he has his family, and also a piece of farm land. He goes home during harvest time. The Indian labouring population is, therefore, termed 'semi-agricultural' or 'floating' or 'migrating.' Moreover, there is a fundamental difference in spirit between the Indian labouring population and the European or American labouring population. The spirit or the ideal which moves the latter is democracy, equality and liberty. No such ideal has yet developed among the Indian mass. Consequently the condition of employment and the general economic conditions of the agriculturists and workers are in

marked contrast with those of the Europeans or of the Americans.

3. The Conditions of the Working Classes in India.

The conditions of employment in the Indian factories and mines are very unsatisfactory. Low wages, long hours, bribery and corruptions are rampant everywhere. The sardar, or the labour contractor or the foreman is a bit of a petty raja in the Indian factory world. The Report Of the Deputation sent out to India by the Joint Committee of the Dundee Trade Unions to enquire into the conditions of the jute workers in India published in 1926 discloses sinister conditions which prevail in the Bengal jute mill areas. With regard to the evils of long hours the report states that "most mills run on a complicated shift system, which renders discovery by the Factory Inspector of the actual hours of work, a matter of considerable difficulty." The wages paid for these long hours of work are miserably low. Moreover, the wages are subject to considerable deductions.

I can do no better than transcribe a few extracts from this report to indicate the various kinds of tolls exacted from the workers in the form of salami, bribes and fines by the sardars and the foreman.

(1) Salami.

"Every worker is compelled to pay an initial bribe for the permission to be employed in the mills. There is no fixed tariff, but every foreman or sardar simply screws what he can out of his applicants. We have heard of weavers paying as high as 75 rupees (two or three months' wages) but the general average of the first stage in the robbery appears to be about 10 rupees. Every worker, man, woman and child—is held up for this tribute by the sardars; none may escape; and we have testimony, of two cases, where assistant sardars were asked for extraordinary bribes by their superior. One had a demand made upon him for 1,500 rupees, another for 500 rupees. In addition to this first toll there is regular weekly or monthly compulsory bakshish after that, usually amounting to a penny or two pence per week. Little wonder we had it pointed out to us one sardar who having worked 22 years on an average wage of 15 rupees per week, had

amassed a fortune out of this robbery system amounting to a lakh of rupees (about £13,000)"

(2) Indebtedness to Money-lenders.

"When a worker starts in a mill it is very rarely the case that he possesses the bribe money. He (or she) is usually an impoverished agricultural worker driven to seek temporary employment in the mills to meet the exactions and extortions of money-lenders and landlords in the home village. And so when a cash down salami is demanded from the employee, he has no recourse but to go to a money-lender. He has no security to offer, and the interest charged upon the loan is, therefore, very high indeed. All up and down the mill area we came upon the hordes of these money-lenders, called Kabulis, who were carrying on this profitable usury business at an interest of 300 per cent. per annum. So that to the graft of salami has to be added the imposition of 300 per cent. usury."

(3) Fines.

"Fines in the Indian jute mills are not so common as in the Indian cotton industry, but they exist. In one mill we found during a single week 21 workers out of 478 who had fines of small amounts deducted from their wages. At the Nudea mills, in Sept. 1925, there was a strike of 6,000 workers for four days against the heavy fines being imposed upon the weavers—declared to be as high in some instances as 80 per cent. to 90 per cent. of their wages."

The conditions of labour in the cotton factories and in the coal mines are not very different from those of the jute industry. Men, women and children of tender age are found working in the mills and mines. In the Bengal coal fields the aboriginals—the Santals and the Bauris work together with their women folks. The evils of child labour and women labour as they existed in the early days of the factory life in England are found here to-day. There are instances of flagrant violation of the factory laws in respect of child labour. The laws are more honoured in their breach than in their observance. In the absence of compulsory birth registration there is no way of knowing the exact age of the children.

The housing conditions of the factory workers including the workers in the tea gardens are very unsatisfactory from the point of view of health and morals of the workers. Regarding the housing condition of the workers in the Bengal jute mills the report quoted above reads: "Two-thirds of the workers in this industry, which make 90 per cent. dividends for the share-holders (mostly Indians) are housed in vile, filthy, disease-ridden hovels called bustees." The bustees are single-room tenement houses with thatched roofs built by the sardars who charge about 12 annas a month. They have no windows, no chimneys, no light and no arrangement for water supplies. Each bustee has an accommodation for a single family, but it is occupied by two or more families. The housing accommodations in the Bombay cotton areas called chawl are also single room-tenement houses which are worse than the bustees of the Bengal jute mill areas.

The excessive over-crowding and insanitary conditions of the tenement houses account for the prevalence of high mortality among the infants and women working in the jute and cotton factories and in the tea gardens. In Bengal the rate of infant mortality is about 50 per cent. but in Bombay the rate of mortality among infants reaches as high as 75 per cent. The workers are deprived of the enjoyment of some of the chief elements of Nature which are essential to physical or moral development.

The report which the two labour representatives—Messrs. A. A. Purcell and Hallsworth have written—on the condition of the Indian workers after a tour of India on behalf of the Trade Union Congress "paints a melancholy picture," says the Statesman, May 27, 1928, "of the distinguishingly bad housing conditions" of the vast majority of workers who "do not receive more than a shilling a day; are half-starved, badly clothed and horridly housed". The same report "describes the plantations in Assam as virtually slave plantations where husband, wife and child bring in no more than 1s. 3d. a day." Exploitation is stated to be the deliberate policy of the employers. In regard to the wage conditions the same report states "apparently it is the definite policy of the employing classes to stabilize poverty on a permanent basis. It is a waste of time to pester about with unheeded petitions regarding minor grievances, while masses are left to scramble

like barabrians for the supply of the most elementary needs of existence."

4. **The Standard of Living of the Indian Labourer.**

The black picture of labour condition in India drawn by the British labour representatives may appear to us to be some what exaggerated. But the account is not very far from the truth. The impression which the account leaves upon one's mind is that the picture is drawn from a comparison of the condition of labour in India with that of Great Britain. A comparative study of the economic conditions of the Indian mass and of the British or of the American mass cannot but lead to conclusions arrived at by the British representatives. But the point which should be noted in this connection is that the standards of living of the people of these countries differ widely from one another. In fact the standard of living differs from continent to continent and from country to country, and from age to age. The British or the American labouring class live a standard of life which is much higher than that of the Indian labouring class. There is, perhaps, no labouring class in Great Britain or in the United States, which resembles in economic or in moral conditions to the Indian labouring class or of the Indian mass. The Indian labouring class or the Indian mass is a class by itself which has no parallel in England or in the United States.

Nevertheless, for the purpose of proper understanding of the state of the Indian labour or of the Indian mass of workers, it is desirable that the economic conditions of the Indian labouring class and those of the European and American labourers should be compared and contrasted. A comparative study discloses the fact that the average Indian worker, artisan or agriculturist fails to satisfy some of the most elementary needs of civilised life, whereas the British or the American labourer has within his reach not only the means of satisfying his biotic needs but also many of the conventional needs of civilised life. In India the struggle for existence amounts practically to a scramble for biological or primary needs of life, whereas, in England or in America the labour movement represents a struggle for a higher standard of life. It is a struggle for equality and liberty.

The average income of the Indian, British or American labour bears a clear testimony to this.

It is a well-known fact that the average income of a family in India is difficult to know. It has been estimated at figures varying from Rs. 100 to Rs. 140 a year. The annual average income of a family in India will not exceed Rs. 150 although there are many families who receive incomes higher or lower than this amount. The minimum income of a family in England will range between Rs. 800 and Rs. 1000. and that of a family in the United States Rs. 1,500 and Rs. 2,250. It is evident that an annual income of Rs. 150 can never satisfy the primary needs of modern civilised life, no matter how low the cost of living may be. Making allowance for climate and other things the minimum income necessary for the satisfaction of the biological needs of modern life ought to be a sum varying from Rs. 400 to Rs. 500 a year which amount now represent the income of a middle class rural family in India.

Modern conditions of life call for notice for the changing needs of modern life. The needs of life are nowhere fixed: they change from age to age. Even the biological needs which are supposed to be fixed have considerably increased in Europe since the Industrial Revolution, and the change brought about by the Industrial Revolution, has affected all the classes of people in Europe and America. With the increase of wealth or production of utilities the per capita income has also immensely increased. In India a radical change has taken place in the economic life of the bourgeoisie. The biological and the conventional needs of the modern bourgeoisie have had an extraordinary development during the last 30 years. The physicians, the lawyers, the professors, the public officials, the capitalists and the merchants living in the modernised cities sometimes earn very large incomes and live a standard of life unheard of in the last generation. The whole change is, of course, due to the economic, political and intellectual forces introduced into India by the Europeans.

It is evident everywhere that the economic life of the bourgeoisie has undergone a complete transformation under the new regime, but that of the mass has remained practically

unchanged. Wealth is much more equitably distributed among the capitalists and workers in England and in America than in India. The contrast between an Indian capitalist or zamindar and his cooly labour or peasant ryot may best be represented by extreme luxury and extreme poverty.

Such a discrepancy in the distribution of values with regard to capital and labour or land and labour is not to be found in England or in America. In India the distribution of social values in general based upon caste and customs is far from just and fair.

5. The Development of Trade Unionism in India.

The labour organisation in India is a recent development. The first trade union was started by Mr. B. P. Wadia in 1918, and since then, trade unions began to spring up all over India. The year 1919-20 has been one of great economic depression. High prices and comparatively low wages were primarily responsible for restlessness and disaffection which prevailed among the working people. The high cost of living caused about 200 strikes in the year 1920 and about 1000 in the following year. But most of these strikes were short lived and many of them were stimulated by political leaders.

Now, the trade unions in India are the development of these strikes into strike committees during disputes between labour and capital. During the earlier days of the trade union movement most of the organisations were more or less evanescent. They were formed during the strikes and they vanished after the dispute was over. They had no permanent funds, and, therefore no permanent organisations.

The reason for this is that labour in India is migratory or floating. But there are certain trade unions which have permanent funds and paid officers, and are, therefore, well-organised. These are the Seamen's Unions, the Indian Telegraph Associations and the Railway Workers' Associations. They are as strong in organisation as any found in Europe or in America. This is explained by the fact that the members of these associations are generally literate and educated, and "a fair proportion of the members belong to the domiciled European and Indian communities."

The trade union movement is still in its infancy. But the remarkable development in the number of trade unions which has taken place within comparatively recent years, indicates that they will grow and multiply, and develop into permanent organisations. In fact the number of registered trade unions has been on the increase since the passage of the Trade Union Act in 1926. It must, however, be noted that the Indian labour organisations of the factory workers bear only "a superficial resemblance to those of Europe and America."

CHAPTER 35.

THE DEVELOPMENT OF RAILWAYS IN INDIA.

1. The Introduction of Guaranteed Railways in India.

The modern railway is a development of the tram car. Tram cars drawn on wooden rails by horses were employed for the carriage of coals from the mines in England in the 18th century. It was not until the first quarter of the 19th century that steam railways were first introduced into England and the system of inland communication was revolutionised in that country. During this period England was dominated by what is known as "railway mania," and English railway speculators contemplated the possibility of introducing railways into India. After much discussion and deliberation upon the possibility of introducing and adjusting railway communications to the physical, climatic and to the social conditions of the country two railway companies—the East Indian and the Great Indian Peninsula, were formed in the year 1845 with a view to construct some experimental lines in India. And in the same year a railway engineer, named Mr. Simms was sent out to India to form a scheme of some experimental railway construction in this country. Mr. Simms, who was an expert engineer drew a scheme of railway organisation which was published in a memorandum in 1846. The construction of Indian railways was largely based upon the scheme drawn up by this engineer.

In the meantime the problem of financing Indian railways drew the attention of the authorities as well as of the companies. The East Indian Company found it difficult to raise capital without some sort of a pecuniary assistance in the form of a guarantee or subsidy from the Government. Mr. Simms thought that it would be advisable to offer some guarantee to the railway companies, but the Government of India was, at first, opposed to any scheme of guarantee, which might lead to unreasonable speculations. The Court of Directors, however, thought that guarantee was essential

to the encouragement of railway construction in India. Owing to the difficulty of raising the necessary capital without some assured return on the capital invested, and the urgent necessity of having railways in India, recourse had ultimately to be had to the guarantee system.

Guarantee system was, therefore, brought into existence. According to the terms of the contract under guarantee a rate of five per cent. interest on capital invested by the East Indian Company was guaranteed for a period of twenty-five years by the State with a promise that if the profits after defrayal of the working expenses should exceed the rate of five per cent. guaranteed, the surplus profits should be equally divided between the Government and the Company. And in order to avoid the loss by the fluctuation of exchange the interests were made convertible at the rate of 22d. for the rupee. The contract also included the free grant of land to the company. The Government, however, reserved the right to supervise and control over the expenditure and also the right to purchase the railways at the end of 25 years or fifty years.

Such in brief was the system of guarantee under which the East Indian Railway, the Great Indian Peninsula Railway, and the Madras Railway were formed in 1849 for the construction of some experimental lines. No serious effort was, however, made to extend railway construction in India before 1855. Prior to the mutiny Lord Dalhousie indicated the various social, economic and political advantages which could be derived by knitting together the Presidencies, the interior and the ports by opening up main lines. His great ideas published in 1855 were favourably received by the Board of Directors. His scheme was further strengthened by the difficulties and dangers to which communication was exposed during the dark days of the Mutiny.

After the Mutiny when the construction of railways was suspended, serious efforts were made to construct railways in India. The guarantee system which naturally offered a great attraction to foreign capital gave a great impetus to the development of railways. By the end of 1868 altogether 1,832 miles of railways were constructed under the principles of guarantee. In fact the great trunk or main lines—the

East Indian, the Great Indian Peninsula, the Madras, the Bombay Baroda and Central India, the Sind Punjab and Delhi, and the Eastern Bengal railways—were all constructed on broad gauge (5ft. 6in.) under a system of guarantee.

2. State Railways.

The method of railway construction by guarantee did not produce satisfactory results. (For the defects of the system Vide Parliamentary Committee of 1858; and S. C. of 1872 Q. 1895, 8867). It entailed heavy loss in the way of interest paid by the Government out of its revenue to the companies. The evils of the guarantee system are stated to be numerous. Application of the expensive standard gauge system, the construction of double track lines in places where the need for such lines hardly existed, alteration of the routes after the construction started; speculations and other difficulties and defects—rendered the earlier railway ventures inefficient and unprofitable. The earnings of the guaranteed railways were inadequate to meet the interest charges and the Government was forced to meet the deficit from its treasuries. Attempts were, therefore, made to induce private capitalists to construct railways without guarantee. But these did not materialise; private capitalists were not willing to invest their capital in Indian railways unless some reasonable return on their capital were assured.

However, the experience gained from the guarantee system led to a change in the railway policy, and the desire to have state railway came into prominence. Suggestion for state railways, first, appeared in a despatch of the Secretary of State in 1868. In this despatch the Secretary of State drew a distinction between commercial lines and political lines. By 'Commercial lines' he meant those lines which "would open up districts whose natural resources are at once the largest and the least developed." These lines should be constructed by companies under a system of guarantee. But the construction of political lines (i. e. military) lines which could not be expected to be remunerative should be undertaken by the State. The idea of constructing railways by the State from its own funds or from borrowed money was also suggested by Lord Lawrence (the then Viceroy of India), in 1869. His views were accepted

by the Secretary of State and definite schemes were prepared for the construction of State railways on the metre gauge (3ft. 3½in.) instead of the expensive broad gauge (5ft. 6in) made use of by the guarantee system.

Then an era of state railway construction followed with rapidity. By the end of 1880-81 over 35.5 million pound sterling (35.5 crores of rupees) were expended on the construction of state railway, and 2, 709 miles of railways were brought into existence. The construction of state railway continued for another decade. The capital needed for the state railway construction was obtained in part from the revenue of India, but largely (about 85 p.c.) from money borrowed in London on the credit of India. The interest charges swelled up to an enormous amount owing to the continuous fall in the exchange value of the rupee from 22½ in 1870-71 to 16½ in 1891-92, inflicting a heavy loss to the Indian treasury. Moreover, the conversion of the Sind and the Punjab lines from metre gauge to broad gauge for strategic reasons involved also a heavy expenditure to the Government. Thus, the state railways were no more a blessing to the country than the guaranteed railways so far as the financial aspect is concerned, although the guaranteed system involved a heavier loss.

3. Renewal of the Guarantee System.

It is necessary to note that at the time when the construction of the state railways commenced the renewal of guarantee of some of the earlier guaranteed lines came under the consideration of the Secretary of State. According to the old terms of the contract under guarantee the Government was empowered to purchase, at the end of 25 years, any of the guaranteed lines. The contract with the East Indian Railway Company was to expire in 1874. The Secretary of State opened negotiations with the company and entered into fresh contract with it. By the new arrangement the Government of India incurred a considerable loss of money. It was also stipulated that during the remainder of the period of the lease the surplus profits above 5 per cent. should be equally divided between the Government and the company. On similar terms fresh contracts were made with the Great Indian Peninsula Railway, the Bombay, Baroda and the Madras railways.

In the meantime a new situation developed in the country. India was visited by a number of disastrous famines. These famines which extended over the period from 1874 to 1879 wrought havoc among men and cattle and caused a heavy loss of land revenue (by remission) to the Government. To cope with the new situation Famine Insurance scheme was inaugurated in 1877-78, and the construction of irrigation works for agricultural development and of railways for the rapid transportation of grains from regions of plenty to the famine-stricken areas came under consideration. The famine Commission of 1880 insisted on the necessity of the extension of railways as a measure of protection against famines. It recommended the construction of 5000 miles of railways for this purpose, and maintained that the country could not be made safe from famine until the total mileage reached 20,000. Elaborate schemes were, therefore, prepared for the construction of famine protection railways. But the actual working-out of the programme was delayed by the out-break of the Afgan war.

It is worthy of note that during this period the question of financing the projected railways led to prolonged discussion both in India and in England. It is impossible to go into details of the discussion within the brief compass of the book. Some of the salient points may, however, be touched here. It was well understood that the method of constructing railways through the agency of the State from exclusively borrowed capital or from Government revenues could not be accomplished at a rapid pace. It would naturally involve a slow process. Moreover, it was decided by a Committee of the House of Commons in 1879 that the construction of public works, chiefly railways, from borrowed capital should not exceed £2.5 million pound sterling a year. In the year 1881 the Secretary of State urged the construction of railways on commercial principles. That is to say, railway construction should be made remunerative and without guarantee if possible. However, several attempts made by Government to induce private capitalists to undertake the construction of railways on their own account proved abortive. It was soon discovered that the rapid extension of railways urged by the needs of the country could not be accomplished without some form of a guarantee.

Under such circumstances the guarantee system had again to be introduced, though on easier terms than before, and a number of new guaranteed railway companies were formed. To illustrate the new guarantee system. The contract made with the Southern Maharatta Railway Company in 1882 provided that the railway should remain the property of the State, but it should be worked and funds provided by the company. It was also stipulated that the company should receive a guarantee of 4 per cent. for five years and $3\frac{1}{2}$ per cent. thereafter, together with a fourth share of the net profits. The Indian Midland Railway (1882) which was afterwards absorbed by the Great Indian Peninsula, and the Bengal Nagpur Railway (1883) were started with a guarantee of 4 per cent. and a fourth share of the surplus profits. The Assam Bengal Railway (1891) was also constructed under guarantee system.

The fundamental difference between the earlier guarantee system and the new guarantee system was this. Under the new system each railway line was from its inception State property, but it was not so under the old system. Moreover, the rate of interest under the new guarantee was lower than it was under the old system. Under the new guarantee a larger share of the profits would accrue to the Government.

It is worthy of note that endeavours were again made to induce private companies to undertake railway construction without guarantee. Between 1880 and 1890 some new experiments were actually tried by four (unaided) companies, viz., the Nilgiri, the Delhi—Ambala Kalka railway, the Bengal Central, and the Bengal North Western railways. All these railways which started without a guarantee met with reverses. The Nilgiri proved a total failure, "and to save the Delhi Ambala Kalka and the Bengal Central guarantees were given, and to prevent the extinction of the Bengal North Western the Tirhut railway was leased to it."

4. The Construction of Branch Lines.

In the meantime a new type of railways introduced into the country was the branch railways constructed under a system of rebate or guarantee. In the year 1893 the rebate system was inaugurated. The main object

of the rebate system was to encourage the construction of branch and feeder lines by private companies without a guarantee. According to this new arrangement companies were offered a rebate instead of a guarantee, which is payable in pound sterling. The rebate was limited to 20 per cent. of the gross earnings of the traffic interchanged with the main line. The lines constructed under this arrangement were the Ahmedabad Prantaj, the South Behar and the Southern Punjab. The competition of the four per cent. trustee securities made the rebate system unattractive. So the terms were revised in 1896 granting a guarantee of 3 per cent. on the capital outlay and a share of the surplus profits, subject to the condition that the total return including rebate and the share of the profits must not exceed $3\frac{1}{2}$ per cent. on the capital outlay. Suffice it to say that under this new arrangement a number of branch lines were constructed.

The rebate system underwent a further modification owing to the changes which had taken place in the trade and commerce as well as in the railway finance of the country. Since their inception the Indian railways worked at a considerable loss to the State up to the close of the last century. From the beginning of the new century, however, they showed signs of gain or excess of return over expenditure, and it was in the year 1900 that the railways earned for the first time in their history some net profits. Although the year 1907-8 was a bad one for railway finance the history of the Indian railway from 1900 onward may be said to have been one of continued progress and prosperity.

The great measure of success which has attained the railway enterprise in India from the beginning of the new century is ascribed to a number of causes of which the industrial development of the country and the stabilisation of the exchange brought about by fixing the ratio at £1 to Rs. 15, are of fundamental importance. The rapid development of the cheap means of communication reduced distances, lowered the cost of carriage and enormously increased traffic. By knitting the different parts of the country the railways rendered a system of national and international economy possible. The rapid development of trade and commerce brought about by the introduction of railways made increas-

ing demand for transport facilities, increased railway earnings and, thereby, made possible the improvement of the existing lines as well as the construction of new lines.

In the year 1910 the guarantee rebate system was revised and new arrangement was made for the construction of branch lines. Under the new arrangement the three per cent guarantee was raised to $3\frac{1}{2}$ per cent. guarantee, and the rebate raised from $3\frac{1}{2}$ per cent. to 5 per cent. It was also stipulated that any surplus profits which might be earned after paying interest on the paid-up capital at the rate of five per cent. shall be equally divided between the Government and the company in both cases (i. e. rebate and guarantee).

The next measure adopted by the Government of India for the construction of branch lines is found in the Resolution of March, 1914. Under it two methods of financial assistance are offered by the Government: a guarantee of $3\frac{1}{2}$ per cent. on the paid-up capital or a rebate of 5 per cent. on the net earnings which the main line may derive from the branch line. In both cases the State is entitled to a half of the surplus profits in excess of five per cent. It should be noted, however, that assistance in the form of a rebate can only be granted to branch lines when the main line is worked by the State. But the Government of India are willing to negotiate similar terms with the parent line on behalf of other projected branch line companies. A rebate and a guarantee of interest cannot be granted simultaneously in respect of the same branch line.

5. Purchase of Railways by the State.

It is needless to reiterate that the State was empowered to purchase the guaranteed lines when the terms of contract lapse. Accordingly in the year 1879 the Secretary of State exercised this power in the purchase of the East Indian Railway. The purchase price is payable in terminable annuities which are to run for 74 years. From 1953 when the annuity expires the Government will be able to reap the full benefits of all the profits. Later on, other lines—the Eastern Bengal Railway (1884), the South Indian Railway (1890), the Sind and the Punjab Railway (1885-6), the Oudh and the Rohilkhand (1888), the Great Indian Peninsula Railway (1900), the Bombay Baroda and the Central India Railway

(1905) and the Madras Railway (1907) have been purchased by the State on the basis of annuities. At present all the earlier guaranteed lines and most of the main lines are State railways. Some are being worked directly by the State, while others by State Agency. Most of the Indian railways are now state railways.

6. Railway Administration.

Since the introduction of railways no definite policy had been pursued by Government with regard to railway finance. That is to say, no separation was made between railway finance and state finance. Railway expenditure and railway profits were intermixed with state expenditure and state finance, and any surplus or deficits in the general finance seriously affected railway finance and railway construction. And not infrequently had railway profits been swallowed up in general expenditure in order to balance the budget. Under such circumstances it became difficult to plan ahead and to carry any scheme of railway construction. The sudden expansion and contraction which the history of Indian railway experienced from time to time resulted from the vicissitudes of general finance. This unstable state of financial affairs has been due to the financial difficulty of the Government, and the fluctuation of the exchange value of the rupee, and the political situation of the country.

The evils of the financial administration of the Indian railways had been frequently pointed out by Members in charge of the Public Works Department, but it was not until the beginning of this new century that the matter had been taken into serious consideration. In 1901 Mr. Thomas Robertson in his Report On The Administration And Working Of Indian Railways recommended the institution of a Railway Board consisting of practical business men, in substitution of the Public Works Department, for the management and control of the Indian railways, and the creation of a Railway Fund. He was of opinion that the sum allotted yearly to railways was inadequate to meet the needs of the country. The Mackay Committee in 1908 set the minimum expenditure on railways at £12,500,000 a year. The Acworth Committee in 1921 estimated that a sum of £20 million pound sterling

should be expended annually on railways. It urged on the complete separation of the railway budget from the general budget and on the emancipation of the railway management from the State control.

In pursuance of the recommendation of the Acworth Committee the Government of India appointed in 1921 the Railway Finance Committee to deliberate upon its recommendations. The Railway Finance Committee found out among other things that the separation of the railway budget from the general budget as contemplated by the Acworth Committee would inflict a heavy loss to the Government finance. The railways have been a great source of revenue to the State. Historically the equilibrium of the general budget depended largely upon the profits of the railways. The Committee, therefore, advised that the question of complete separation should be reconsidered in future when financial equilibrium is re-established. But for the immediate improvement of the existing lines the Committee recommended a five year programme, with a capital expenditure of Rs. 150 crores, i. e. Rs. 30 crores a year. All this sum is to be spent exclusively on existing lines or on lines under construction. No portion of this money should be spent on new lines.

The Legislative Assembly accepted the recommendation of the Railway Finance Committee and recommended that a sum of Rs. 150 crores should be devoted to railways during the five-year period commencing from 1922-23. The question of separating the railway budget was re-examined by the Inchaape Committee in 1923. Examination of the railway workings by the Committee revealed several defects in connection with the working of the railways. It showed among other things that the railways could be so worked as to yield an average return of at least $5\frac{1}{2}$ per cent. on the capital outlay at charge and that a surplus of Rs. $8\frac{1}{2}$ crores would be left to the Government after meeting the working expenses, interest charges, annuity and sinking fund charges. The Committee advised that the railways should be rendered self-supporting. It thought that the time for separating the railway finance from general finance had come, and advised that the separation should be accomplished. On March, 1924 the Legislative Assembly accepted this recommendation and passed a Resolution recommending among other things that

“the railway finances shall be separated from the general finances of the country and the general revenues shall receive a definite annual contribution from railways which shall be the first charge on railway earnings.”

The nature of the contribution as adopted by the Resolution of March, 1924, was, however, modified by the Resolution passed by the Assembly on Sept., 1924, and accepted by Government. According to the final resolution the contribution was fixed at a sum equal to 1 p. c. on the capital out-lay and if the surplus remaining after this payment should exceed Rs. 3 crores, only two-thirds of the excess over 3 crores were to be transferred to the railway reserve and the remaining one-third was to accrue to general revenue.

Thus, at last railway finance was separated from general finance, in 1924-25. In the same year (1924) following the recommendation of the Acworth Committee some material changes have also been introduced into the constitution of the Railway Board.

7. Inadequacy of Railway Transport.

It is needless to dwell upon the immense benefits—political, social and economic which the railways have conferred upon the peoples of India. The railways are one of the main arteries of modern civilisation. The development of industries and agriculture which have taken place in India to an unprecedented measure during the last 70 years must largely be attributed to the introduction and development of railways into India. No country in Asia except Japan, and Turkey can boast of such an extensive development of modern transport facilities as India. The table below shows the rapid development of railways in India.

Statistics Of Indian Railways.
(Figures in miles)

1860	838
1871	4,771
1880	8,996
1890	16,404
1900	24,752
1905	28,287

DEVELOPMENT OF RAILWAYS

1910	32,093
1915-16	35,833
1920-21	37,029
1924-25	38,270
1927-28	39,712

Of the total railway mileage over 27 thousand miles are Imperial State railways and about 5000 miles are Indian State railways. About 72 per cent. of the Imperial State railways are owned by the State but worked by the State Agency, while 24 per cent. is directly managed by the State. The gauges of the railways, 1925-26, included:

The Standard gauge (5ft. 6in.)	18,932 miles
The Meter " (3ft. 3in.)	15,872 miles
The Narrow " (2ft. 6in. and 2ft.)	3,774 miles

The railway figure at once suggests that India is rather poorly provided with railways. India is a vast country with an immense area of over 1.8 million square miles and inhabited by a very large population which according to the Census of 1921 numbered about 319 million souls. If the total mileage is roughly taken at 39,000, this figure gives 20 miles of railway per 1000 square miles of territory and 1.2 miles of railway per tens of thousand of population, or 1 mile of railway to over 85,00 persons. This distribution at once indicates that compared with Japan or with any European country India is not well-provided with railways. This fact has been recognised by the Famine Commission of 1880, the Robertson Committee of 1901, and by the Acworth Committee of 1921. It has been recently pointed out by an authority on railways that the total Indian railway mileage is "a drop in the ocean as compared to the enormous areas now under-developed in India." India with an area of 1,803,000 square miles has only 39,712 miles of railway, while Europe minus European Russia has an area of 1,754,000 square miles with 190,000 miles of railway.

It is a well-known fact that in India there exists a disproportionate relation between railway transport facilities and the growth of traffic. In fact the former has not been able to keep pace with the development of commerce and indus-

tries of the country. Consequently, the merchants, the manufacturers and the public in general have alleged a variety of grievances against the railways. Among the numerous defects pointed out by the railway committees and by the merchants and manufacturers the following are noteworthy: inadequacy of railway facilities, delay in transportation, inefficiency in handling traffic, over-crowding of third-class passenger carriages, insufficient booking-office facilities, prevalence of bribery and corruptions among the railway servants, and racial discrimination.

Inadequacy of railway transport has tended to retard the extension of trade and commerce and the development of industry and agriculture. The traffic has in many cases grown too large for the capacity of the existing railways to deal with it. Absence of adequate transport facilities has been a great impediment to the development of the coal mining industries, the metallurgical industries, and of agricultural and forest industries. It has often been pointed out that, grains, sugar, tobacco and other agricultural products lie sometimes for months before wagons are available for transporting them to their destination, and not infrequently damaged by exposure to atmosphere.

The present capacity of the railways is quite inadequate to meet the needs of the ever-growing traffic—both passenger and goods. Serious over-crowding of passenger—traffic has been a characteristic feature of the third-class railway carriages. Provision made in advance for pilgrim traffic or Puja-vacation traffic has always proven to be quite inadequate for the immense crowds of pilgrims and holiday-excursionists. On such occasions some portion of the pilgrim traffic has sometimes to be carried in goods wagons. Although bribery in some shape or other is almost a universal phenomenon in India the shortage of railway carriage and the consequent over-crowding afford the railway servants the opportunity of "making hay while the sun shines." They squeeze out whatever they can from their ignorant and helpless victims.

BOOK V.

THE OLD ECONOMIC REGIME AND THE NEW ECONOMIC SYSTEM.

CHAPTER 36.

ECONOMIC TRANSITION.

I. The Commercial Policy of Great Britain.

The colonial policy of England has been caustically criticised by historians all over the world. The conflicts of interests between the mother country and the colonies are well-known to all students of economic history. Regarding the colonial policy pursued by England towards her colonies Mr. Briggs in his *Economic History Of England* (p 193) says, "In the early days of a colony, England, transacting all business, materially controlled taxation. This was the weapon used later for control of trade. Foreign commodities were often refused admission or made to pay duty, while colonial exports were similarly controlled".

The profits of trade, "says another historian," "were undoubtedly the real motives of nearly all the British colonial enterprises. Later on, when these profits were seen to be considerable the home Government began to formulate a definite scheme of colonial policy in the interests of the mother country. This scheme was to raise up a number of agricultural dependencies which would exchange their useful products for the numerous manufactures of the home country." "The colonies were regarded," said Toinbee in his *Lectures on Industrial Revolution In England* (p. 81), "as markets and farms of the mother country."

The colonies were not only forced to purchase English manufactures, but were prohibited from undertaking these manufactures. The colonial manufactures within the colonies were hindered with such excessive duties, as particularly to

confine the manufactures, to a scanty home supply. The late Mr. R. C. Dutt pointed out over a quarter of a century ago that British manufactures were forced into India through the agency of the East India Company while Indian manufactures were shut out from England by prohibitive tariffs.

The commercial policy pursued by England towards India during the earlier days of the East India Company did not materially differ from the British colonial policy just outlined above. The differences lay in the fact that while England controlled the trade of the colonies only, (also politics for a time only) the East India Company had not only controlled commerce but also politics in India. It played the part of king-makers and established the vast British Indian Empire. And although the commercial policy of England had been greatly modified in favour of India since the transference of the Government of India from the hands of the Company to the Crown, the policy of controlling finance and industries of India in the interests of the mother country has not yet altogether ceased.

However, the commercial motive described above represents only an aspect of that policy. The commercial policy based upon commercial motive has never been fixed, but it has undergone great changes in the course of time. And although there is a dark side to it there is a bright side to it also. The disadvantages of a selfish commercial policy are greatly out-weighed by the benefits of trade and commerce. The foreign trade brought with it the British idea of liberty and progress, infused and circulated this idea among the peoples of the dependencies and protectorates. It is idle to suppose that commercial policy or foreign trade is an un-mixed evil and that it has always been destructive and not constructive at all. The European commercial relations wherever established produced a salutary effect upon the people; they have tended to heighten the intelligence and moral standard of the people, developed agriculture, industry and commerce. Upon whatever land commercialism or European baniaism and capitalism has set its foot upon it has changed the moral out-look of the people concerned. It has tended to infuse the idea of common interests, and the ideal of unity and social and political solidarity among peoples formerly divided by disintegrating forces of castes

and religions. European capitalism has developed the wild Americas, Australasia, Africa, and even the civilised India.

It is also an admitted fact that commercialism and capitalism has also an humanitarian aspect. It is, indeed true that the flow of capital from a place of low interest to a place of high interest where there is a scarcity of supply of capital is bound up with the motive for profit. Both commercialism and capitalism proceed from a selfish principle inherent in all human beings. But the idea of gain or profit does not exhaust the ethical meaning of such motive. Every motive leads to consequences. It is the deeds and consequences which evaluate the meaning of the motives. The flow of capital from England and also from the Continent developed the industries of the United States, Canada and South America, and paved the way for the great American civilisation. In like manner the foreign capital invested in India, although earns a large income, does in return a great service to India.

2. The Industrial Transformation of India under the British Rule

The fact that India has undergone a complete transformation in her economic life is exhibited by the changes which have taken place in the character of her industries. It is a well-known fact that the native industrial regime of India has been domestic in character. Handicraft domestic industries, simplicity of organisation and local or almost parochial markets characterised the native industrial system. The organisation of capital—money capital or instruments of production was primitive. The village was practically the economic unit both for production and consumption. Now all this has largely changed as a result of the establishment of the trade relation between the East and the West.

It seems that the industrial system of India passed through three stages or phases under the British rule. During the first period (1775-1850) some of her excellent hand industries, especially textiles, suffered from many a vicissitude under the East India Company's rule. The anarchy and confusion and political revolution which marked these days led naturally to the destruction of some of her best

industries, or led to their circumscription. Moreover, the policy pursued by the Company's Government towards these industries, especially textiles, was far from favourable towards India. The manipulation of the trade of the country through taxation tended to stiffen them. In fact the decline of the Indian textile industries was partly due to the operation of the restrictive trade regulations, and partly due to the effect of superior machine competition. However, side by side with the decay of the textiles there has sprung up in their place an immense machine cotton industry. And it is a well-known fact that deliberate efforts were made by the Company to foster agriculture in India.

Now, the processes of decay which began since the beginning of the 18th century continued up to the present time. But during the second half of the 19th century a new process of reconstruction commenced and continued also up to the present. During this period which lasted well into the first decade of this new century prepared the way for the third period, the modern period. The introduction of scientific methods into the industrial, commercial and educational life and even into the political life, of the people during the last sixty or seventy years has created the modern Indian economic world.

As a result of the introduction of the superior European methods since the middle of the 19th century a favourable change has been taking place in the Indian industry. The returns of foreign trade show a slow but a steady expansion in the exportation of manufactures and in the importation of raw materials. The tendency of the last twenty years has been in the direction of larger production of manufactured goods and partially manufactured goods; and commodities, which had hitherto been largely or wholly imported from abroad, are now being produced in greater quantities at home for domestic consumption. However, India still remains as she had been in the past, predominantly an agricultural country.

We must not, however, overlook the fact that many of the ancient articles once extensively made are still produced to a small or great extent. India still produces many of the beautiful articles for which she has been celebrated for ages.

Sir Richard Temple in his India. In 1880 pointed out that "If the purely indigenous industries of the finer sorts could be compared with those which existed in the days of the Mogul, some decline is perceptible. Thus, the Muslins of Dacca are now virtually extinct. These delicate fabrics are now made cheaper though not better elsewhere.....But if the indigenous industries of the coarser and commoner sorts," which constitute the major industries of India are compared with the existing handicrafts and machine industries introduced from Europe "expansion (language is altered to suit our purpose here) rather than contraction would be observed."

The opinion expressed by Sir Richard Temple in 1880 needs no authentication. Under the new exotic economic system production of wealth has immensely increased. Many of the modern industries have attained unprecedented dimensions. The introduction of the western scientific methods of production in India have brought about a tremendous change in the industrial life of the country. The development of the modern means of transport, banking, industrial and commercial institutions has no parallel in the history of India.

The history of Indian cotton industry, for example, shows a tremendous development since the middle of the 19th century. Statistics go to show that India now turns out about 55 p. c. of the piece-goods needed for her teeming population and over ninety per cent. of the yarns annually consumed by her mills and hand looms (valued perhaps, at Rs. 60 or 70 crores), and her annual exports of these goods are increasing slowly but steadily. It has already been noted by us that industrial development has not been confined to cotton textiles only, but extended to many other industries. The mining and metallurgical industries—coal, iron, gold, manganese, aluminium, copper, lead, zinc, &c., and the manufacturing industries—paper, glass, pottery, textiles and a host of other industries, however inadequate in their range of production for the enormous Indian demand, involve and indicate radically new method of production, and a new standard of consumption. Almost a revolutionary change has been going on in the industrial life of the country since the middle of the 19th century.

The essential difference which subsists between the old economic regime and the new economic system may be stated

in a few words. The indigenous industrial system has no pretence whatever to be scientific. It is based upon empirical knowledge. The modern development of the mining, manufacturing and agricultural industries has come as a result of the development of the sciences of geology, chemistry, engineering, physics, botany, and so on. Modern industry is based upon a foundation of a sound scientific knowledge. The indigenous industry is without any rudiments of science in the proper sense of the term.

The contrast does not end here. Modern economic world is based upon a knowledge of science which goes beyond the "ken of senses" and utilises the subtle forces of nature. Steam power, electric power, petrol and alcohol, drawn from nature are the foundation of the economic life of the advanced western countries. The use of these forces was unknown to us till they had been introduced into our economic life by the Europeans. Even the use of coal as a source of power is a recent development borrowed from the west. The native industrial regime has been founded upon palpable powers like charcoal, water, wind, and human energy.

It is evident that the old economic regime has been founded upon a knowledge of natural phenomena, and not upon a knowledge of the subtle forces of nature. Hand-tools and hand-implements may be regarded as simply extensions of hands and limbs (i.e. of senses), while a machine is an expression of thought (reason). The knowledge of science involves in handicrafts in general and in primitive agriculture is empirical, perceptual rather than conceptual, systematic and scientific. They have to do more with things rather than with relations of things and ideas—with tangibility rather than with relativity—with the palpable or perceptual natural phenomena, rather than with the subtle forces of nature.

Science introduced into India from the west has brought with it immense possibilities for future reconstruction. With the help of science India may succeed in bringing some of the turbulent and destructive cosmic forces which are responsible for miscellaneous evils and misfortunes, and she may in future escape from the servitude of nature.

3. Development of the Means of Communication and Banking.

We may now briefly review the influence of the new means of communication upon economic and social progress. A somewhat similar distinction just out-lined above may be drawn between the old means of communication and the new means of communication, the old methods of 'banking' or money-lending and the new method of banking or the new system of financial organisation, between the old instruments of production—handtools, and the new instruments of production—machinery, between the old method of marketing and exchange and the new method of marketing and exchange, and between the old laws of production and distribution and the new laws of production and distribution. It is not possible to do more than to mention here one or two of the most important of these principles.

In all forms of economic life the means of transport is an important consideration. It is a well-known fact that the means of communication in India have undergone a radical transformation both in character and in extent. This continent of India had practically been devoid of the modern means of communication except waterways and a few roads of primitive character—till the middle of the 19th century. The old means of communication consisted of human porters, bullock carts and palanquins on land and small wooden crafts on water with the maximum tonnage capacity of, perhaps, 300 or 500 tons. It may be noted that a modern sea-going vessel has the tonnage capacity ranging from 3000 to 55,000. Now, the Indian means of transport, whether land transport or water transport, whether for passenger or for cargo, were too primitive, local and too inadequate as means of conveyance for modern economic needs of life. With such a primitive transport economy the different communities could not but be self-sufficient. Under the age-old self-sufficient village economy and simple life the amount of transport required and the amount of traffic hauled must have been extremely small.

The difficulties of transport and the simple needs of life limited the extent of trade and commerce. Owing to the absence of adequate transport facilities the country

could not but be in a state of social, political, and economic isolation. In fact India, before the British rule was politically divided into countless rajyas (kingdoms) or chiefships and territories isolated from one another. Inadequacy of transport facilities, fears of robbers on land, and of pirates on water combined with the exclusive social institution and the pluralistic political systems—limited the range and scope of communication between distant parts within the country as well as without.

Now all this has changed. The modern facilities of communication and intercourse offered by the railways, the postal systems, the electric telegraphy, and telephony and wireless have completely revolutionised the economic life of the people. The application of electricity to traction, and its growing use as a source of power, the introduction of petrol engine and motor vehicles and the aeroplanes—are innovations from the "materialistic" west. As a result of the introduction of these scientific means of communication and the growth of modern industry and trade India is getting closely knit in all its parts. Railways, steamships, wireless and telegraphy have combined to draw the different races and peoples of India together into close relation. Under the new economic system we are getting more and more socialised and inter-dependent. The new means of communication have linked us with the important industrial and commercial countries as well as with the most civilised countries of the world with which we are in commercial and intellectual relation. They have revolutionised our commerce, affected directly and indirectly our exclusive social institutions and even our religions, and have tended to break down the barriers to isolation and "don't touchism."

Improvements in the means of transport or to put the same thing in another way, the rapid and cheap means of communication reduced distances, extended trade and commerce, and increased the national wealth of the country. Finally the different parts of the country have for the first time in the history of India been linked into *national economic system* by the rapid means of communication.

The modern organisation of the means of production and exchange are entirely dependent upon another factor—

namely, financial organisation. Banking organisation and modern means of communication are the two pivotal bases of modern western economy. Until recently the modern scientific method of banking organisation was unknown to India. There has indeed, been big individual merchants or money-lenders or mahajans, doing money-lending business, but there was no such thing as organisation of banking or capital. Under the old self-sufficient village economy the need for banking could hardly exist. Whatever savings made were buried under-ground or were converted into ornaments a load of which the feminine body carries does in fact represent a saving bank. Both the practices are still extant to a considerable extent throughout India even to-day. Money lending at usurious rates were and even now are universal phenomena. The co-operative banking systems, the industrial and the exchange banking organisations which are growing in extent and in importance are exotic institutions of comparatively recent development.

4. Development of Economic Organisation.

The changes in the industrial and economic life show exactly similar changes in organised life. The new western method of organisation of complex character has been introduced into India by the Europeans and are being imitated by us, Indians. All native organisations are comparatively simple and personal. The caste organisations, the agricultural organisations and the village organisations are all simple and personal. Even the zamindari organisations are personal and in principle simple, although the land tenures are in some places, extremely complex. The social structures in the wider sense of the term reflect the nature of morality of a people or its social habits and characters.

However, the associations of complex and impersonal character have been introduced into India from the occident. All corporate organisations—economic, political and municipal which modern India enjoys are foreign in origin. The municipal self-government is an exotic institution. Even the co-operative organisations and labour organisations which are growing in India represent foreign ideas transplanted into the soil of India from abroad. But they have produced little effect upon the caste institutions of the country.

However the introduction of these exotic ideas into the soil of India is producing consequences which are beneficial to the country. The modern development of the ideas of common enterprise and common interest and also of the conflicts of interests (group conflicts) have arisen as a result of the transplantation of the western economic system or methods. It is worthy of note that the slow and unconscious growth of individuality among certain sections of the Indians congregated in large industrial and commercial and political centers are the product, direct and indirect, of the western ideas of organisation and combination.

5. Contrast between the Old Economic Regime and the New Economic System.

Close examination of the economic facts described in the preceding pages discloses that there exist in India two systems of economic life—the old economic regime and the new economic system which stand in somewhat contrasted relations. Modern industrial India is a strange mixture of scientific industries and primitive crafts—and of modern economic structures grounded upon primitive economic ideals. We have, indeed, many of the modern western economic and political institutions of impersonal, corporate and legal character, but we have not yet been able to imbibe the western "soul". Although most of the exotic institutions are founded upon western principles they lack the western spirit or ideal, obviously because they have been grafted upon the primitive social and economic institutions. Nowhere in the world have caste institutions and feudalistic land organisations been rendered compatible with modern democratic institutions and corporate organisations. It appears as if the new system is something super-imposed upon the old system by extraneous forces, and consequently the extraneous and the indigenous have not yet developed a bond of spiritual unity. The mixture of the two incompatible systems is rendered apparently harmonious by the British rule of Law. The modern economic and political system rests upon an artificial and adventitious support.

The contrast between the old economic regime and the new system is remarkable in the relation which subsists between the exotic industrial system and the indigenous industrial and agricultural systems. This relation may best be tackled through the four factors of production, land, labour, capital and organisation upon which an industry is supposed to depend, and also through the social and political ideals of the peoples.

It is necessary to point out here that although agriculture does not admit of large-scale organisation, yet it has attained a much higher development in respect of organisation of land, labour, capital, and in tilling lands and in marketing of agricultural produce in Europe and in America than in India. The Agricultural Revolution in England necessarily followed the Industrial Revolution. In Europe or in America there is a complete co-ordination between agricultural and industrial development, but there is no such co-ordination between them in India. The Indian land systems breathe the spirit of feudalism, agriculture that of primitivism, and social life castism and "don't touchism"!

It appears that there is no essential relation between the primitive agricultural system and the new industrial system, and between the indigenous handicraft and the exotic machinery, evidently because the former is not a descendant of the latter nor a product of the spiritual heritage of India. This is clearly exhibited by the extent and complexity of organisation in the factory industry as against the simplicity and crudity of organisation in agriculture and in handicrafts. It is evident that the modern mining and metallurgical industries, the power-driven iron and steel and textile and other industries, and the banking and marketing and transport organisations which are associated with these trades are highly organised, and some of them are extremely complex. These trades are organised on scientific principles and are carried on by the Europeans or by the educated Indians of means, while the handicrafts are carried on by the ignorant and generally by the low-class poor people and financed by money-lenders. There is a wide gap to be bridged between the old domestic system and the new domestic system and between the old domestic system and the

factory system, between the low classes and the high classes who respectively carry on these trades, and between the primitive ideals and the exotic new ideals.

However, between the native domestic industry and agriculture there is a harmonious relation, but as between these and modern industry the relation is far from harmonious. Both hand-industry and agriculture in India remain practically individualistic and practically unorganised. There is a lack of alignment or adjustment between agriculture and industry and between handicraft and machine industry. And it appears that this discrepancy between them will continue until the arts of agriculture and domestic industries are brought to the level of the arts of machine industry or to scientific standard of the hand industry.

It is worthy of note that the methods of agriculture have not made as much progress as the industrial arts have done. One of the fundamental reasons for this is the fact that in the industrial development the initiative has come from the European capitalists, European entrepreneurs and European experts, while agriculture or tilling has been left practically to the initiative and to the old methods of the ignorant peasants. And it is evident everywhere that on whatever line there has been European touch or European influence the whole system has undergone a complete transformation. In agriculture the tea, indigo and the rubber industries are conspicuous examples. The same is true of the textile and iron or other metallic industries—which are either owned and managed by the Europeans, or where they belonged to the Indians they had to pass through a period of instruction under Europeans. Had the Europeans gone to the extent of tilling the soil agriculture (and some handicrafts also) would have undergone a complete transformation.

(6) Economic Transition.

The above discussion on the relation between the old and the new economic systems logically leads to the question of economic transition. The economic transition out-lined above cannot be said to be a genuine one. First, it has not been an all-around transformation, and secondly, it has been, more or less the result of exotic influence, and not so much of

Indian or native influence. There is a distinction in meaning and significance between things and ideas originated from foreign initiative and those originated from native (Indian)—initiative or ingenuity. The difference evidently lies in the appreciation of the meaning of progress. Where progress is achieved by one's own effort there is an intelligent appreciation of its meaning, but where it is effected through or thrust upon by a foreign agency or by forefathers, the meaning is not very clear to the people or to the descendants.

The cardinal point to be noted is that whatever transformation has taken place has affected more or less things and sporadic ideas or industrial structures, and not the very soul of the Indian life. Economic transition signifies the passage from one stage or state of economic phenomena into another stage or state of economic phenomena, but such a transformation involves a spiritual force. Some evidence on this point will make this statement clear. The substitution of the "charka" by machine, the bullock-cart by railway or motor car, hand-driven wooden vessel by steam-driven steel vessels, and so on—only give us the structural transformation of economic life. But transition or transformation of this character in England was preceded and followed by or involved, some deeper meanings or ideals. The old economic system which existed before the Industrial Revolution and the new system created by the revolution involved and expressed two different types of social and economic ideals or meanings. The industrial revolution in Europe was not merely structural but moral and spiritual. An economic transition not only involves changes in structures and in principles but also changes in the wills and aspirations of those who are affected by the transition. A transition to be genuine must involve a change not only of things and ideas but also of ideals. Has there been any such change in the moral outlook of the peoples of India—is a question which needs deliberation and reflection.

It is often said that the importation and transplantation of new things and new ideas sharpen the intellect, quicken the imagination and change the moral and spiritual outlook of the people concerned, and even revolutionise

the "mind stuff" or the wills and aspirations of the people. Now, it is noticeable that the introduction of the countless things and ideas into India from the occident has not been entirely meaningless to the Indians. They have produced some salutary effect upon the emotion, volition and the ideation of the reflective Indians. It is evident everywhere that concurrently with the constant appeal made in the name of the glorious golden age of the past for the revival of the old traditions and antiquated institutions, and agitation carried on against foreign things and ideas, the production and consumption of the "untouchable" and "materialistic" western ideas and commodities—from the news-paper printing down to powdering the face—and the imitation of the western fashions—has been growing out of all proportions. The fact that the production and consumption of the new things and ideas and the adoption and application of the western methods to our economic, social and political life involve and imply a somewhat different life—a better and more efficiently organised life, has not, perhaps been grasped by the bulk of the people. However, the increasing demand for the "despicable" western things and novelties show the slow and silent, though unconscious, development of a new economic and moral force.

The insatiable desires for new and better things testify to the fact that human nature is somewhat similar everywhere, and that it is susceptible to change with the changing environment. Progress results from the influx of new ideas. It begins with the appreciation of the difference between the past and the present and between the present and the future. It consists in discovering new values and better means and methods of production and organisation. But the antiquarian, enlightened or orthodox, always look back to the past—to the origin—to the old values,—to the supposed "good—old days" and are tempted to measure everything in terms of the time-immemorial standard of "perfection."

There are various forces at work in the social and economic world of India to-day which required to be balanced and counter-poised in their operation. In fact the reactionary antiquarian forces are too strong, and they dominate the average man, big or small. The Indian in general lag a long

way behind the swift onward march of modern thoughts, ideas and ideals. The illusion and superstition of a golden age supposed to exist in the hoary antiquity is largely responsible for the lack of harmony in neo-India.

Yet it is evident everywhere that modern India is passing through rapid changes, especially in her political and economic life, but little in her social life. It is also worthy of note that practically all changes are centered in the top and little in the bottom. The modern political and industrial India is in fact top-heavy, just as it has always been the case with her in the past when lakhs of "rajās" and sages monopolised all the privileges. For the present top-heavy condition of India the government and the Indian bourgeoisie as well as the people themselves must be blamed, for no matter what shape and form or constitution of the government may be it is always the "rajās" and the "spiritualists" who will hold and do in fact hold the reign of law and justice. This is, perhaps, because autocracy, land-serfdom and caste-servitude are our time-honoured spiritual heritage which none could shake off no matter how well-instructed one may be in western science, art or philosophy. In fact, power or force is congenial to the people. Autocracy or force is better understood and quickly responded to where appeal to humanity or universality or to common interests and common enterprise which democracy presupposes are wasted breaths.

"India" is changing and is consenting to change, but without any original "impetus" or spring of vitality or initiative from the people themselves. That is why the changes or achievements and advancement which modern India enjoy have all proceeded from the top. The bottom is full of inertia of the past. The bourgeoisie group is in the process of being emancipated from the past inertia, but the mass of the people are still in the grip of the old "fetters". They are still subjected to all sorts of exploitation which help to fatten the aristocrats.

The so-called exploitation of India by the foreigners is in fact rendered possible by the time immemorial exploitation of the mass by the "rajās" and "sages" since ages. India paid too dearly in the way of slavery to foreigners, for the

material, moral, intellectual and spiritual exploitation of the people has been exacted at the expense of the freedom and growth of the individual self as well as of the social self. In the name of spiritual civilisation the development of the "atma" (self) has been held in check so that the "soul" of the people has degenerated and corrupted into an unnatural fixity. Salvation of a country, depends not upon the freedom of the "rajas" and "sages" only but upon that of the people itself.

CHAPTER 37.

DISTRIBUTION AND SOCIAL STRATIFICATION.

1. The Hindu law of Karma and Distribution and Production.

The Hindu doctrine of distribution is complicated by philosophical speculations and by religio-social customs and institutions. According to the Upanishadic speculations the Brahman or the pantheistic spirit is the efficient cause of the universe. From it the origin, the subsistence and the dissolution of the universe proceed. It is "the sole ruler, the inner self of all creation, which has out of its almightiness made this diversified world." In the Hindu sastras or scriptures or sacred books the spirit is described both as a pantheistic spirit and a monotheistic deity, and even as polytheistic deities. It or he is the creator, the preserver and the destroyer of the universe. He is the determinator of everything and of every being. But, on the other hand, the influence of karma upon life is strongly emphasised. Karma is believed to be the determinator of everything. All human beings are subject to karma and caste laws. The Bhagabata Gita teaches that Krishna—the pantheistic deity—the incarnation of God, is the creator of the four castes. Manu, the Hindu law-giver, also reveals the caste divisions of humanity as contemplated by the Sambhu.

There are, thus, two theories in the Hindu sacred books—the divine will and karma which account for the production and distribution of values. But which of these two doctrines is of fundamental importance is difficult to decide. On the one hand it is maintained that the evil effects of karma (or influence of karma) may be destroyed or modified by the divine grace, while, on the other hand, karma is believed to have precedence over all other divine or satanic or planetary forces which, according to Hindu beliefs, control human destiny. However, the doctrine of karma plays a very large roll in the life of the Hindus, high

or low, rich or poor. The Hindu social system is intimately associated with the law of karma and caste. Moreover, it is considered by the wise Hindus to be the most perfect law of moral justice ever discovered by man. It is a pity that this super-sensuous doctrine of karma has been discarded by the western scientists except by the occidental occultists and antiquarians.

Now, the law of karma is believed to be the ultimate explanation of all joy and sorrow of life. The ultimate basis of the laws of production and distribution must be sought in this subtle law of karma. Karma is the cumulative force of the activities of the past lives of the present individual. All events of life are believed to be explicable by the karmic cause and effect. It is the cause as well as the effect of production, distribution and consumption of all values, and it is the determinator of human and animal conduct as well as of the motion of, or change in, the vegetable and mineral world. An individual's productive capacity, his worth and his lot—are all mapped out by his past karma. Present will or what is called free will has little power over the cumulative force of the past karma of the individual.

The law of karma is employed as an universal criterion to explain all that we do not and cannot know. All events, especially the bad ones, are attributed to karma, an individual force. Individuals suffering from poverty, from incurable diseases or from any of the multitudinous evils to which life is subjected in the semi-controlled Indian environment, impute these misfortunes to karma and also to gods, demons and planets or cosmic forces. In short karma is the commensurate of all the ills and wealth of life.

Karma, an individual force, is the common measure of all values. The individual is responsible for all the good fortunes and misfortunes of life. The environment social or physical, has no influence whatever, upon man. The toll of heavy mortality from premature and infantile deaths, the weepings and wailings of the parents and widows, poverty and miseries—all must be attributed to karma. The census report of 1921 discloses that there are about 5 million beggars in India and that with their families they will total four crores or forty millions. Marriage being a religious

necessity for one and all, the Hindus marry without a thought for the future generation. They say God who has given them mouth will provide them with food. So the lame, the beggars, the lepers, the consumptive, the idiot, the insane, the diseased, the never-do-wells and the rest of them—all go on multiplying from generation to generation. The excess of births over deaths keep the population increasing, while the means of subsistence and the productive capacity of the people never seem to keep pace with the growth of population. Consequently, poverty which generates poverty and its concomitant vices never seems to quit the land. But the genesis of all these evils is ascribed to karma, and recently to the British Raj. However, no reflective person can throw on Barhma or Karma the responsibility for bringing up unwanted children into the world. No rightly constituted mind can view without grave apprehensions the unrestricted multiplication of the "waste product of civilisation."

Individualism is the soul of the Hindu life, and individuality or rather personality played the most important part in Indian history. There is a deep-rooted belief that the individual (karma) is primarily responsible for all his conduct, for his success, greatness or failure in life, or for his efficiency or inefficiency in life. There is, of course, certain element of truth in this. The individual has some inforce which counts much in life, but, the "individual" cannot be the sole explanation for his success, failure or misfortune in life. The individual efficiency or inefficiency brings success or failure or misfortune in life in extremely rare cases. The social environment or the social heritage is the real determinator of the individual force as well as of the worth and lot of the individual.

2. The Law of Karma and Caste.

The subtle law of karmic justice is inseparably bound up with the Hindu caste scheme—the Hindu caste division of labour, and also with the social scheme of the Hindus. There is a strong belief among the Hindus that a man is born into a high, low or middle caste as a result of his past karma. The passage of the low caste into a high caste is impossible in the present life, while a descent of the high caste to the low caste, for violation of some of the

sacred laws, is permissible and practicable in this life. That is to say, devolution, not evolution, is the basis of the karmic-caste laws.

Within comparatively recent times strenuous efforts have been made by eminent scholars to interpret the doctrine of karma as an evolutionary moral force in a plausible and scientific way. Instead of trying to impart the truth to the people and to get rid of all errors dexterous theories are being invented to justify superstitions and tyranny of caste of which one ought to be ashamed. European science has been exploited to the full extent with a view to equip oneself with scientific arguments and subtle logic with which to support the tyranny of caste and other religious institutions which had been nurtured since ages. The spirit of the modern intellectual India is not only to shun the disclosures of truth but to veil and camouflage evils with "spiritual coatings". With the help of western science myths, dogmas and superstitions are often interpreted with such ingenuity as to render them more fascinating and more interesting than science itself to the unreflective, though educated people. The real purpose seems to be to keep the people in perpetual ignorance and superstition so that the privileged classes may not lose the time-immemorial monopoly rights to exploit the mass.

It is impossible within the brief compass of this work to unveil the mist and mystery which shroud the doctrines of karma, brahma, samsara, metempsychosis, and so forth. Nevertheless, it seems desirable to touch upon some of the salient features of the doctrine of karma. To the superficial observer it seems that the doctrine of karma is an evolutionary principle; in fact, however, it is a static concept, and it is devoid of even the rudiments of evolution. It is a well-known fact that the range and scope of the karmic movement so far as the moral world is concerned is absolutely fixed by the laws of Varna or castes revealed by Manu. No matter how meritorious one's past karma may be one cannot get out of the pre-fixed caste categories or caste-fetters. The distribution of wealth involved in the karmic-caste scheme is, indeed, "spiritual", not moral, for it is not founded upon merit, effort, or productivity or need or even

upon karma itself but actually upon castes. The ban put upon the study of the Vedas to the bulk of the humanity is the most pernicious piece of legislation ever enacted or invented by man for the moral and intellectual exploitation of the mass. It is not possible to enumerate the numerous divine codes revealed by the "hyper-seers", for the exploitation of the mass. Nevertheless, one or two codes may here be introduced for the sake of illustration. Manu, the Hindu law-giver, enjoins upon the Brahmanas "to allot" to the Sudra "out of their own property a stable maintenance. The standard of living fixed by Manu for the Sudra, which is illuminating runs as follows:

"The remnants of their (Brahman's) food must be given to him, as well as their old cloths, the refuse of their grain, and their old furniture" (Laws of Manu. X, 124-125, Sacred Book of The East, Vol. XXVI).

Like Manu, Brihaspati, Narada, Sukracharya and other divine doctors revealed or enacted various divine codes supposed to be based upon the karmic-caste "merit" for the material, moral and intellectual exploitation of the mass. Sukracharya's distribution of land based also upon caste-merit is interesting:

"To the lowest class the land given should be thirty-two cubits in length and half of that in extent; to the highest class the land should be double that measure; to the middle class it should be one and half of the lowest class" (Sacred Book of The Hindus, Vol. XIII, Chap. V. 274-178).

It is superfluous to multiply instances to indicate the laws of production, distribution and consumption prescribed by the divine doctors. It is worthy of note, however, that the regular circle of life of the several castes is already defined by Brahma. None but the fallen can move out of the regular circle of life, and the general rule, viz., once a Sudra always a Sudra or once a Brahmin always a Brahmin, holds true even to-day.

There is very little novelty in caste economy and feudal economy and polity. A caste individual lives a life of imitation and repetition of the past. The term "progress" hardly

applies to the caste plan of life which implies and involves a pre-determined and pre-fixed plan of life. There is nothing new in life or in the social environment which is already known, exploited and pre-arranged. The environmental arrangement under the Brahmic-karmic-caste plan of life is so marvellously designed that nobody has any need of using his own efforts to adapt himself to the environment or to the new conditions of life, for the exploitation of the environment, the fitting, attuning or adjusting to the environment—is already arranged by the subtle laws of Brahma, karma and castes. The law of karma does automatically and mechanically arrange the movement and behaviour of the individual.

The laws of Varna (castes) decreed by Samhbu (creator) presuppose that the low castes labour under a preternatural incapacity for the higher intellectual and moral culture monopolised by the higher castes, just as the Europeans presume that we, the Asiatics, are incapable for the higher civilisation and culture of the occident; that Sambhu has irrevocably doomed the low castes for servitude and serfdom, and that he has been "quixotically" generous with the high castes whom he has, through His benevolent and omnipotent will, ordained with the exalted position or superior privileges for holding a despotic sway over the multitude of cattle and untouchables.

It will not be out of place, perhaps, in this connection to consider the object of the "spiritual" legislatures in enacting different laws for the different castes. It appears, however, that the law of caste is a law imposed by the strong upon the weak, for the basic principle, the division of labour, did obviously not spring forth from the deliberate plan of the individuals who furnished the materials for the caste organisation. It was devised by the wisemen, the sages, who alone knew through their "hyper-eye" the working of the laws of karma and of Brahma, and devised the caste scheme as the best principle of order and organisation. The method of knowledge involved in the caste scheme is evidently the "hyper-sensuous" method, and not the idealistic method often claimed to be. In the transcendental method of knowledge the object of knowledge is independent of human experience (not of divine

experience, of course), while in idealism the object of knowledge depends upon our own experience. Were the caste scheme an ideal institution as is often alleged to be, it must express the free will or conscious knowledge of the individuals, and not of the particular "wisemen". In fact to the "wisemen" the principle of blind obedience and order appeared to be more important than the materials out of which the caste organisation was formed. They imposed the idea of order and obedience with the threat of eternal damnation upon the unreflective multitude.

It is evident that the caste scheme is an imposition of the superior upon the inferior. There seems to be a deliberate attempt on the part of the schemer to establish the belief that there is an inherent superiority in cotemplating, in philosophizing, in myth-manufacturing and in spiritual pretensions than in economic or industrial activity. The art of ruling or learning the Vedas or spiritual pretensions are much superior to the productive activity of tilling, manufacturing or trading.

Although the method of production, of distribution and consumption based upon caste is being slowly disintegrated, especially among certain sections of the higher castes "enlightened" by western education, the old mode of thinking in the light of caste differentiation is still predominant everywhere, particularly in the rural areas where the bulk of the people live. The old tendency to keep the low castes down to the place where they belong or to keep the subordinate down so that they may not equal or excel their master is universal under the "spiritual" regime.

3. Caste versus Class.

The "system of classes presupposes a rationally organised state" (Bluntchili: *Theory Of The State*, p 114). The same writer adds rightly that the castes are regarded as work of God, while classes are institutions of the State. In caste the authority is religion "The caste system is not an institution of the state nor a part of the constitution. It is a frame-work into which the state is fitted and to which it is subordinated." Hence the higher development of the state (says Bluntchili) is impossible so long as the state is subordinated to serve the caste.

The distinguishing characteristics of caste and class are status and rights respectively. Rights are the essential attributes of the British or American class system, while status is the special character of the caste organisation. Rights implies and involves contract or contractual relations between the parties concerned, which calls for reflection and deliberation. Status, however, stands for or depends upon some pre-existing customary institutions which demand not deliberation or reflection but obedience and observance. Rights are something to be compared, measured and even bargained, while status stands for something to be simply observed and even worshipped if necessary. Blind obedience and self-assertion are the characteristic features of status and rights respectively. Rights are the product of human efforts, status has its genesis in revelation. Rights are man-made things and relations, while status is something revealed by some gods.

In the caste arrangement of social life the range and scope of choice is extremely limited. The caste institutions are so exclusive, local and particular that none of the castes can detach themselves from their religio-social functions or associate freely with members not of the same caste or with members of the same caste of "foreign regions".

In caste organisation the idea of inequality of birth is a very important part of social arrangement, while the idea of the inequality of merit is an important part of the class society. A caste is an exclusive and particular institution, while the class concept is both particular and universal. Classes overlap each other. A system of classes may be compared to a series of excentric and concentric circles, each cutting the others as well as including the others. In the United States the class systems connect the upper and the lower orders of the society and blend them together into a whole. A caste group is made up of isolated units of families who are exclusive to each other. A class society is a compact group, while caste society is a "sandy group", if I am permitted to coin an expression, i. e. like a "group" made of sand particles. A caste is a hereditary institution, while a class is not; the former is sacred or "untouchable," while the latter is a very commonplace thing of

life. The class system prevalent among the Mahomedans in India is almost as rigid as the caste among the Hindus.

The contrast between caste and class does not end here. The distinction has a far-reaching ethical significance. The class institutions are variable in form. In class organisation no individual is pre-ordained to any trade or profession or religio-social function by the Samblu or Creator. And as he is not tied to any pre-ordained functions the class individual is at liberty to pass from one hypothetical position to another hypothetical position. He is free to pass from one class to another. That is to say, a class individual is a hypothetical, a conditional entity. It is both divisible and indivisible. The class self or the social self is both divisible and indivisible. Were it divisible alone there could be no class at all; were it indivisible only it would be a caste and not a class.

There is a great difference between the Hindu social laws and the social laws of the British or of the American people. The laws of the latter are at once hypothetical and developmental, while those of the former are divine, eternal and unchangeable. Social institutions of the democratic nations of the west are based upon the laws of both positive and normative sciences, while those of the Hindus or of the Indians upon divine laws, revealed by sages, which involve a pre-fixed and pre-determined plan of life. There is no hypothetical element and consequently no constructive element in Hindu social laws. It is evident that a caste group is already made; it cannot be re-made or reconstructed; while a class society is in the process of being made. All historical reformation which had taken place in the Hindu social life had been effected in strict obedience to the pre-existing caste scheme or mould. The hypothetical element involved in the class concept of the occident affords ample scope for construction, reconstruction, and reformation, but there is no room for reformation of castes according to the divine scheme.

The line of demarcation between class and caste is much more wide than is ordinarily supposed to be. Classes are both mobile and immobile, flexible and inflexible, exclusive

and inclusive, or in brief, they are both particular and universal. The British or American social system is both universal and particular and exclusive, yet it is all-absorbing (especially the American system), but the Hindu social group is only particular, local and exclusive. There is no such thing as an universal caste or a Hindu society or a universal social principle or ideal which may include and absorb all the different races, tribes, communities and religions of India. The class group is an indefinite, hypothetical and conditional entity, while a caste group is a definite, particular and local institution. The elasticity of the class individual has a greater advantage over the inflexible caste individual. The class mobility enables the individual to pass from one occupation to another, from one class to another class and from one locality or country to another locality or country without suffering any loss of his social value or importance. He is thus empowered to know not only his own life but that of his superior neighbours or fellows. It enables him to live a life of his own as well as that of his fellows. Without this mobility and elasticity he would be a prisoner tied to his work or function or land just as a caste individual is imprisoned within a caste wall of Sylhet, Dacca, Calcutta, Cuttuck, Poona, Agra, Trichinopoly, Canara, Benares, Gaya or Delhi.

The extraordinary development of knowledge and power in Great Britain or in the United States must be sought, among other things, in the freedom of scope or opportunity offered by the elastic nature of its class system for the development of the intellectual, moral and spiritual faculties of the people. In caste group, however, where society or nationality hardly exists the enormous store of human intellect lying dormant in the great bulk of the people is suppressed or perhaps, destroyed by the age-old caste ban imposed upon them.

Among the religious communities religion or dharma is primarily responsible for the arrestation of the development of life and knowledge. It impedes the growth of life by reserving to itself the sole right to knowledge and authority. It limits self-expression and self-assertion by demanding immediate and absolute submission and obedience to its sacred laws which are injunctions or categorical imperatives. It defines an individual in terms of status and not in the

light of rights and responsibilities. The right of self-determination, freedom and equality of merit or of opportunity are all denied by the laws of barhma, castes or karma and enforced by their spokemen—that is, some autocratic authority. Self-assertion, democracy, or equality and liberty from bondage imply social conscience, reflection and deliberation, and not obedience to holy customs or observance of divine customs. There is very little cognitive or reflective element in religious morality.

The fundamental spirit of our social organisation may be summed up in three words: Diversity without Unity. There is no unity, uniformity and universality in our social life. Our social systems are comprised of many rajas and maharajas or kingdoms and chieftains without any fundamental or spiritual bond of unity in them; many sacred laws and customs with only local validity; many peoples or races without a nation; countless castes without a society; enumerable artistic temples without the idea of western church organisation; and many "spiritual virtues" with "aham" or ego as their sovereign.

Now it is evident that the production of wealth or the distribution of values in general depends directly or indirectly, immediately or mediately, upon the social, political, economic and religious institutions and organisations. There is an intimate relation between industrial development and the social heritage of the people.

CHAPTER 38.

DISTRIBUTION OF VALUES.

1. The Distribution of Economic Values.

Bearing in mind the observations made in the last chapter upon the kármic-caste theories of distribution we may now briefly touch upon some of the principles of distribution involved in the land systems, especially, in the zamindari systems, and in the caste systems. There is an intimate relation between the economic structures or economic institutions and the conception of the ownership of property and the distribution of lands or of economic values. Property depends upon the conditions of industrial arts, and with the conception of property is bound up the theory or the principles of distribution. It is a well-known fact that there is no unconditional ownership of property in land in India; the superior property right is vested in the zamindar, and supreme property right being reserved by the State or by the Raja.

Now, it is well-known that the conception of property involved in the zamindari system has a savour of feudalism. Not long ago zamindari property (by which is meant here property of the revenue-farmers, etc.) was bound up with political or territorial chiefship or with some sort of a semi-sovereign power. Zamindari system was never agricultural nor is it now agricultural but feudal or semi-feudal in principle. Although the administrative power of the zamindar has been abolished by the British Government the old idea of property for power as contrasted with property for the utilisation of natural resources still persists. In the United States land is given to individual by the State for the exploitation of its resources. That is to say, land in the States is owned by individuals or companies for agricultural purposes or for otherwise utilising its resources, while in India zamindari property is intended, for acquiring power and for living on "taxes" levied from "subjects" or from tenants.

There are entirely two different standards of justice involved in the American conception of property and in the Indian conception of property. In the American system, or according to the labour theory of value, the final justification of property lies in the development of the land owned. Just as a tool is an extension of the body or of the self, and the ownership of the tool and the enjoyment of the utilities yielded by the tool is justified by the labour of the its inventor or maker, so the property in land must be sought in the production of economic utilities or in the exploitation of the land resources owned. However the zamindari conception of property also rests upon the production of utilities, but very different sorts of utilities. The final justification of the zamindari property lies, as is known to all, in the fiscal exigency and in customs and not in the exploitation of the resources. According to the established customs and laws of the country the zamindar is a revenue farmer or revenue-collector which position entitles him to exercise power and control like that of a "feudal" chief over his proja or subjects.

The case is, however, different with the tillers' or tenant's property. Lands are let by the zamindars and sub-tenureholders to the tenants for tilling or otherwise exploiting the land resources on rents fixed by the tenancy laws. A somewhat different standard of justice is obviously involved in the tenant's property in land. The tiller's property in land may be justified on the ground that he uses his land in the production of utilities which satisfy his organic needs. But by far the majority of the landlord's property is intended not for the production of utilities which may satisfy his organic needs but for the exploitation of the tenants. The basic principles of the zamindari regime and the caste regime are to control the life and liberty of the individuals or subordinates. The zamindari method of distribution is "to grind the face of the peasants and then devoting a part of the accruing surplus to charity".

Western capitalism is justified on the ground that capital is produced by abstinence and employed for productive purposes—for the creation of new values. Capitalism stands for the augmentation of national wealth, while zamindari feudalism for the expenditure of wealth produced by the til-

lers of the soil. Property should be justified when it is used for productive purposes and for the satisfaction of organic needs. There are three conceptions of property, namely, the economic conception of property, the legal conception of property, and the ethical conception of property.

Now, the economic conception of property is bound up with the economic theory of value. The economic value of a commodity is made up of the values of land (rent), labour (wages), capital (interest) and enterprise (profits). According to the economic theory of value labour is one of the fundamental causes of value, but according to the labour theory labour is the sole cause of value. The labour theory maintains that labour should be the determinator of value or of the property right. The "claim to the whole product" is based upon the labour theory of value. Of course, under the modern round-about method of production under the factory system, it is not easy to determine the contribution made by each individual unit of labour to the whole product, nor can labour be the sole cause of value. But under the mediaval condition of agriculture and industry where personal organisation is the rule, and the product turned out by the individual unit of labour is easily discernible, it may be assumed that labour is practically, though not necessarily, the sole cause of value. In other words, the product under a system of minute division of labour is social, while under the zamindari land system it is individual. It is a well-known fact that the distinction between earned and unearned income in taxation is based upon the labour theory of value.

Now, turning to the legal theory of property, we notice that law makes no distinction between earned and unearned income or wealth. Legally property descends by inheritance. Law makes no distinction between the active and the indolent, and between one using property for use or for the satisfaction of organic needs of life and one using property or income derived from the starving peasants for conspicuous luxury and for controlling the lives of others. The ethical theory of property is somewhat different from both the economic and the legal theory of property. It is based upon a humanistic standard of justice, and embraces the three factors, namely, labour, (effort), productivity and, need. Before

closing this chapter we may briefly touch upon the modern conception of distribution as it exists in the occident.

2. Contrast between the modern method of Distribution, and the traditional method.

There are three factors which appear to determine the distribution of values in the western countries. They are labour or effort, out-put or productivity, and need or standard of living or minimum subsistence. The labour theory maintains that for the satisfaction of one's organic needs one must exert oneself, and that wealth or property should be distributed according to effort. Effort or labour should be the basis of property right. According to the labour theory of value the distribution of wealth is justifiable when it is measurable in terms of effort. But experience shows that the doctrine of effort is not altogether sound, for effort is subjective and, therefore, it is not measurable by any objective standard. Moreover, one may make great effort and produce little of wealth. Effort reflects economic motive only. Productivity or out-put, as the number of things or units turned out in a given unit of time, is objective and is therefore, measurable by objective standards. Productivity or out-put as the determinant of property or of the distribution of wealth is therefore considered by the capitalist to be the best and the most perfect standard. However, the productivity theory is also not altogether devoid of flaws. It is defective in that where minute division of labour exists as it does under the modern era of machinery there is no way of knowing one's out-put or contribution.

The two principles, effort and out-put, are not, however, independent of the laws of supply and demand, nor do they imply and involve a pure competitive world. Modern economic world is not, however, entirely competitive. Non-competitive and anti-competitive forces like customs, state regulation, combination of workers and of the capitalists or of employers and humanitarian movements—are also in operation in the distribution of values. It has often been pointed out by the economists or by the humanists that the effort-and-out-put theories of distribution are not altogether fair, for they do not take into consideration the needs and wants of the individuals. It has, therefore, been maintained that

wealth should be distributed according to the fundamental human needs. With reasonable effort one may produce enough to enrich his employer or master, while getting in return starving wages. The needs of the individual must also be taken into consideration. The needs should consist of those things and ideas which are essential for the intellectual and moral development of the individual. The principle of need or a decent standard of living has become an important factor in the consideration of the modern distribution of values.

We are now, in a position to compare and contrast the modern theories of distribution with the Hindu theories of distribution. It is worthy of note that the effort-out-put-and-need theory of distribution is the ideal of modern economic life in the occident. Both effort and out-put look to the past, whereas, the need theory takes into consideration both the present and the future of the individuals. It is humanistic and ethical. The karma theory and the zamindari method of distribution are non-humanistic. They are individualistic. They neglect the human needs which are common to all. The out-put theory says: a man gets what he makes; the need theory says that a man should get what a decent life or civilised life needs or requires; while the karma theory reveals that a man gets what his past karma allows him and the zamindari regime smacks of the principles of the "lathi jar mati tar" (or force) and customs.

The karma theory looks to the unknown past—the past deeds of the individual, and justifies the present lot of the individual in the light of the past. In fact it is not karma which provides the laws of distribution for the Hindus, but the castes. The caste system arbitrarily sets up different standards of justice for the different castes.

The standard of justice actually involved in the social organisation of the Hindus is far from fair and equitable. There is in force different standards of justice for different castes and for different communities and for different individuals of the same caste or class. And it is natural that the standards should differ from class to class and from individual

to individual for every individual is unique. But there are many "spiritual" standards of justice prevalent in India, where the standard of justice differs from caste to caste, from tribe to tribe and from locality to locality, and almost every family or individual needs special treatment. Then, there is one standard for the strong, another for the weak, one for the relative or 'kins' and another for those outside the tribe, one for the sycophant, favourite and bhakta or "devotee", and another for the unfavourite, and one for the chalack and another for the non-chalack. The rajas, heroes, gods or avatars, who with their auxiliaries and lieutenants will number lakhs—are under the impression that they belong to some super-worldly order and that the mundane (common) laws do not apply to them.

Before we close this chapter a brief reference should be made to another, a very important, doctrine of production and distribution, which is more realistic and practical than the subtle and theoretical doctrine of karma. It is the doctrine of brahma-vishnu-and-maheswar or "creator-preserver-and-destroyer" (God). There seems to subsist a close analogy between the 'raja' who controls the bread and butter of his "creatures" or subjects and the omnipotent deity who is the preserver, creator, and disposer of everything and being on earth. Just as the deity may, through his grace, turn a devoted worshipper or a beggar into, say, a king, or he may, through his wrath hurl him down into hell-fire, so the 'raja' may, through his favour, raise his devoted 'subject' to an exalted position, or he may, through his wrath, knock him down, or reduce him to a state of poverty, degeneration and demoralisation.

Now it may be noted in passing that the Europeans in India do neither strictly follow the European method nor purely the Indian methods, for to govern and maintain a huge empire like India due respect has to be paid to the tradition and antiquity of the country.

CHAPTER 39

PRODUCTION AND CONSUMPTION

In a work of this character it is not possible to enter upon a detail description of the theories of production and consumption. In a general way it may, however, be stated that all economic activities fall into two classes: production and consumption. Distribution and exchange are a part of production. The processes of distribution and exchange are involved in the processes of production and consumption. In other words, distribution and exchange go on with the complex process of production from the raw materials to the finished products. The whole economic world may, therefore, be said to be connected with production and final consumption.

Production consists in shaping and in re-shaping of the infinite variety of natural objects and natural forces by human efforts and human intelligence into useful forms. Ultimately it means the exploitation of the natural resources for the satisfaction of human wants and human desires. Production, therefore, may be considered as the result of wants and needs as well as of efforts. Production points to efforts or supply side of the commodities, while consumption refers to the demand or needs or desires of the consumers. There is a close co-relation between production and needs, demands or desires, or consumption—one reacting upon the other.

It is a matter of common observation that people are everywhere engaged in the trades, industries and occupations which the particular environment encourages. In other words, the environment does not only decide the economic activities of the people but also the standard of production and consumption. In a customary society production and consumption are practically fixed by customs, there being very little of novelty, while in a progressive society they are determined by the changing needs of life. It may broadly be stated that in the former consumption dominates production.

and in the latter, to a large extent, production decides the nature and extent of consumption.

Under the old self-sufficient village economy direct consumption was almost entirely the object of production, and the line of division between production and consumption was very thin. The producers and the consumers practically represented the same people. Many articles, especially textiles, were produced for the use of the family needs, and not intended for sale. The production of food grains was generally, though not always nor universally meant for consumption by the family. In a self-sufficient village economy exchange of products except for a few articles like salts, utensils, hardware and cutlery,—was limited. It was limited not only by production but by the simple needs of life. Production of or importation of new things and new ideas was practically unknown. Such an economic world could not but be static—a world dominated by customary production and consumption.

The old theory of production and consumption bears some resemblance to the Mahatma Gandhi's theory of production and consumption. His theory of needs amounts to the reduction of life to simplicity or to the primary needs or the most elementary needs of life. This theory is idealised by many "spiritualists". However, the Mahatma is true to his ideals while many of the so-called modern spiritualists are sunk in sensuous luxury. Now, according to the need theory of the spiritualists or the "simple" need theory of the moralists these elementary needs should be produced by the consumers themselves. The producers and the consumers, especially in the production of certain classes of commodities (textiles and food-grains) should be the same people. It is believed that the economic evils of India is due to the separation created by the Britishers between production and consumption, and also to the influx of western "materialism." But to combine production and consumption in the same field of action and to reduce life to the most elementary—to the sanyanic (hermit's) needs of life is nothing short of reversion to a state of primitivism. Actually and ultimately it comes to mean destruction of civilisation and return prac-

tically to Nature. If the most perfect system of economic or moral order can be had under an ideal of simple economy, the question is—Why is it not adopted by the lovers of such an ideal?

Modern civilisation has, however, developed a new method of production which is carried on for profits. In the modern economic regime production is carried on not by hereditary castes but by experts, and not only for the satisfaction of the customary needs, but also for creating new needs and wants. The basic idea is not only to produce what people already have, but to produce what people may still want to have or desire to have. Various means—advertisement, agents and canvassers, are employed to inculcate new desires or ideas in the people. The object of the modern industrial arts is not only to repeat forefathers' merit, but to invent new things and new ideas which are essential to higher or to progressive life. In a progressive society the whole initiative for the production or creation of novelties comes from the producers, while in the customary society the initiative mainly, but not entirely, comes from the established customs. The introduction of the western economic systems—railways, motor cars, cinema, trade and commerce—have tended to create a separation between production and consumption in India.

The separation of production from consumption involves far-reaching economic consequences. It arises as a result of the development of industrial and commercial life from simplicity to complexity—as a result of the multiplication of the conventional needs of life or from a rise in the standard of living. Where life is subjected to simplicity—to the elementary needs of life the separation of production from consumption is unnecessary. Broadly speaking there are two kinds of needs or wants: organic needs and conventional needs. There is, of course, no hard and fast line of demarcation between them. But it is a well-known fact that under the old village economy or family economy almost the entire process of production were carried on for the satisfaction of the primary needs or vital needs of life.

Even to-day the bulk of the people of India are engaged in a struggle for the most elementary needs of life. The

production of luxuries, especially under the old regime, were intended for the satisfaction of the conventional needs of the kings, chiefs and the privileged classes. Even these needs were fixed and stationary, and a line of demarcation was drawn between the needs of the "rajahs" and those of the "subjects." While the tendency of the modern economic world is to destroy all monopoly privileges and to turn luxuries into necessities, the tendency of the old regime was and still is to stick to the traditional method.

The modern method of production is intended not only for the satisfaction of the organic needs of life, which are more or less constant, but for the creation and satisfaction of the aesthetic, intellectual and spiritual needs which are infinite and insatiable. Simple life means after all a life of struggle for existence, a struggle for the satisfaction of the most elementary needs of life. In the so-called "spiritual economy" where the art of production is extremely primitive, there reigns incessant scrambles, conflicts, altercations and feuds for "roots and fruits".

Progress consists in the emergence and discovery of higher intellectual, moral and spiritual values. Science by controlling nature has discovered many new means and methods for the satisfaction of both the biological and the higher needs of life. Economic progress consists in increasing the amount of human good and human welfare which is achieved through the co-operation of many people in economic and social activity. In an ultimate analysis the modern scientific method of production implies a greater control over the competing or conflicting forces which rule biological life. It opens up wider area for common good and enables man to co-operate together.

It is evident, therefore, that the two theories of production and consumption stand in somewhat contrasted relations. In the customary society the needs of the people furnish the standard of consumption, and these needs vary considerably according to the stereotyped classes and castes and ranks of the society. In the modern economic world production furnishes the standard of consumption which has no caste attached to it. The people's needs, especially the conven-

tional needs, have increased tremendously with the changing needs of life. A world dominated by customs and castes cannot but be a stationary, a motionless world—a monotonous world—a world of biological needs, while a world dominated by production is a restless world—a world of ceaseless activity and enterprise. Such is the nature of the modern British or American world. It is in sharp contrast with the customary world of acquiescence.

To sum up. Modern economic world assumes that human needs and human desires are infinite and insatiable, and that progress consists in the discovery of better instruments and appliances for the production of new things and new ideas in order to satisfy the ever-growing needs of modern life. No stage of production and consumption can, therefore, be held to be final. No system of industrial art can be so perfect that it cannot be made more perfect. The "Charka" is no more perfect than a machine is. Progress, therefore, means a ceaseless activity and struggle for the better and not for the "perfect"

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56	22	beside	besides
59	5	reached to	reached
61	10	sesamum.	sesamum,
70	3	in	of
75	24	glace	glacé
141	18	made jute	made of jute
150	12	for the wool stands	of stands for the wool of
162	24	howver	however
162	27	imporved	improved
178	37	(over 95 p.c.	(over 95 p.c.)
181	table	There should be decimal points between the last two digits from the right and those on the left.	
195	"	in millions acres	in million acres
196	21	2.	(2).
199	19	elsewhere	elsewhere

CORRIGENDA

Page	Line (or table)	Incorrect	Correct
202	34	popular	poplar
206	11	19t	19th
214-221	headings	Rosjn	Rosin
223	15	Forest Bulletin	(Forest Bulletin
224	table	Owts.	Cwts.
244	6	co-operation	Co-operation
244	19	whole	whale
248	13	abcence	absence
258	table	members	members
260	table	1925-29	1925-26
262	2	conforred	Conferred
272	12	pirnceple	principle
279	7	Enquiry	Enquiry
306	23	new	now
306	36	indicatea	indicate a
307	27	asd	and
308	8	handhools	hand tools
313	27	matalic	metallic
315	13	priinting	printing
315	27	xngu	influx
322	7	if	of
323	31	nit.	not
325	37	ti	to
327	26	if	of
329	32	ir	or
331	29	taeory	theory
331	31	weaith	wealth
333	19	if	of
334	20	destroper	destroyer