

## **Preliminary Survey**

# INDIAN INDUSTRY AND ITS PROBLEMS

VOL. I. FACTORS IN INDUSTRIAL  
DEVELOPMENT

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**INDIAN INDUSTRY AND ITS PROBLEMS**

**VOLUME II**

**Industries of the Basic Order**

**VOLUME. III**

**Non-Basic Industries**

**TO**  
**DR. GILBERT SLATER,**  
**a token of gratitude for his many kindnesses**



## PREFACE.

Since the beginning of the present century a loud chorus of protests and complaints against the industrial policy of the Government has been emanating from the platform, the newspaper press, and the publications of professional economists in India; but all these splashings of printer's ink and oral expressions of indignation have not so far resulted even in the formulation of a plan of action, far less in action itself. The only tangible result of this long agitation has been that a regular procession of Royal and plain Commissions has marched past the scene during the past few years. They are all supposed to have left behind a carefully-constructed engine to haul Indian industry along the road to progress. And yet during all these years industry in India has obstinately refused to move an inch onward. Where lies the fault?

It seems that these engines were not complete units at all; they were only parts of a machine-unit, and, what is more unfortunate, they were indifferently constructed by different batches of designers and craftsmen who were, moreover, never given a chance to co-operate. The products of this motley crowd of workmen were clumsy in shape and form, and, designed as they were under widely different conditions and at different times, were turned out more or less according to the whims and fancies of a particular batch of designers and not according to the requirements of other component parts of the machine. The result was that, try as our rulers might, these parts could never be fitted together to form a complete machine-unit. Moreover, quite a number of vital parts were missing, which no one ever cared to provide. In these volumes an attempt has been made to re-shape the defective parts, to provide the missing nuts and wheels, and to fit the lot together into a complete, workable machine-unit.

Although, in conformity with the time-honoured principles, I have divided my plan of industrial

reconstruction into three parts, and devoted a separate volume to each part, it cannot be broken up and dealt with piecemeal. It is obvious that neither basic nor non-basic industries will flourish until the problems relating to power supply, labour, finance, fiscal policy, transport, and various forms of direct and indirect State assistance to industry have been definitely solved. Again, it would not be possible to expedite the development of non-basic industries so long as basic industries are not established on sound lines; and it would not be possible to take any action with a view to establish the various basic and non-basic industries in the country without a thorough examination of the conditions governing the establishment of these industries. These facts speak for the unity, or rather the indivisibility, of my plan for all practical and theoretical purposes.

The practical efficacy of the plan I have presented cannot be established by argument; but I hope I have provided sufficient data in these volumes to prove that if a solution of the problem of industrial development is ever sought in India, a beginning will have to be made on the lines identical to those suggested by me. Indeed, I am prepared to go so far as to assert that although practical experience will necessitate readjustments and changes in the programme of industrial reconstruction, those readjustments and changes will affect only the details of action and not the principles on which this plan is based.

It will be noticed that I have furnished a historical background in my treatment of various main topics. These historical portions, however well-set, may appear to be rather superfluous in a work aiming, so to speak, at grasping the future, but it will be conceded that in avoiding mistakes and settling controversies nothing is more effective and useful than an appeal to history.

One more objection I feel bound to meet in advance—the objection that in estimating the potentialities of India's financial resources and in calculating the cost of power in the coal zone I have made my conclusions less dependable and convincing by using data which are not quite up-to-date. I have only to say that the omission

is deliberate. Since the year 1928 financial conditions in India, as all over the world, have been so abnormal that in order to explain away the various abnormalities in connection with banking deposits and new flotations long digressions would have been necessary; and these digressions would not have served any useful purpose, especially as I could by no means base my estimates on the data relating to abnormal times. In these circumstances it would have been unscientific not to depend on the pre-depression figures as the basis of calculation. Similar considerations are responsible for my dependence on comparatively old data in connection with power costs. During the past four years industry in Europe and America has been in a state of collapse, with the result that power stations have been operating on extraordinarily low loads; and this has been naturally reflected in the average cost of power. In these circumstances I could not afford to be very punctilious in selecting the most up-to-date data. Moreover, recent statistics suggest that, load factor apart, periodical variations in different items comprising the total working cost tend to follow the same course in every country, so that the index numbers for the total working cost do not show any startling dissimilarities from country to country. If that be a correct view, it would not be unscientific to use my data as a basis of calculation for a number of years to come.

I have just one more explanation to offer. It will be noticed that in dealing with the problems of labour I have not referred to the report of the Whitley Commission, although I have made full use of the evidence collected by them at various centres. This extraordinary conduct is explained by the fact that the chapters on labour were completed in December, 1930, while the Commission's report was not published till August, 1931. In these circumstances I had no other alternative but to incorporate the evidence (which was being broadcast by press correspondents in those days) in this work without waiting for the Commission's report. I had certainly plenty of time to incorporate the recommendations of the Commission; but as I found my own views and

ideas diametrically opposed to those of the Commission in many important particulars, I decided to leave the report severely alone. I have given plenty of facts and arguments in support of my own contentions, so that I feel that any direct criticism of the Commission's findings and recommendations would be superfluous.

As these volumes are meant more for laymen than for "highbrow" technicians, I have endeavoured to explain the various technicalities—especially those relating to the manufacturing processes—in as simple and popular a language as possible. While speaking of the language I have employed, I am reminded of some curiosity-stricken manuscript readers' criticism of certain unvarnished phrases I have used in tracing the economic consequences of viciousness, dishonesty, and corruption; but I can always justify my action by retorting that in speaking of matters affecting the destiny of a people nothing is gained and everything is lost by not calling a spade a spade.

I am not so fortunate as to be able to conclude this preface in the customary fashion. There is no one whom I could thank for correcting the proofs, or even for preparing the index. It would, however, be sheer ingratitude if I do not acknowledge the kindness of numerous Indian, British, German, French, Belgian, and other Continental factory owners and managers in granting me facilities for conducting my investigations. I also owe a debt of gratitude to a number of British technicians and writers on technical subjects with whom I was brought in contact by my work, and who often went out of their way to help me.

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## PRELIMINARY SURVEY

### I. THE DECLINE OF ANCIENT INDUSTRIES

**The decay of handicrafts inevitable.**—In ancient times, and even up to a comparatively modern period, Indian industry, based upon a high development of technique in handicrafts, was on a much higher level than that of contemporary Europe. A process of industrial decay began with the break up of the Moghal Empire after Aurangzeb's death. It would not have set in for nearly a century had there been someone powerful enough to exercise his authority throughout the length and breadth of Hindustan. We say "for nearly a century", as not even the peacefulness and industrial patronage of an Akbar or the might and organization of an Aurangzeb would have succeeded in saving the industries of the country from that horrible fate much longer. The Industrial Revolution, by which is meant the application of mechanical power to the manufacturing industries, began in England in the sixties of the eighteenth century; the cotton industry was the first to be revolutionized, but improvements of a truly revolutionary character had been effected in the technique of iron and steel manufacture long before the time when the Industrial Revolution is supposed to have begun in England. The result of these inventions and improvements was that the cost of production came down to a level unattainable by old methods. It is certainly true that the quality of the goods manufactured by new methods did not, in the beginning, compare favourably with that of the hand-made articles, but improve-

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ments were made in quick succession, more particularly in the cotton industry, with the result that as early as the beginning of the nineteenth century the products of some of the "revolutionized" industries actually began to displace even the finest products of the cottage.

But as we are about to see in the following section, these revolutionary changes in the technique of industry were not introduced into India until after half the nineteenth century had run its course. It was in these circumstances the handicraftsman in India who had to fight against those monsters of efficiency in Britain which were daily becoming more efficient and powerful. Unlike his new rival, the Indian craftsman could not improve the quality of his products, or bring down the cost of production below a certain level without starving himself. So he was utterly powerless when the machine-made goods invaded India. He lost the foreign market, then the home market, and finally, when the newly-constructed railways brought the enemy to his very door, even the local market. He was in no way equipped for that unequal struggle, so that, as had happened in the birth-place of the Industrial Revolution, the decline and in some cases even the disappearance of his craft could not be averted by any means.

**British policy blamed for the decline of industries.**—A good deal has been said and written, usually in an unfriendly spirit, about the part played by Britain in annihilating the national industries of India. It is contended, with every justification of course, that until the advent of the British, and long afterwards, India's exports consisted mainly of the manufactured articles, and that she was more or less completely self-

sufficing in the matter of industrial products up to about the end of the eighteenth century. Moreover, it is asserted that with the political ascendancy of the British, India gradually became dependent on foreign countries for the supply of manufactured goods, and so sank to the position of the exporter of raw materials; and for these catastrophic developments the policy of the British Government has often been held responsible. The various factors which are supposed to have been responsible for the decline in India's export trade in manufactured articles are too well known to be set down here: indeed their authenticity has never been challenged by any writer of repute, whether foreign or Indian. But although we accept the conclusion that Britain had always a desire to push her own manufactures in the Indian market regardless of the interests of Indian industries, we cannot subscribe to the view that the blame for the destruction of Indian industries rests entirely on the shoulders of Britain, or that if Britain's political power in India had not been consolidated, India would have still retained her industrial supremacy, or even that in the matter of industrial products she would have been as self-sufficient as she was in the pre-British days.

**Industrial decay could have been postponed but not averted.**—Let us first see if India could have maintained her industrial supremacy, or even self-sufficiency in the matter of industrial products, had not the British traders ever touched her soil. It is a well-known fact that immediately after the death of Aurangzeb industries in India began to show signs of decay; and by no stretch of imagination can we hold the British, or indeed any European nation, responsible for



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that political chaos in the country of which the decline of India's national industries was the natural outcome. Again, the Industrial Revolution would have taken place just the same in England whether the ships of the East India Company had or had not undertaken their voyages to the East. In these circumstances the disappearance of the cotton industry in India was merely a question of time, especially when her artisans could not, in the long run, hope to compete with the mills in Lancashire, and when political conditions in the country were so chaotic as to render production and accumulation a desperate gamble. England certainly inflicted considerable damage on the cotton industry in India by the imposition of prohibitive duties on India's cotton products; but England would have protected her infant industry just the same whether she had established direct trading connections with India or not. A good deal has been written against these protective measures—and strangely enough by those who are themselves the warmest advocates of protection for India—but they do not tell us why Britain was not justified in adopting these measures. It cannot be denied that "the mills in Paisley and Lancashire would have been brought to a standstill" had the Indian cotton products been allowed to enter the country unhampered during the initial stages of the Industrial Revolution. But if they were kept going by means of various protective measures, India had no justification to complain: Britain had every moral and political right to protect her infant industries—indeed it was her duty to do so.

But then it is argued that Britain took advantage of her political supremacy in denying this right of protecting her industries to India. We cannot but concede that in India the British

people had found a very lucrative market for the products of their "revolutionized" industries, and that the economic interests of Britain could be best served only by depriving the Indian people of their right to protect their industries. But what right has India to complain of the policy of her British rulers and to talk of political rights and wrongs when she knows that her own people would not have done any better? Long after the death of Aurangzeb there was no stable government in any part of India, and we repeat that in the absence of a central unified government there would have been no authority strong and far-seeing enough to protect the manufacturing industries in the country. It would thus appear that the disappearance of industries in India, organized as they were on the handicraft basis, was merely a question of time, and the policy of India's new rulers only expedited to a certain extent the process of extinction.

The above remarks are applicable not only to the cotton industry but also to other industries which had made Indian craftsmen famous all over the world. The iron and steel manufacturers of India, whose products were known and valued the world over, had, in spite of their exquisite skill in the manipulation of materials, not the remotest chance of competing against the scientifically-constructed furnaces, especially after charcoal had been displaced by coke. Again, the silk industry being subject to the same rules as the cotton industry, it would have been impossible ~~to save it for any length of time~~. The ship-building industry was not completely lost until the appearance of iron-clad ships during the second quarter of the nineteenth century; it had certainly suffered a decline all through the preceding century, but that decline was chiefly due to the

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fact that the carrying trade had been captured by foreigners—the Arabs and various European nations—as well as to a certain extent owing to the operations of the British Navigation Laws. But these Navigation Laws were just as much against India as against any other nation, and we cannot blame Britain for safeguarding her own interests. Whatever the case may be, the shipbuilding industry would have eventually declined just the same after the appearance of steel ships. As regards the woollen (shawl) industry, it is interesting to note that it survives in Kashmere up to the present day, and if it has somewhat declined during the past fifty years or so, it is because of the changes in fashion as well as owing to the appearance of cheap factory-made imitations. Similarly, the vegetable dye industry held its own until comparatively recently when aniline dyes, against which they could not compete on equal terms, gradually drove them out of the market. Indigo is probably the only exception, but the demand for even this important dyestuff is on the decline.

In the circumstances described above even if we assume that the success of the Mahrattas, or the Rajputs, or any of the Mahomedan chiefs in the battle-field had resulted in the establishment of a strong, stable central government in India, it is impossible to believe that any measure of protection enforced by that authority—supposing for the sake of argument that it had been enforced—would have averted the disaster that befell the industries in the country. A royal decree aiming at protecting the indigenous industries would have merely acted as a narcotic and not as a rejuvenator: as had happened in other parts of the world, they would have been crushed out of existence sooner or later under

the pressure of changes in the technique of manufacture which were taking place with remarkable rapidity in Britain.

**Survival of the unfit : its causes.**—The process of annihilation, however, has not been quite thorough and complete. Numerous industries, such as cotton-spinning and weaving, the manufacture of silk and woollen fabrics, metal-working, leather-tanning and others survive up to the present day ; but they are the fast disappearing shadows of the past industrial greatness of India : for while in the days gone by the industrial skill of Indian craftsmen was the marvel of its time in the world, to-day it is an object of contempt to Indians themselves. When, therefore, we speak of the decay of industries in India, we mean the disappearance of the highly developed branches of industry, which were dependent for their existence not on local patronage but on the markets of the entire sub-continent and the whole of the civilized world beyond its frontiers. If some of the degraded specimens of industry have survived, it is because the modern methods of manufacture have not been applied to some of the industries, or because in some cases (as leather) it is cheaper to manufacture by old methods, or again because custom and fashion have decreed the use of certain articles which can be manufactured only by hand or for which the demand is so small that a modern factory cannot be set up to cater for a limited and gradually disappearing market. Far from re-organizing some of these industries on scientific lines, it appears that it would be difficult for them to hold their own in view of the changes that are taking place in the customs and manners of the people in all parts of the country. And,

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as may be inferred from what we have already said, it is impossible to evolve the extinct, highly developed species from the existing degenerate specimens of industry. It was the factory that destroyed the Indian handicrafts, and the factory will always be there to strangle them the moment they are reborn. The regeneration of the highly developed branches of industry in India must now, therefore, take place through the factory.

**Is this a loss or gain?**—But, as we are about to see, very little has so far been done even in the direction of factory installation. We are not concerned with the relative merits of the two systems of manufacture; but if peace of mind, contentment, and amity and good will among men be the final goal of the creation of commodities and riches, the factory system, no matter how ingeniously and highly developed, is likely to be a poor substitute for a system which had a history of many thousand years, which was based more on charity and service and less on competition, and which was above all “friendly to thought, to virtue and to peace”. But a community must move with the rest of the world, even though the finer instincts of the individual mourn the final disappearance of the old order.

We are men and must grieve when even the shade  
Of that which once was great has passed  
away.

## II. THE PROGRESS OF THE FACTORY SYSTEM

**British rule and slow progress of the factory system.**—The decline of India’s ancient industries

was not due to, or even followed by, the introduction of the factory system of manufacture in the country; it was, as we have seen, caused by competition from abroad, while many political, economic and social factors jointly conspired to delay the birth of the new system. It is often asserted that not only was the British sovereignty in India responsible for the destruction of Indian industries, but it was also the root cause of the slowness of development of the new system of manufacture in the country; and the fact that until the fifties of the nineteenth century, or nearly a hundred years after the commencement of the Industrial Revolution in England, there were no modern factories of any description in India, is brought forward in support of the theory that Britain could not tolerate the development of a rival system in a country which held out every promise of being the finest market for her new industries, and that she made a ruthless use of her newly-acquired political weapons in keeping India innocent of all modern developments in the field of industry. The meaning of all these assertions is that had not Britain established her political sovereignty in India, the industries in the latter country would never have been allowed to suffer a decline, and that a free India, or an India without the British, would have answered the British challenge by gradually evolving a new system of manufacture out of her ancient, crumbling organization.

These allegations and hypotheses are manifestly built on the assumption that, in the absence of British interference, India would have enjoyed the benefits of a national government strong enough to exercise its authority over the whole, or at least a major portion, of the Indian continent: for without peace and security it would

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never have been possible to invest large amounts of capital in setting up modern factories. We have seen that immediately after the death of Aurangzeb India had found herself in the grips of civil war and anarchy which were by no means confined to any particular locality or province. The absence of a central authority, we repeat, would have under all conceivable circumstances exposed the industries in the country to the ravages of foreign competition, and we claim furthermore that the political conditions which were not favourable for bringing relief to the existing industries in the country would have been equally, and probably more, unfavourable to the introduction of the methods about whose mysteries the Indians knew very little. It is worth remembering in this connection that in spite of various material advantages over England, and notwithstanding the fact that she was at only "a stone's throw distance" from the scene of the first industrial revolution in the world, the industrial developments in France on an extensive and nationwide scale were delayed for nearly three quarters of a century; and the causes of this delay were more or less the same as those operating in India at the time, with the difference that while in the former country there was a strong central government to enforce the laws of the land, in India there were neither laws nor a central authority. In these circumstances even if we start with the assumption—which on the face of it is manifestly absurd and impossible—that a band of Indian adventurers had crossed over to England and succeeded in buying or stealing the secrets of the Industrial Revolution in that country, it is impossible to believe that they would have been equally successful in installing and maintaining

the new system in India. Apart from technical knowledge, large amounts of capital would have been necessary, and in those days of civil war, when every war-lord was in need of funds, the display of wealth would have been like the appearance of a lamb in the midst of a pack of ravenous wolves, and, there always being scant respect for any written or unwritten law among the Eastern despots, would have certainly suffered the same fate. When all these facts are taken into account, it becomes evident that had India been left to herself by Britain, her old national industries would have been destroyed just the same in course of time, while the introduction of the new system would have been a slow process, especially as it would have presented many material and cultural difficulties.

Let us now suppose for the sake of argument that a new central authority had arisen from the ashes of the Moghal Empire, equally extensive and powerful, and that the affairs of that mighty organization had fallen into the hands of Dante's ideal monarch or Plato's heaven-born statesman. That all the princely benevolence and enterprise of that monarch would never have succeeded in introducing the new methods of manufacture into his empire before the first quarter of the nineteenth century is evident from the fact that up to about that time the mills in England were run by waterfalls, and in India there were no waterfalls which could be harnessed in the service of factories if their establishment was ever contemplated. The steam power came into general use in industry in England only during the first quarter of the nineteenth century; but even this development would not have materially affected the prospects of an industrial revolution in India, as the existence of coal had not yet been proved :



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and without an adequate supply of coal it would have been impossible to manufacture iron and steel in large quantities for the building of machinery, or even to drive machinery if the English had been foolish enough to permit the export of those contrivances. Again, as it was the foreigner and not the Indian who discovered coal in India, it may very seriously be doubted if anyone in India would have had an adequate geological and technical knowledge to find the deposits and to work them. But even if someone had the enterprise, wisdom and foresight to engage foreign experts—which is wholly an absurd supposition—the discoveries thus made would have been of no avail, as the metallurgy of iron and steel had not so far advanced in those days as to make it possible to utilize coals of so strange a composition as Indian coals in the manufacture of iron and steel. And without an adequate supply of iron and steel it would have been impossible to bring about an industrial revolution in India.

But leaving aside these hypothetical situations, if we can make up our minds to face realities it would be difficult for us to escape the conclusion that the introduction of the factory system of manufacture in India was immeasurably hastened by her intimate contact with Britain. The continuance of political instability and anarchy after the break-up of the Moghal Empire may be open to dispute; but we cannot visualize the circumstances in which the various technical difficulties would have been overcome. As in the case of China, even the presence of a central authority would not have materially altered the course of events; inborn superstition and conservatism, and consequent lack of the spirit of enterprise, would have always militated against

the growth of modern ideas in the country with their reactions on all economic institutions.

**The slow progress of the factory system: its causes.**—Despite the fact that by the beginning of the nineteenth century a large part of India had come under British control, and that political conditions in the country were fairly stable, it never occurred to anyone to make an attempt in the direction of introducing the factory system into India. With the arrival of English factory-made goods there must have also come to India the news of some of the latest technical developments in the field of industry in Britain; but to a people who were more or less completely ignorant of all material sciences the whole process must have looked like a wizardly performance. Even assuming that someone was available to instruct the nation in these “black arts”, it is doubtful if many people really capable of understanding these mysteries would have been forthcoming: for it is only on account of India’s association with Britain that prejudice and superstition have been banished from among those who have received Western education. Moreover, this association has been responsible for spreading the knowledge of material sciences among the people in India. And it is only after the destruction of centuries-old prejudices and superstitions and the acquisition of scientific knowledge that Indians have been able to understand the principles underlying the construction and working of various kinds of mechanical appliances.

This process of intellectual development had not gone very far up to the beginning of the nineteenth century; indeed it had hardly begun, as India’s new rulers were still engaged in extending and consolidating their political power, and

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naturally enough had not yet started tackling the problem of education. It was not until the second quarter of the nineteenth century was well advanced that, intellectually, conditions had become favourable for the introduction of the factory system into India. Had India's new rulers so desired, the ground for the introduction of that system would have been prepared a little earlier; but it is difficult to visualize the circumstances in which these developments could have been anticipated by more than a quarter of a century. On the other hand, as we have said, in the absence of the British no amount of effort would have prepared the Indian soil for the reception of the Western ideas and methods of manufacture for countless years.

It is a significant fact that even after men well versed in physical and chemical sciences and therefore endowed with a capacity to understand the mysteries of modern industrialism were available in India, no serious attempt was made to bring about an industrial revolution in the country. The lack of opportunities and the absence of enterprise may at first sight appear to be responsible for this inactivity, but a deeper analysis of the situation would show that these factors were only indirectly responsible for checking the growth of the new system: a national system of industries could not be built up on modern lines without adequate supplies of coal and iron, and these basic articles were not available in the desired quantities, nay, even the extent of the resources of the country had not yet been determined. It was not till the beginning of the second quarter of the nineteenth century that the exploitation of coalfields began in Bengal and Bihar, but even then the coal of suitable quality for the manufacture of iron and steel

was not available. Moreover, the various extensive iron-ore deposits in the neighbourhood of coalfields were not discovered until much later. In the face of these basic deficiencies the establishment of the iron and steel industry, and consequently the engineering industries, could not, contrary to what had happened in England, precede the establishment of other industries.

**The evolution of modern industrialism in India.**—But it must not be supposed that no attempt whatever was made to establish the iron industry on modern lines in India before the introduction of various dependent industries: as will be shown in connection with industries of the basic order in a later volume of this work, as early as the seventies of the eighteenth century attempts were made to manufacture iron by the more up-to-date methods of the time in the Birbhum district; and, strangely enough, these also constituted the first attempts to introduce modern industrialism into India. These and subsequent attempts in this direction failed in spite of all the encouragement and active assistance of the East India Company itself—the pity of it! Had Motte and Farquhar, or even Josiah Heath, somehow succeeded in establishing the iron industry in India, we would have had probably a different story to relate. There would have been no better institution to educate the minds of men and to develop the spirit of enterprise in India than these pioneer factories. However, the frequency of attempts in this direction during subsequent years shows how even the hopeless failures of these men had inspired the imagination of the rulers and subjects alike. It is certainly true that in the absence of water power in India it would not have been possible to establish

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various dependent industries until the beginning of the nineteenth century when steam power began to be generally applied to industry ; but even at this late hour it would have not been difficult to introduce the basic engineering industries, especially as machinery was still simple and had not become too complicated to defy all attempts at imitation by ordinary skilled metal workers. All things considered it seems pretty certain that developments along these lines would have radically changed the course of events during the past hundred years.

But these basic deficiencies were not considered to be so formidable as to compel enterprising men to turn their back upon the manufacturing industries in dismay. Western education had been gradually broadening the outlook of men ; ever-widening facilities for trade and commerce coupled with the establishment of law and order in the country were stimulating the creation and accumulation of capital on a scale hitherto unknown in the history of India. So the manufacturing industries once again began to occupy the mind of the Indian people. India had been the home of the cotton industry from time immemorial ; there was also an extensive and ever-widening home market for cotton goods ; above all the spinning and weaving of cotton by modern methods did not require much technical skill and knowledge. Naturally the cotton industry was the first to be developed on modern lines in India. The cost of machinery was certainly very high, but the lower cost of raw cotton, the proximity of the market, and the abundance and cheapness of labour were expected to counteract the adverse effects of that deficiency ; and the pioneers were not far wrong in their calculations. These considerations were also

responsible for the growth of the jute industry in Bengal. The first cotton mill was set up in 1838, but it was not till 1855 that the first jute mill started operations. It was also at this time that, following the construction of the railways, coal-mining began to be developed in Bengal and Bihar. The success of the earlier attempts paved the way for the development of these industries on an extensive scale. Jute and cotton mills were established and new coal-fields were opened up in rapid succession. These developments naturally led to the establishment of engineering workshops to undertake repairs and emergency renewals. The second half of the nineteenth century also witnessed the establishment of blast furnaces, woollen mills, silk mills, leather tanneries, glass works, tile and cement factories, oil mills, sugar mills, paper mills and various other kinds of factories, but so slow and insignificant was the progress in this direction that until the completion of the Tata Iron and Steel Works at Jamshedpur in 1911, cotton, jute and coal dominated the field of industry in India. With the establishment of the steel industry on modern lines, various dependent industries—such as tin plate, wire, agricultural implement, railway wagon and others—came into existence ; but not the basic engineering industry. India still remains dependent on foreign countries for the supply of machinery. Indeed, the representatives of almost every industry are to be found in India, except those of the chemical and engineering industries which are the universally recognised starting points in modern industrial development. It was rather a strange spectacle, but Indian industrialism actually began its onward march with its tail-end in front.

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**The extent of industries.**—The grand, majestic list of industries given in the above paragraph is at first sight likely to convey the idea that after all the industries in India have not been seriously hurt by that freakish developmental error. But in this case, unfortunately, the size of the list does not offer us any consolation. It is the extent, preferably combined with variety, but never variety alone, by which the importance of a national system of industries is determined. In the year 1927 there were 7,704 factories in India, employing only 1,680,702 hands. In other words, after more than three quarters of a century of effort and development industries in India can offer employment to only one man out of 200 in the country. To apply another test, the articles manufactured by these 7,704 factories and nearly 1.75 million men meet only a fraction of the total requirements of the country; they pale into insignificance when compared with the volume of imports from abroad. And this state of affairs is to be witnessed in spite of the fact that the raw materials for almost every industry are being exported in large quantities as the producing country has no use for them. We realize that under modern conditions no country can or should hope to be entirely self-sufficient in the matter of industrial products, but then at the same time the imports and the home supplies must not be in a serious disproportion. And in India this disparity is so glaring as to lead even a superficial observer to the conclusion that the development of industries in the country has not yet seriously begun.

**Deficiencies and their consequences.**—The question at this stage arises: are the deficiencies, which we have already noted, responsible for this

sorry state of affairs? They are; but unfortunately we have to add many more to the list. The deficiencies that retard India's industrial development are of two kinds: material deficiencies and deficiencies relating to organization. The absence of the engineering and chemical industries belongs to the first category, but in order to complete our list we must mention the absence of such basic industries as power production and the manufacture of industrial leathers and leather products which, like chemicals and machinery, are directly or indirectly responsible for the smooth running of almost every kind of industrial establishment. There is one important deficiency which stands between the two above-mentioned classes, and it is the scarcity of capital for industrial development. It is a well-known fact that many an industrial establishment in India has to close down for want of capital. Not that capital is by any means scarce in the country: it is because the capitalist has no faith in the ability and honesty of the Indian industrialist.

This brings us to the second class of deficiencies, which are more important than material deficiencies in the sense that it is to a very large extent due to these that various material deficiencies exist in India to-day. In this connection we have to note the scarcity of men capable of controlling and guiding industries. This deficiency exists not because Indians are congenitally incapable of controlling industries, but because industry has so far failed to attract men of the right kind. One should have no hesitation in declaring that industry in India has fallen into the hands of mediocrities without stamina. As a consequence, not only the concerns directly controlled by these second and third class brains suffer, but also the whole organization of industry



tends to deteriorate. Industry in India has thus fallen into disrepute, and is looked upon with suspicion and distrust by the investor. Apart from this appalling incompetence, the "captains of industry" in India betray another serious deficiency, and it is the lack of business morality and sense of duty. In the face of these deficiencies how can industry prosper in India?

It is obvious that these deficiencies would produce a vicious circle: those connected with organization and management would result in all sorts of scandals, including failures; the industry would not prosper, and therefore would not be in a position to attract first-class men. All things considered it seems certain that so long as the various material deficiencies exist, the development of industries in India will never proceed at a more desirable speed; and none of the material deficiencies would disappear so long as the whole organization of industry is not thoroughly overhauled.

### III. THE END OF INDIAN INDUSTRIALISM

**Industrialization as a cure for poverty.**—The decay of old national industries in India, to which attention has been drawn in a preceding section, has often been held responsible by Indian economists for the poverty of the masses; and naturally enough it has been urged that an effective and almost infallible remedy for India's economic ills is to be found in the rapid and intensive development of manufacturing industries. If the industrialization of the masses is a magic wand that promises to open the door to prosperity in India, it is a thing worth having at all cost; and this in itself is an end whose glamour dis-

tinctly outshines that of all others to which the social, political and economic idealists may point. But is this dazzling end a reality?

We need not try to prove the well-known fact that a great majority of the people in India are incredibly poor; nor is it necessary to enter into a controversy regarding the income per head in the country. What we want to emphasise at this stage is that a very large number of people in India constantly live in a state of semi-starvation, because their income is far too inadequate to bring them even the barest necessaries of life. Will the industrialization of the country be helpful in making up this deficiency, and will the improvement in the economic condition of the masses brought about thereby be of a permanent character?

The answer to this question is likely to be in the affirmative in all circumstances. Some would instantly apply the simple arithmetical rules of addition and subtraction, and claim that if a section of the people entirely dependent on agriculture migrates to the factory, the pressure on the soil would diminish accordingly, and so bring prosperity both to the "migrant" and the "stay-at-home". Others would automatically recall to their minds the advice of no less an authority than the Famine Commission of 1880 who urged the necessity of opening up other avenues of employment in order to relieve the overcrowded village of its surplus population in times of acute distress and emergency.

The stronghold of these claims and assertions is open to attack on all sides. As the main object of the development of industries is supposed to be the gradual elimination of pressure on the soil by the transference of the surplus population to the factory, the population of the

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country and the number of people who can be usefully employed in the manufacturing industries must of necessity figure as central points in our enquiry and discussions. The population of India, in round numbers, is reckoned to be 350,000,000 at the present time. Poverty being an elastic term and involving comparisons, it is very difficult to offer an accurate estimate with regard to the number of men, women and children who are doomed to end their days in want and poverty; but anyone who claims even a superficial acquaintance with the conditions prevailing in India would readily agree that at least a third of the population in the country is badly in need of relief in order to be able to procure the barest necessities of life.

Let us now assume that the sole object of the development of industries in India is to improve the condition of only this section of the population to such an extent as to bring them just enough food and clothing, and not to make their lot as happy as that of an average labourer in the West. This is the very minimum a human being can demand and expect; but anyone who has cared to study the poorest classes in India would readily agree that even this small improvement cannot be effected without, on an average, increasing the income of this section of the population by at least 25 per cent. Evidently this goal can be achieved only by transferring nearly 20 per cent. of this section of the population to the factory. But as nearly a third of the country's population is in need of relief, at least 22 million people will have to be removed from the land. In other words, the manufacturing industries in India will have to be developed to such an extent as to offer food and clothing to at least 22 million people, or, if each man

employed in an industrial establishment takes with him as many as three dependents from the countryside, at least 5.5 million workmen will have to be absorbed by industries in India.

It is obvious that 5.5 million workers with their 16.5 million dependents cannot be transferred from the fields to the newly set up factories all at once in the twinkling of an eye; only a small percentage can be annually taken away, and the rate at which this transference can take place will depend entirely on the pace at which new factories are set up. Even if a policy of wholesale and indiscriminate protection is adopted with a view to stimulate the growth of industries and to offer a chance of success to even the worst-managed establishment of its kind in the universe, the rate of industrial expansion even in these "ideal" conditions will be governed ultimately by the amount of capital available for that purpose. And so it transpires that, if industrialization is at all a remedy for want and poverty, the fate of nearly 110 million people in India will be decided ultimately by the amount of capital which will be actually forthcoming for industrial development.

**Industrialization a slow process.**—When we take into consideration the paid up capital and debenture stock of industrial concerns in India, our eyes are opened to a very significant and remarkable fact: it is found that it has been necessary to invest on an average more than Rs. 1,500 per man employed in industry. This average is more likely to go up than to come down when industries requiring much larger amounts of capital per workman employed—such as the chemical and engineering industries—are established in India. The fact that certain existing

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industrial establishments are over-capitalized and that the cost of chemicals and machinery will probably show a downward tendency, may suggest the necessity of a readjustment in our calculations regarding the average cost; but the necessity of such readjustments would at once disappear when it is realized that all industries, both basic and non-basic, for which conditions in the country are suitable, will have to be developed more or less simultaneously and that the capital requirements of the chemical and engineering industries are enormous and beyond all proportion to the number of workmen employed. The present average of Rs. 1,500 per head, therefore, is more likely to go up than to come down in the future, especially as we must look forward to an improvement in the efficiency of labour with the passing of time.

We have seen that if industry is going to be of any help at all in solving the problem, not of poverty but of removing acute distress, at least 5.5 million men with their 16.5 million dependents will have to be removed from the village to the factory. The employment of these 5.5 million workers will, on the above basis of calculation, necessitate the expenditure of at least 8,250 million rupees on factory installation. Now when we know that the post office and bank deposits in India amount to only 2,500 million rupees at the present time, it becomes difficult to believe that any scheme of industrial development would succeed in inducing the people to invest more than 250 million rupees a year in industrial enterprises. In forming an idea of the true potentialities of the country's resources it may be helpful to remember that the total paid up capital of new industrial flotations during the seven years (1922-29) is well below the

100 million mark. Again, it must be remembered that only a small percentage of bank deposits (probably not more than 25 per cent. of the capital thus represented) can be withdrawn for industrial purposes without bringing about an acute shortage of money and so damaging the commerce of the country. When these facts are taken into account it becomes obvious that, even after exploring all possibilities of attracting foreign capital and of re-investing a substantial portion of the profits of industry, no amount of effort and organization would succeed in attracting on an average more than 250 million rupees a year for at least a quarter of a century. And so it would appear that even on this liberal, almost fantastic, assumption the industrialization of 5·5 million men cannot be accomplished in less than thirty years.

**Actual gain : an estimate.**—If the problem of acute economic distress in India could be solved within thirty years, it would indeed be an accomplishment without a parallel in the world's history. But unfortunately for the masses in India the course of events is not likely to be quite so simple and smooth as we have assumed in forming our estimates in the preceding paragraph. It is a well-known fact that, in spite of want and poverty, the birth-rate in India is higher than in any civilized country in the world, and that although infant mortality and death-rate in general are almost equally high, the population of India is gradually increasing. We also know that high infant mortality and death-rate in general are chiefly, though not entirely, due to economic causes. The conclusion is obvious: when industrialization leads to an increase in the income of the family, a large

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percentage of children and grown up men and women, who would have otherwise perished for want of suitable food and medical attention, would survive because of an improvement in the economic condition of the family and therefore in their general vitality. And when it is remembered that, with improved vitality, the birth-rate will be more likely to go up than to come down, it becomes obvious that an industrialized family will show a greater tendency to expand than it had ever exhibited before its migration to the factory area.<sup>1</sup>

In these circumstances would it be an exaggeration to suggest that (since we have assumed every workman having no fewer than three dependents—a wife and two children) after eight or nine years every two workmen will be in a position to bring to the factory at least three young men or boys who have been brought up in the factory area? We need not go into all the various intricate details, but if the above estimate can be accepted as the basis of calculation, we must come to the conclusion that emigration from the village to the factory will cease within fifteen years, and probably much earlier. Even if we start with the highly fantastic assumption that for full fifteen years not a single offspring of the original emigrants would join the factory, except to fill the place of his deceased father or guardian, it would be possible to bring out only about 2.75 million men with their eight million dependents from the village. Thus even under most favourable conditions only about half

<sup>1</sup> This statement is based on the assumption that conditions of employment and housing, more particularly the latter, are improved considerably. But then the whole scheme of large-scale industrialization would be a complete failure unless due attention is paid to these aspects of the question.

the poorest section of the population would, other things remaining the same, draw the anticipated benefit by the intensive development of industries in the country.

We had started with the none too liberal assumption that only a third of the population was in need of relief, and that an addition of only 25 per cent. to the income of that section of the population was necessary in order to provide it with adequate amounts of food and clothing. Having seen that industrialization promises to bring even this meagre relief to only about half the number of the poor and needy in the country, the question naturally arises: will even this small improvement in the economic condition of a section of the population prove to be of a permanent character? In other words, will it be possible to leave that section of the population or families whom industrial development has benefited out of consideration in the future? Certainly it would be possible if we aim at improving their condition only to the extent of bringing them just an adequate amount of food and clothing, and no more—but always on the condition that even this meagre improvement in their economic condition does not prove to be temporary in character. But unfortunately it is impossible to start with this assumption. In the first place the question of the growth of population cannot be disregarded. As high infant mortality and death-rate in general are overwhelmingly due to want and poverty, and as the last extra penny is capable of saving a life among the poor and needy, we cannot resist the conclusion that the number of those who stay behind in the village will, in the absence of checks, steadily increase, and in some cases may even reach the former level in course of time. How,



in these circumstances, can we be justified in looking upon industrial expansion as a solvent of the difficulties of India's starving millions ?

**Creation of wealth as an end.**—Although the development of industries in India is not likely to bring about a substantial increase in income per individual, it can always be relied upon as a fertile source of wealth. It is the capitalist and the worker directly connected with the factory who would be the chief gainers, but these gains when taken collectively would rapidly increase the national wealth of India. And this, apart from the fact that modern industrial organization offers an opportunity to almost everyone with a little capital to participate in industry and so to share its profits, is in itself a very desirable end of industrial development.

**The approach to self-sufficiency.**—Modern industrial organization tends to bring about specialization among the nations of the world; but although this specialization is more conducive to prosperity, no great State, not even the British Empire, has so far finally given up the idea of industrial self-sufficiency. The requirements of the country in time of war and the dangers of relying on foreign countries for the supply of some of the articles of vital importance to the conduct of war-time operations or to the industries of the country in general are often responsible for this tendency; but in other directions the natural facilities enjoyed by a rival nation have been recognized and it is here that a break on the road to self-sufficiency is often noticeable. As in developing her industries India also must follow the path that leads to the greatest prosperity, and as there are certain industries for which

conditions in India are decidedly less suitable than in other countries, it would be clearly uneconomical to seek the ideal of complete self-sufficiency. But the industries necessary for national defence in time of war, or some of the basic industries on which the prosperity and sometimes the very existence of other industries depends, cannot and must not be neglected. India's own experience during the Great War, when the supply of certain articles (which were necessary for national defence or indispensable for the existence and efficiency of some of the industrial establishments in the country) were suddenly cut off, proves that it is not only desirable but necessary to develop certain industries even in spite of various handicaps.

**Exploitation by foreign countries : a defensive weapon.**—In the modern world of industry large-scale production and sometimes mass production are the necessary conditions of success. When two or more rivals in trade are at war, an open market becomes the dumping ground for their surplus products ; and when they come to an understanding, the truce is usually followed by the division of open markets, which, in the absence of competition, leads to exploitation. Obviously there is no other way to prevent this exploitation and to bring about a stability in prices except by re-introducing the element of competition by setting up rival industrial concerns in the country. Of course there is nothing to prevent these concerns from coming to an agreement with their foreign rivals and so artificially swelling the price of their products, but there is always the consolation that the profits of monopoly remain in the country although

the consumer finds himself about as unhappily situated as before.

**Educative influence of modern factories.**—In order to appreciate the value of the influence which modern factories exercise in broadening the outlook of men, in breaking down the barriers of ignorance and superstition, and in bringing about political consciousness, we have only to compare the national characteristics—which are more the outcome of the environments than anything else—of agricultural and industrial communities. The discipline associated with the factory and city life and all those acquired habits and manners tend to permeate, though ever so slowly and imperceptibly, far afield into the country, and so tend to spread enlightenment and discipline. Towns and cities have at all times in man's history stood as the beacons of enlightenment to the country around, and modern factory towns, in spite of all their undesirable features, exercise a far wider influence in shaping the thoughts and actions of men.

**The problem of middle class unemployment.**—All the various economic and intellectual advantages ascribed to the development of industries pale into insignificance when its possibilities as a source of employment for educated middle class young men are taken into account. Education in India has made enormous progress during the last quarter of a century, but this progress has many undesirable features. It is not so much the primary education which has received attention but the high school and university education. A fairly good idea of progress in this direction is given by the number of universities and scholars, which have increased by nearly

250 per cent. and 600 per cent. respectively during the past twenty-five years. Again, the number of graduates has increased by nearly 75 per cent. during the past nine years. In Bengal a much larger percentage of the population is receiving university education than in England, while other provinces, notably Bombay, Madras and the Punjab, are not far behind and are rapidly overhauling Bengal in this exciting race.

The causes of this startling increase may be summed up in a sentence: It is because the university education in India is hopelessly inefficient and cheap. It is inefficient because it is cheap; and it is cheap, almost dirt-cheap, because the public opinion in the country demands that it should be within everybody's reach. And the Government in its anxiety to avoid the hornet's nest has created a situation which is full of possibilities for a political disaster of the first magnitude.

When higher education is deplorably inefficient and cheap, it cannot fail to attract a large number of scholars who are too incompetent to benefit from a higher standard of instruction, or too poor to make their due contribution towards the maintenance of that standard. And that is precisely what has happened in India, with the result that universities are turning out graduates of all descriptions on mass production lines. With no new avenues of employment, there has naturally been a slump in the market, and the value of a graduate's services has rapidly declined during recent years. Men with Master's degrees, sometimes with lawyer's diplomas in addition, are seen working as petty clerks in Government and railway offices; holders of less exalted academic distinctions are seen seeking a pittance in the police department as ordinary

low-paid constables; thousands who have been cast adrift without a graduate's diploma (in spite of all their efforts) are trying to make the two ends meet by working as railway porters, cart drivers, and in other low and undignified occupations. But there are tens of thousands who cannot find decent employment, whatever that may imply, and who prefer to wander from place to place rather than do anything which they consider too ill paid or too humiliating for the holder of a university degree.

But in spite of these catastrophic results the graduate-making process is proceeding more merrily than ever. New colleges and universities are springing up like mushrooms all over the country with the object, it seems, of rescuing the cast-off human material from the waste-paper baskets of the older institutions. The claim that they are designed to bring enlightenment to the benighted millions of India and that their founders are heroes and patriots who exist only to serve the goddess of learning and their country is a fraud and imposture. The need of the moment is primary education, and if these "heroes and patriots" insist upon setting up new colleges and universities (at public expense of course), it is because like all true Orientals they are anxious to commemorate their memories in stone and plaster, and because their whole being is saturated with an incurable itch for playing the sultan. After all it is always more pleasing to build and rule a Rome, or a Baghdad, or a Shiraz than to set up a thousand petty principalities among the savages of Africa: and a hundred or a thousand primary schools in the darkest parts of the country are, in comparison with the majestic edifice of a university or a college, apt to be a poor and unstable monument

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and a barren ground for the exercise of power and authority.

And the Government is no less culpable than these hawkers of learning and enlightenment for the existing deplorable state of affairs : as a matter of fact its responsibility is even greater. Not only has it helped these universities and colleges with a generous hand without any condition as to their equipment and standard of education, but it has actually entered the field as an earnest competitor while neglecting the more pressing problems of standard of instruction and primary education. There is hardly any clear-cut plan or policy behind these activities ; there is only a desire for shutting the largest number of the noisiest mouths in the country, and it has so happened that the advocates of university expansion possess those mouths. Instead of training public opinion in favour of a more rational policy it has looked upon primary education as a noose and depended upon university education for deliverance—little suspecting that by adopting the policy of ruling by placating the noisiest elements it was putting its head straight into a deadlier noose.

It is obvious that if the problem of middle class unemployment is at all to be solved, the Government will have to make a beginning towards that end by re-shaping its whole educational policy and by preventing the entire breed of adventurers and fame and power seekers from exploiting the gullibility and weakness of the people and from deliberately misguiding public opinion for their own selfish ends. It may not be judicious to abolish even the wretchedest among the existing universities and colleges, but there should be no difficulty in clipping the wings of the would-be founders of new institu-

tions and so preventing them from doing further mischief. But, human nature being what it is, it would be possible to take this step only when the Government has something more useful to offer as a substitute. In any case the production of graduates will have to be brought under a strict control without any further delay, but without in any way damaging the prospects of the poor but promising aspirants. If for some reason action in this truly volcanic field is delayed or postponed for any considerable length of time, one need not be a prophet to predict that these university products as well as the country as a whole are in for a sorry time. The situation in the country is already far from satisfactory, and demands prompt measures to arrest the growth of discontent among the educated unemployed. It is immaterial whether they are right or wrong, but they are blaming the Government for their misfortunes, and have leisure enough for subvertive schemes; while with the passing of time there is bound to come a brisker recruitment to their ranks. The existence of these educated unemployed persons with their rapidly-increasing numbers would be a source of danger to the stability of even the best government.

It is, however, not only the stability of political institutions but also the safety of the existing social and economic institutions of the country that is seriously imperilled. Their present objective may be to capture the governmental machinery, but even the attainment of this end is bound to be followed by a grand disillusionment; the whole economic and social organization that permits inequality in its respective spheres will be the next target, and even now signs are not wanting that the trend of thought of these people is in that direction. It is, in these circum-

stances, as much in the interests of the community as of Government to devise measures to check the growth of this common danger.

The overhauling of the whole system of education may at first sight appear to be the only practicable and effective remedy, but a closer examination would reveal many of its inadequacies. In the first place the standard of education cannot be improved in a day; it must be a gradual process, and those who claim some sort of acquaintance with the Indian system would agree that many decades would pass before educational institutions in India attain the efficiency of their Western contemporaries. Again, the Government cannot artificially increase the cost of education in the country merely by cutting down grants to the existing institutions, as it would always be taken, regardless of the motives underlying this move, as a retrograde step. And lastly, so long as university education is cheap and inefficient, we cannot prevent the incompetent from swelling the number of diploma-holders, especially when a great deal of social prestige is attached to that distinction.

In these circumstances it would be obviously suicidal to depend entirely on educational reforms for the solution of the thorny problem of middle class unemployment. These reforms would be of little use by themselves; they will have to be accompanied by the opening up of new avenues of employment. And, as far as we can see, there is no better source of employment for educated young men than modern factories. It is, therefore, in the interests of the Government as well as the community at large to develop manufacturing industries. The danger of having tens of thousands of educated unemployed roaming all over the country is real and is fast



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becoming a menace to the stability of the State itself. It is not too early to-day, but to-morrow when the lion demands a solid meal it may be too late.

## **Factors in Industrial Development**

## CHAPTER I

### RAW MATERIALS

**Meaning of the term "Raw Materials".**—From the standpoint of orthodox economic theory only the material gifts of Nature, or various vegetable, animal and mineral products in their crude natural form, can be described as raw materials. In this case the distinction between raw materials and manufactured articles seems to be based on the fact that the articles which can legitimately be scheduled in the former category are those in the creation of which human skill and energy play no direct part, while the articles belonging to the manufactured group owe to a very large extent their properties and form directly to the skill and energy of man.

In the practical world of industry the principles underlying this distinction are totally disregarded, and the status of an article is determined by the intentions of the consumer and by the nature of the part the article is expected to play in the scheme of manufacture. Any article which is directly used in the manufacture of another article is described by the manufacturer of the latter as a raw material, though it may be a manufactured product from the commercial point of view. Many instances can be given to illustrate the complexities of the situation created by the rival claims of the character of the article itself and of the intentions of the user in determining its status—except when the article is a primary raw material, or a crude product in its natural state. To take a typical case, linseed is an article which is universally regarded, both

from the theoretical and manufacturing points of view, as a primary raw material for the manufacture of linseed oil. From the commercial and manufacturing standpoints the oil is a finished product, capable of being used for all manufacturing and non-manufacturing purposes without any further treatment, but it is scarcely anything more than a raw material when the requirements of the paint and varnish manufacturing industries are taken into consideration. This crude distinction, which is based chiefly on the conflicting claims of the producer and different classes of consumers, is carried yet another step further when we are told that even paints and varnishes are regarded as raw materials in various dependent industries.

The use of the term in the above sense is far too wide and arbitrary: although from the consumers' point of view the manufactured and semi-manufactured articles can legitimately be described as raw materials, their inclusion in the present discussion is not likely to serve any useful purpose, especially as their production is itself dependent on those raw materials which are in no sense capable of being described as manufactured articles. As our principal object is only to examine the prospects of Indian industries as a whole in so far as they are dependent on raw materials, and as the ultimate bases of all kinds of industries are the primary raw materials, it is necessary that we should confine our attention mainly to these articles.

**Primary raw materials.**—Primary raw materials may be roughly divided into three main groups: vegetable and animal products and minerals. Vegetable products may, for our present purpose, be subdivided into (a) agricultural and (b) forest

products; while both technically and commercially minerals are generally classified as those belonging to (a) metallic and (b) non-metallic groups. An extensive variety of articles may be noted under the three main heads: but as industrial progress in general is dependent upon a small group of raw materials, it is neither desirable nor possible to treat all the raw materials in these pages. We shall therefore confine our attention to only a few articles of outstanding importance, which in their manufactured form figure largely in national and international trade. Even in this restricted field only a brief summary is all that is necessary for our present purpose, while the detailed description of most of these articles will be taken up in connection with various consuming industries in later parts of this work.

## I. VEGETABLE PRODUCTS

**A. Agricultural products.**—Of the vegetable products used in manufacturing industries all over the world, cotton, linen, jute, oilseeds, sugarcane and rubber are the most important—in fact it seems that, breweries, tobacco factories and confectioneries apart, the consumption of agricultural products in industry is confined almost entirely to these articles.<sup>1</sup>

**Cotton.**—India is the second largest producer of raw cotton in the world: the yield at the present time averages more than 2,000,000,000 lbs. a

<sup>1</sup> Indigo and other vegetable dyes and various plants with medicinal properties may be mentioned as exceptions, but even in these cases while synthetic dyes have already dealt a death-blow to the vegetable-colouring materials, the consumption of organic drugs and extracts is extremely small, so that the quantity and value of both these organic products is quite negligible in comparison with that of other vegetable products consumed all over the world for manufacturing purposes.

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year, which is about half of the average annual yield in the United States. The fibre is cultivated in almost every part of India, but agricultural statistics for recent years show that nearly 75 per cent. of the crop is raised in Bombay, the Central Provinces and Berar, and Hyderabad State. On an average nearly half of the entire output is consumed locally, while the remaining half is exported in the raw state. There are many varieties of cotton cultivated in India, but all indigenous varieties have a shorter and coarser staple than those grown in the United States and Egypt. Some idea of the inferiority of Indian cottons may be formed when it is pointed out that the spinning qualities of any particular variety of cotton depend upon the length and fineness of the staple, and that while Indian cotton fibres are mostly less than an inch in length and 0·00085 in diameter, the staple of Sea Island cotton has an average length of about 1·6 ins. and a diameter of 0·00065 in., that of American cotton varies from 1 in. to 1·5 ins. in length and has a diameter of about 0·00075 in., and Egyptian cotton has a staple of about the same length and fineness as the Sea Island cotton.<sup>1</sup> Indian cottons are thus suitable only for the manufacture of coarser varieties of yarn and cloth. Attempts have been made by the Department of Agriculture in India to improve the indigenous short-stapled varieties of cotton by developing a longer and finer staple through the crossing of different varieties, and by introducing long-stapled cottons—particularly the best American varieties—in some of the suitable areas. The publications of the Department of Agriculture show that the annual production of long-stapled

<sup>1</sup> J. M. Matthews on Textiles in A. Roger's Industrial Chemistry, p. 854.

American varieties in India averages only about 250,000 bales, which, as the existence of import trade in raw cotton suggests, is not enough even to meet the present meagre requirements of cotton mills in the country.<sup>1</sup>

The position, then, at the present time is this, that while India is producing more than twice the short-stapled cotton required for internal consumption, she is still largely dependent on foreign countries for the supplies of long-stapled fibre. This dependence is in no way due to any inherent defects in India's soil or climate as a whole; it is chiefly due to the fact that no systematic attempt has been made to induce the cultivator to grow long-stapled cotton instead of the indigenous short-stapled varieties in the areas suitable for the purpose. The publications of the Provincial Departments of Agriculture show that American cotton can be grown in certain parts of Central, Northern and North-Western India, more particularly in the Punjab and Sind, and that the indigenous varieties are capable of being vastly improved in quality in other parts of the country. Even if we assume that botanical research will not result in improving the local varieties to any appreciable extent, the potentialities of North-Western India in the matter of long-stapled cotton cultivation are immense, and there is no doubt that when vast areas of land are brought under cultivation after the completion of the Sukkar Barrage irrigation project, the production of American cotton, for which these areas are said to be most suitable, will not only

<sup>1</sup> Apart from long-stapled cotton, certain quantities of yarn of higher counts are also imported. The imports of raw cotton into India averaged 12,000 tons during the pre-war period, and were reported to be 13,000 tons in 1923-24, 20,000 tons in 1924-25, and 46,000 tons in 1926-27. It seems that a large proportion of this was long-stapled cotton for consumption in Indian mills.

make India independent of foreign countries for the supply of long-stapled fibre, but under proper State guidance and control will actually make her an exporting country.

That the introduction of the more up-to-date and scientific methods of cultivation will bring about a vast improvement in the situation is proved by the fact that whereas in India the average yield of ginned cotton is only 98 lbs. per acre, it has been estimated that in America it is more than 200 lbs. per acre and in Egypt 450 lbs. per acre. As far as we can see, the fault lies wholly with the methods of cultivation, and there is no doubt whatever that, given proper facilities, the yield can be greatly increased. The obvious conclusion, then, appears to be that although India's position as a producer of long-stapled cotton is far from satisfactory at the present time, it is capable of being improved, and that various cotton-consuming industries (such as spinning and weaving, and the manufacture of artificial silk, explosives, celluloid, etc.) in India will be just as favourably situated with regard to the supplies of the principal raw material as those in the United States or indeed in any other part of the world.

**Flax and linen.**—Second in importance to cotton as a vegetable textile fibre is linen, which is obtained from the flax plant. Large quantities of this fibre are annually consumed in Europe and America in the manufacture of dress materials. In India, however, there is not, and never has been, much demand for linen fabrics; and probably this accounts for the fact that although large areas are devoted all over the country to linseed production, the cultivation of the plant for the sake of the fibre is practically



unknown in India. The publications of the Provincial Departments of Agriculture show that, as a result of numerous experiments, it has been established that it is possible to grow flax in many parts of India—especially in Northern Bengal, Assam and Bihar—on a large scale for the production of linen fibre. “Careful experiments in both Bihar and Assam indicate that the crop could be cultivated with profit in those tracts even at pre-war prices for the fibre.”<sup>1</sup> In these circumstances it is but natural to conclude that the absence of this important raw material in India is not due to unfavourable natural conditions.

**Jute.**—Another important vegetable fibre is jute, which is obtained from two closely allied varieties of plants, and which owes its importance in the world markets to the fact that, compared with its strength and wearing qualities, it is the cheapest known substance for the manufacture of bags for agricultural produce, and of wraps for all sorts of packages and articles. Efforts have been made to cultivate jute in other parts of the world, more particularly in South American countries, but they have always ended in failure, so that India still enjoys a complete monopoly for the supply of this fibre.

The cultivation of jute in India is confined to the Ganges-Brahmaputra delta in Bengal, and certain parts of Assam, Cooch Bihar, and Bihar and Orissa. During the last quarter of a century the area under jute cultivation has averaged about 2,500,000 acres a year and the yield has been recorded as generally varying between seven and eight million bales (of 400 lbs.) a year. A little

<sup>1</sup> F. S. Finlow and D. B. Meek on “Jute, Sann Hemp and Flax”, Indian Munitions Board's Industrial Handbook, p. 367.

less than half is exported in the form of raw fibre, cloth and bags, while the remaining half is consumed in the country. The present output per acre is by no means the maximum, as we find that still a good deal of work remains to be done in the direction of improving the technique of cultivation; with the introduction of scientific and up-to-date methods the yield can be considerably increased without widening the area under cultivation.

**Oilseeds.**—Many important vegetable products may be noted under this head. The detailed description of the various kinds of seeds and of the industrial application of their oils is obviously beyond the scope of this chapter, and will be taken up when we inquire into the present position and the possibilities of the vegetable oil industry in a later part of this work. It is only necessary to point out at this stage that India is the largest producer of oilseeds in the world; that there is usually a very large surplus available for export purposes; and that almost every important variety of oilseeds is cultivated in the country. The total area under oilseed cultivation (not including cotton-seed, which is obtained as a by-product or as an appendage of production) averages nearly 14,000,000 acres, and the yield amounts to several million tons.<sup>1</sup> As in the case of other agricultural products, the introduction of scientific methods of cultivation will greatly increase the yield: but even as it is, the vegetable oil-consuming industries in India are, and will be, more favour-

<sup>1</sup> The production in 1923-24 was as follows: linseed, 463,000 tons; rape and mustard seeds, 1,149,000 tons; sesamum, 441,000 tons; and groundnut, 1,086,000 tons. No data regarding the yield of other oilseeds are available.

ably situated than those in most of the foreign countries.

**Sugar-cane.**—The problem of sugar-cane cultivation cannot be examined without direct reference to the requirements of the sugar-manufacturing industry, and as we propose to deal with the subject in all its details in the concluding volume, we may content ourselves with some of the salient points in these pages. Briefly, the position at the present time with regard to sugar-cane cultivation in India is this, that the cane is cultivated in almost every part of the country in varying quantities<sup>1</sup> for the manufacture of “gur” or unrefined sugar. The total area under sugar-cane cultivation has averaged about 2,800,000 acres during recent years, which is larger than in any other country in the world. The yield per acre as reckoned in terms of sugar naturally differs in different areas, but taken as a whole it is much smaller than in any other large sugar-producing country. According to the Indian Sugar Committee, “the average outturn of sugar in India during the five years ending 1918-19 has been 1·07 tons per acre as against 1·96 tons in Cuba, 4·12 tons in Java and 4·61 tons in Hawaii, the only three countries besides India which contribute more than half a million tons of cane sugar to the world’s supply”.

This poverty of yield is principally due to inferior methods of cultivation and to the fact that the sugar-canecultivated in India are generally of a poor quality. There is no doubt, however, that with proper and adequate manuring and

<sup>1</sup> The United Provinces, Bengal, Bihar and Orissa and the Punjab are the chief sugar-cane growing provinces, and the total area in these provinces has averaged over 2 million acres during the past quarter of a century, or just 75 per cent. of the area under sugar-cane cultivation in India.

with the introduction of better varieties of cane, the yield can be easily doubled. But apart from improvements in the methods of cultivation, the concentration of holdings under sugar-cane will be necessary for the large-scale production of refined sugar. At the present time the holdings under sugar-cane are too small and widely scattered to enable large, modern sugar refineries to obtain the requisite amount of raw material. The whole aspect of the question in all its technical details will be examined when we enquire into the possibilities of the sugar industry in a later part of this work ; but from what we have said it is evident that with improvements in the methods of cultivation and cultural organization, extensive supplies of raw material can be raised in India for the manufacture of refined sugar on a large scale by modern methods.

**Rubber.**—Another important vegetable product of great industrial importance, which can be described both as an agricultural and forest product, is raw rubber. Although a number of rubber-yielding plants are indigenous to India, no effort appears to have been made to grow them on a commercial scale until the beginning of the present century. The publications of the Forest Department tell us that the Tenasserim district in Burma and the southern half of the Malabar Coast are the most suitable localities for the cultivation of rubber—in fact they are just as suitable both as regards the quality of the soil and climate as the Malaya Peninsula. The cultivation of rubber, however, is not confined to these areas, as we find that rubber plantations also exist in the Nilgris and Salem districts of Madras, and in Assam, Mysore, Cochin, Coorg and other parts of Southern India.

The total area devoted to rubber cultivation was estimated to be 127,458 acres in 1922, of which 100,000 acres were situated in Burma and Travancore. The exports of raw rubber in 1926-27 (which roughly corresponded to production in the country during the year) amounted to 23,000,000 lbs., which show an increase of nearly 75 per cent. during the preceding four years.

Practically nothing is known about the methods of cultivation, estate management and extraction; but as rubber plantations in all parts of the country are owned and managed by men of substantial means and education, we must assume that under the prevailing conditions there is not much room for improvement. As only about half the area under rubber cultivation in the country has so far been tapped, it is but reasonable to assume that when the plantations in the other half are also tapped, the yield of raw rubber will correspondingly increase. In addition to this, extensive areas suitable for rubber cultivation are still awaiting development in Southern Burma and various parts of Southern India, so that it appears that should the demand for raw rubber in India or abroad increase beyond its present level, it would be possible to bring fresh areas under rubber cultivation to meet this additional demand. Even as it is, the yield from the existing plantations may be taken as sufficient not only to meet the requirements of India—in case the industries dependent on rubber are established—but also to supply other countries with raw rubber and rubber goods.

**Agricultural products : their position reviewed.—**  
The above concise survey of the position of agricultural products which are used as raw

materials in manufacturing industries shows that, taken as a whole, the situation is still far from satisfactory and that while certain industries can rely upon the existing indigenous sources of supply, the introduction or development of others will necessitate drastic reforms in the methods of cultivation. Unless, therefore, these reforms are carried out in their entirety, the industries consuming these raw materials will, as in the case of long-stapled cotton, be dependent on imported raw materials, or, as in the case of sugar, will be in a very unfavourable position in comparison with their foreign rivals in trade. The existing deficiencies are not due to the poverty of the soil or the unsuitability of the climate: they are chiefly due to the fact that there is no "organized" demand for the non-existent commodities, while the origin of the poverty of yield, the extent of which in certain cases is almost unbelievable, can be traced to the ignorance and unprogressive mentality of the Indian agriculturist and to the general smallness of holdings. It is for the Government as the guardian of the interests of the country to take action: to institute research work in connection with the improvement of crops and to induce the agriculturists by demonstration and otherwise to adopt the more up-to-date methods of cultivation. By these means new and better varieties can be introduced, and the yield increased. A good deal of work has already been done, and is still being done, in connection with the improvement of crops by Agricultural Departments in various provinces; but very little has so far been done by way of overcoming the deep-rooted prejudices of the ignorant peasantry against the more scientific methods of cultivation, or making the results of researches readily available to those

who are directly concerned. It cannot be denied that it is an arduous task to introduce reforms among a thoroughly illiterate and unambitious people, but unless it can be done, it will be a mere waste of money and effort to carry on the research work.

**B. Forest products.**—There are many forest products which are extensively used in modern industries, and of these various kinds of timbers, wood pulp, tanning materials and certain kinds of essential oils, gums, waxes and resins appear to be the most important. As all these products will be fully discussed in connection with various consuming industries, it would be evidently superfluous to discuss them in detail at this stage. We may therefore content ourselves with only a rough estimate of the potentialities of Indian forests in the matter of these articles.

**Yield of forest products.**—The total area of forests in India is estimated to be nearly 250,000 square miles, of which nearly 100,000 square miles are reserved. The combined output of timber and fuel at the present time stands at nearly 350,000,000 cubic feet a year, while the value of minor products has averaged nearly Rs. 1,50,00,000 per annum during recent years. In addition to these, considerable quantities of timber and minor products are obtained from forests in the Native States, with regard to which no statistics are available. However, as far as the forests in British India are concerned, the yield of timber averages only 1,400 cubic feet per square mile, while the value of other forest products works out at only Rs. 60 for the same unit of area. Relatively to the area the yield of forest products is certainly very poor, but as forests

are scattered all over the country and as almost every kind of climate is represented on the Indian continent, the variety of timber and other forest products must be very extensive indeed.

**Varieties of forest products.**—It would be clearly superfluous to discuss in detail all the varieties of timber found in Indian forests; although most of the timbers can be used only as fuel for domestic purposes, there are many varieties indigenous to India—especially the mountainous regions—which are eminently suitable for industrial purposes. Timber is chiefly used for the manufacture of pulp (for paper and artificial silk), matches, and packing chests and cases for manufactured articles. It is also used to a minor extent in the engineering industries, both basic and non-basic, for the construction of frames and bases for certain types of machines as well as foundry patterns. For all these purposes only woods with certain well-defined properties can be employed: and from various bulletins issued on the subject by the Provincial Departments of Forest it appears that certain indigenous varieties of timber are just as suitable for industrial purposes as those used in the manufacture of any of the ordinary foreign products. Apart from that there are many varieties of Indian timbers with regard to the industrial uses of which nothing whatever is known. The list of timbers suitable for various industrial purposes is, therefore, likely to expand as research work on the subject by private agencies and by the Departments of Industries and Forests begins to yield fruit.

**Necessity of improving forest organization.**—The abundance of raw materials, however, does not prove that all the different suitable varieties



of timber are actually available for industrial purposes in desired quantities. In this connection it may be stated at the outset that in order to enable a factory to draw its supplies of timber it is necessary that each suitable variety should be available in such quantities as to justify the erection of a factory in a locality. From what the Industrial Commission has recorded in its report it appears that no particular variety of timber which can be used for industrial purposes abounds in any locality, and that no attempt had been made until recently by the Forest Department in any part of the country to establish plantations for some of the more important indigenous species.<sup>1</sup> On the other hand the exploitation of the existing sources of supply for industrial purposes would in certain instances necessitate the penetration of dense forests, and under existing conditions even this cannot be done, as in most cases neither railways nor ropeways, nor even roads have been constructed. The forests in India are owned by the Government, and it is for the owners not only to find means for the marketing of their produce but actually to create a demand for it. Unless, therefore, plantations are established and transport organized so as to render an adequate and constant supply of timber available at a reasonable cost, the position from the industrial point of view cannot be regarded as at all satisfactory.<sup>2</sup>

<sup>1</sup> Cf. Report, Par. 68.

<sup>2</sup> These remarks are equally applicable to wood pulp which, strictly speaking, is a semi-manufactured article, and is employed in the manufacture of paper, paste-board and artificial silk. Different grades and varieties of pulp are required for the manufacture of various kinds of paper and artificial silk, and the quality of pulp depends a good deal upon the physical and chemical properties of the timber used in its manufacture. It is true that fairly large quantities of timber suitable for the manufacture of the finest varieties of pulp are already available in India, but seeing that a pulp factory cannot

**Tanning materials.**—Next in importance to timber among the forest products are the tanning materials. Recent publications of the Government of India and the various provincial Governments show that Indian forests are capable of yielding a very extensive variety of tanning materials, the industrial and commercial value of a large majority of which has yet to be ascertained by research and experiment. Those materials, however, whose tanning qualities have already been proved and which are in great demand both in India and abroad are by no means abundant; all accessible areas are already being fully exploited, while no systematic attempt is being made by the Government to extend the area by plantation or by the improvement and extension of the existing means of transport. Even as it is, some of the best and most popular tanning materials are found in fairly large quantities in Indian forests; and it may be confidently predicted that while research work, which is now being conducted at many centres in the country, will result in the introduction of new materials, improvements in the means of transport and the policy of restoring and extending the existing sources of supply will result in gradually increasing the supplies of the materials already known to the leather tanning industry in India and abroad.<sup>1</sup>

follow timber areas and that the consumption of timber in these factories is very large, it follows that transport will have to be organized before any single area can be depended upon as a source of raw material for even a moderate-sized pulp factory.

<sup>1</sup> Our account of the forest products would be scarcely complete without a reference to turpentine and rosin, which are "manufactured raw materials" and are extensively employed in manufacturing operations. As far as we know there are only two factories which are owned by Government and are engaged in the manufacture of these articles in India. They are situated at Bhqwali in the United Provinces and at Jallo in the Punjab, and their combined output stood at about 60,000 maunds (at 82 lbs.) of rosin and nearly 140,000

## II. ANIMAL PRODUCTS

**Variety of animal products and the extent of India's resources.**—Of the animal products which are used as raw materials in manufacturing industries, hides and skins, wool, bones, horns and tallow are the most important. Hides and skins are used in the manufacture of leather, and wool as a textile material; bones and horns are employed in the manufacture of glue and gelatine, and of buttons, handles and an endless variety of other articles of daily use; tallow is employed in large quantities as a substitute for heavy semi-solid vegetable oils in the soap and candle industry. An idea of India's resources in connexion with these materials may be formed directly from the number of cattle in the country. With regard to this various estimates have been offered by different authorities, but according to the Indian Industrial Commission, whose figures are based on the incomplete reports of the Agricultural Department, there are about 180 million cattle and 87 million goats and sheep in India. Even if we accept this estimate, which, in view of the difficulties of collecting

gallons of turpentine at the end of the war. There is, however, enormous scope for expansion as large quantities of raw material (the Himalayan pine known as *pinus longifolia*) are available. It seems that only the fringes of forests have been touched, while according to the estimates offered by Mr. A. J. Gibson, more than 800,000 acres of forests under the Himalayan pine are available for exploitation (*cf.* The Indian Pine Rosin Industry: Indian Munitions Board's Handbook, pp. 377-78). In addition to this, according to the same author, "large areas of other species of pine in the Himalayas of the Punjab, United Provinces, Assam and the Hills of Burma will become available as soon as communications are improved or developed. One may put the ultimate maximum annual production of Indian rosin and turpentine at 600,000 maunds and 1,600,000 gallons respectively. With such an output at its command, India could probably meet the demands of Africa, the Straits, China, Java and Australasia as well as her own, but it will require many years of effort and organised expansion before such yields can be attained".

accurate statistics in a country like India, seems to be a trifle conservative,<sup>1</sup> it transpires that India's resources are far more extensive than those of any other country in the world. Furthermore, the fact that all animal products except tallow are exported in large quantities is not only a proof of the extensiveness of India's resources, but also indicates that the supply of animal products is actually in excess of the present requirements of the country.

**Hides and skins : production.**—No statistics are available regarding the production of hides and skins in India, but it has been estimated that before the war nearly half the pelts available in the country were exported, while the other half were locally consumed. As the exports of hides and skins (both tanned and raw) from India at the present time average nearly 70,000 tons a year, and as neither a diminution in the number of cattle nor any substantial change in the leather-consuming capacity of the country has been reported during recent years, we must assume that the total production of hides and skins in India stands in the neighbourhood of 140,000 tons a year at the present time.

**The quality of Indian hides and skins.**—As Indian skins are taken chiefly from slaughtered animals, they are, considered all round, just as good as the products of any other country. Indian hides, on the other hand, compare very unfavourably with foreign pelts. This inferiority

<sup>1</sup> The cattle census is generally taken by the officers belonging to the Revenue Department, and as the ignorant peasantry in India often regards the counting of livestock by the revenue authorities as a preliminary to an increase in taxes, there is always a tendency to give false returns in connection with the number of cattle owned by the cultivator.

is chiefly due to the fact that whereas in foreign countries hides are generally taken from slaughtered animals, those in India are obtained mostly from animals which die of old age and disease. In consequence of this, Indian hides show signs of wear and tear. There is another factor which tends to deteriorate Indian hides, and that is the barbaric practice of branding animals. And to these we may add the faulty methods of flaying which result in a considerable waste of the hide substance. However, this is a minor drawback, and constant instruction and demonstrations coupled with the offer of a small premium on better flayed hides will gradually improve the situation. But as the quality of the hide substance chiefly depends on the use to which cattle are put, and as the practice of branding is due to the ignorance and superstitions of cattle-owners in India, no one should expect a reform in these directions within his lifetime, as a nation cannot give up its customs, habits and inborn superstitions in a day.

From the above statement it must not be understood that all available hides in India are of an inferior quality. Quite a large number of cattle are annually slaughtered for food, and some of the pelts recovered through slaughter house agency compare very favourably with even the best foreign hides. The inferior grades of Indian hides, however, are much cheaper than the better grade Indian and foreign varieties, and, as will be shown in connection with the leather tanning industry, are in demand in Europe and America, where by skilful handling they are converted into leather of good quality.

**Wool.**—Another animal product for which there is a large demand all over the world is wool.

For all trade and manufacturing purposes three distinct varieties of wool are recognized according to the length and fineness of the staple, viz. merino, cross-breds, and carpet wool. The first-named variety has the finest and the longest staple, and is used in the manufacture of goods known as "worsted"; the second variety, which is obtained from cross-bred sheep (merino and ordinary native species), is comparatively rough and short-stapled, and is used in the manufacture of ordinary "woollens"; the so-called "carpet wools" are used in the manufacture of felts, blankets, rugs and carpets.

The discussion of details regarding the quality of Indian wools may be postponed until we start our investigations on the woollen industry in the concluding parts of this work; at this stage we may discuss only some broad aspects of the question. Generally speaking, a very large proportion of Indian wool is classed as carpet wool—in fact it is said that fully half the breeds of sheep found on the plains of India "yield a kind of hair rather than of wool".<sup>1</sup> Small quantities of wool approximating the cross-bred variety are also obtained from certain types of sheep in Bikaner and other parts of the country, while the merino variety is unknown to sheep-breeders in India.

**Production and imports.**—It has been estimated that the production of wool in India stands in the neighbourhood of 60,000,000 lbs. a year. This estimate is based on the assumption that the average Indian sheep is capable of yielding 2 lbs. of wool a year. There being very little demand for the indigenous varieties of wool in

<sup>1</sup> See Notes on Wool in India: A. H. Silver and J. K. Mehta, p. 13.

India, more than 80 per cent. of even these meagre supplies of the material are exported to Europe and America.<sup>1</sup> On the other hand considerable quantities of wool are imported from Tibet, Afghanistan, Persia and Australia; a very large proportion of that imported from Tibet, Afghanistan and Persia is exported, while that from Australia is used in the woollen mills of the Punjab and the United Provinces in the manufacture of woollen and worsted cloth.

Although the production of wool in India is far in excess of the country's requirements, the position of the wool-growing industry when seen in the light of the quality of the material and yield per animal is far from satisfactory. From the point of view of yield alone the figures for India present an astonishing contrast to those for other countries. It has been estimated that the average yield of wool per sheep is 7.5 lbs. in Australia, 7 lbs. in the United States and nearly 6.5 lbs. in the United Kingdom; whereas in India, as we have already stated, it is only 2 lbs. per animal. Thus on the one hand the quality of the material is poor and on the other the yield is less than 30 per cent. of that in other chief wool-producing countries.

**Cross-breeding: possible results.**—It is not possible to discuss at this stage all the details regarding the methods by which both quality and yield can be improved. It may, however, be pointed out briefly that by persistent cross-breeding the yield in India can be easily increased by 200 per cent., and possibly more, without increasing the number of sheep. Needless to add,

<sup>1</sup> The exports of indigenous wool from India have averaged nearly 50,000,000 lbs. a year during the last 20 years. At the present time more than 95 per cent. of the exports are taken by the United Kingdom.

this cross-breeding will also improve the quality of fleece. Even if we assume that the price of cross-bred wool is only 50 per cent. higher than that of carpet wool—which in the face of prevailing prices is a very moderate estimate—the cross-breeding system, whenever it is introduced, will result in increasing the value of wool by at least 350 per cent. per animal.

It seems that before the war some of the provincial Governments procured merino rams from Australia, and distributed them through the Veterinary Departments with a view to introducing the desired cross-breeds. The results of these efforts do not appear to have been encouraging, as there was no organization to deal with the difficult problem of preventing the cross-breeds (if they were ever obtained in any important proportion) from completely reverting to the inferior side through mixing with the native species. Seeing that the herds in India are small, their owners ignorant, superstitious and completely unambitious, it must be exceedingly difficult to maintain the purity of the new breed.

**The position of animal products reviewed.**—The position of animal products in India as described above is by no means more satisfactory than that of the agricultural and forest products. The number of animals is undoubtedly very large, but their quality, and therefore the quality of products, is on the whole much poorer than in Western countries. The ignorance and superstition of the masses are to a great extent responsible for these anomalies, but the apathy of the Government towards reforms in the face of these difficulties is also in part responsible for the hopeless degradation of livestock all over the



country. Had the Government taken a leaf out of the book of other nations' experience in this field, there would have been to-day a somewhat different story to tell. In spite of these handicaps, however, the consumers of animal products (excepting the woollen textile manufacturers) in India are on the whole more favourably situated than their rivals in most of the leading industrial countries in the world.

### III. MINERALS

#### A. Minerals of the metalliferous group : Iron.—

From the industrial point of view iron ore is the most important mineral of this group. It is scattered almost all over India in varying quantities: but as the value of iron-ore deposits is judged by the quantity of ore in reserve in any locality, by its quality as shown by its metallic contents as well as the percentage of sulphur, phosphorus and other undesirable elements present in the ore, and by its accessibility and proximity to coalfields or water power sites and various raw materials, there are not many deposits in India which can be exploited under existing conditions. The detailed examination of all these factors will be taken up in connection with iron and steel industry in the next volume: it is hardly necessary to record anything at this stage beyond the facts that only the ore deposits in the neighbourhood of coalfields in Bengal and Bihar and Orissa, and, if suitable hydro-electric power sites are available in their neighbourhood, those in Madras and Mysore are capable of being exploited by the manufacturers of iron and steel in India. In Orissa and the Central Provinces almost unlimited reserves of compact ore, amounting in all to thousands of

millions of tons, are available, while in Southern India several fairly extensive deposits of the ore are known to occur, and the extension of geological surveys and prospecting operations is likely to reveal the existence of new deposits. In all these cases the metallic contents of the ore are generally high—averaging higher than in most of the ores used in Europe and America—but unfortunately sulphur and phosphorus also appear in higher proportions, and the presence of these highly undesirable impurities tends to reduce the value of the mineral. However, as it is, India is on the whole in a better position with regard to the supplies of iron ore than probably any other country in the world.

**Copper ore.**—The position, however, is reversed when India's reserves of copper ore are taken into account. From the publications of the Geological Survey of India it appears that this mineral is about as widely scattered in India as iron ore, but nowhere except in the Singhbhum district in Bihar and Orissa has it been found in workable quantities; and even in this area, as will be shown in connection with non-ferrous metals, the deposits are so small and the quality of the ore is so poor that no amount of optimism would enable us to place any reliance on this source. Finally, as both the Geological Survey and private prospectors have made an exhaustive but fruitless search for the mineral in every likely corner, we must assume that India is practically devoid of copper ore; or at any rate the known deposits cannot be exploited under the prevailing conditions.

**Zinc ores.**—As regards zinc ores, it may be said that although, like copper ores, their occurrence

has been reported by the Geological Survey of India in many localities in the country, nowhere has the mineral been found in workable quantities except at Bawdwin in Burma. The Bawdwin deposits are already being exploited, and the output of ore (zinc concentrates) at the present time averages nearly 20,000 tons a year. The present output, as will be shown in connection with non-ferrous metals, is far from adequate to meet the requirements of India; in fact even these small quantities, meagre as the reserves of ore are, are not expected to last for long. Unless, therefore, some more deposits of zinc ores are discovered in Burma or other parts of the country, the position of India in connexion with this raw material may be regarded as threatening to become about as unsatisfactory within the next quarter of a century as it is with respect to copper ore at the present time.

**Lead ore.**—What we have said about zinc ore is equally true of lead ore in India. The occurrence of lead ore has been reported by the Geological Survey in many parts of the Indian continent, but nowhere has it been found in workable quantities except in Burma, where it occurs in association with the silver-zinc ores of Bawdwin mines. According to the estimates given by the Burma Corporation Limited to the Geological Survey of India, the reserves of these ores (containing about 17.5 per cent. zinc and 26 per cent. lead) amount to 4,000,000 tons. As the production of ore at the present time amounts to nearly 500,000 tons a year, it is but natural to assume that the lead-zinc ore reserves of the Burmese mines will last for just about eight years if the present rate of exploitation is maintained. There is hardly anything to guide us in probing the

possibilities of lead mining in the future except the fact that there are still many virgin areas untrodden by the geologist and the prospector, in which some important discoveries are likely to be made; in case, however, these expectations are not realized, it may be safely predicted that in the course of a few years the lead-smelting industry in India will completely disappear in consequence of the lack of the principal raw material.

**Tin ore.**—This is another mineral the occurrence of which has been reported in many parts of India, but which is not found anywhere in large workable quantities except in Burma. And as the cassiterite-bearing areas in India proper have already been systematically searched for workable deposits, it may be assumed that the Burmese occurrences are the only source on which the tin-smelting industry in India can rely for its principal raw material. The ore is widely distributed in Burma, but the production at the present time amounts only to about 50,000 cwts. a year, which is too small even to warrant the establishment of a modern tin-smelting plant. As will be explained in connection with basic industries, the production can be considerably increased by the adoption of the more up-to-date methods of mining and concentrating the ore. No estimates regarding the potentialities of cassiterite deposits have been made by the Geological Survey of India, but the writings of various authorities tend to show that at the present rate of exploitation the occurrences can be regarded as practically inexhaustible, although with the extension of operations an increase in the cost of winning the ore will become inevitable; and this increase which is already in evidence, may ultimately sound

the death-knell of the cassiterite-mining industry in Burma.

**Manganese ore.**—This ore is another important mineral, and is extensively employed in the iron and steel industry. India is one of the largest producers of manganese ore in the world, and the output at the present time averages nearly 800,000 tons a year, the bulk of which is exported in its original raw form to Europe and America. The mineral is now being worked in Bihar and Orissa, Bombay, Mysore, Madras, Central India and the Central Provinces. So far the quality of the ore is good—in fact it compares very favourably with that of the foreign ores—but all over India, with the extension of underground mining operations, an increase in the phosphorus contents of the mineral is in evidence. This defect may bring down the value of the mineral, unless foreign ores also exhibit the same tendency, which, however, does not appear to be the case. Although the Geological Survey of India has given no definite estimate with regard to the quantity of ore in reserve, from what has been written by various authorities and the Geological Survey itself, it appears that Indian manganese ore reserves are probably the most extensive in the world.

**Chromium ore.**—Chromite is another important mineral which is used for a variety of purposes in the metallurgical and chemical industries. Important and extensive deposits of this mineral are situated in Baluchistan, Mysore and Singhbhum (Bihar and Orissa), and the production at the present time averages nearly 40,000 tons a year, which is larger than that in any other country. In certain respects the quality of the mineral,

especially of that from Baluchistan and Mysore, is better than that of foreign chromites; and the publications of the Geological Survey point to the conclusion that the quantity of the mineral in reserve is large enough to stand many years of intensive exploitation.

**Tungsten ore.**—Wolfram or tungsten ore is also found in many parts of India, but, except during the war, it has not been found economical to work these deposits. In Tavoy (Burma), it occurs in association with cassiterite, and the present output, which amounts to only a few hundred tons a year, is obtained in the course of tin-mining operations in that area. There is, however, no doubt that should a demand for this mineral arise in India or abroad (as was the case during the war), large quantities would be available from the Burmese deposits.

**Bauxite.**—This mineral, which is used in the manufacture of metallic aluminium and various aluminium salts as well as for many other industrial purposes, is found in many parts of India, the deposits in Bombay, Madras, Central Provinces, Orissa and Jammu being the most important. So far very little prospecting work has been done, but even from what is already known about these deposits it can be safely inferred that India is one of the largest known reservoirs of high-grade bauxite in the world.

**Other metalliferous minerals.**—Of the other metalliferous minerals, the ores of molybdenum, nickel and cobalt are of considerable industrial importance. Although their occurrence in various parts of the country has been reported by the Geological Survey of India, the existence

of large workable deposits has yet to be proved. So far, very little prospecting work has been done in connection with these minerals; but if operations in this direction do not result in the discovery of large workable deposits, the consuming industries in India must for ever remain dependent on foreign countries for the supply of these metals.<sup>1</sup>

**B. Non-metalliferous minerals : Coal.**—From the industrial point of view, coal is the most important mineral of this group. It is not only the principal primary source of heat and power for industrial purposes, but is also the source of an endless variety of chemicals and other articles of the greatest industrial and commercial importance. It is found in many parts of India,<sup>2</sup> but the best and the most extensive deposits are situated in Bengal and Bihar and Orissa, and the coalfields in these areas are responsible for the production of nearly 90 per cent. of the coal annually produced in the country.<sup>3</sup> It has been estimated that the reserves of coal in India amount to nearly 53,000 million tons, of which only about 10,000 million tons can be described as high grade—including nearly 2,000 million tons of coking coal. The details regarding the quality and chemical composition of various Indian coals will be discussed in connection with basic industries in a later part of this work: for our present purpose it is only necessary to

<sup>1</sup> As, unlike nickel, molybdenum is consumed in small quantities, and as molybdenite or molybdenum ore is more widely distributed in India than cobalt and nickel ores, it may eventually prove to be an exception to the above statement.

<sup>2</sup> Apart from Bengal and Bihar and Orissa, coal is also found in the Central Provinces, Assam, Punjab, Baluchistan, Central India, Rajasthan and Hyderabad.

<sup>3</sup> The output of coal in India at the present time amounts to nearly 21,000,000 tons a year.

state that Indian coals contain a larger percentage of volatile matter, sulphur and phosphorus than the British, American and Continental coals, and that the calorific or heat-producing value of the best coals in India is nearly 10 per cent. lower than that of the average British and American coals.

**Mineral oil.**—Petroleum is another mineral product which can be used for lighting, heating, and power-producing purposes. It is also the basis for the manufacture of many articles of great commercial and industrial importance, of which only paraffin wax, lubricating oils and semi-solid greases may be mentioned. Mineral oil deposits occur in Burma, Assam and the Punjab, and the total production of crude oil in India at the present time amounts to nearly 280,000,000 gallons a year, of which nearly 95 per cent. comes from the Burmese oilfields. Nothing definite regarding the potentialities of oilfields in Burma is known, but whilst the downward tendency of the output during recent years suggests that the known areas are gradually nearing exhaustion, the search for new oilfields in the province has not so far yielded any promising results. As, however, many parts of Burma have yet to be systematically examined, the position cannot be regarded as utterly hopeless. And these remarks are equally applicable to the Punjab and Assam, where a number of promising localities have not yet been systematically explored by the prospector.

**Sulphur.**—The importance of sulphur as the basis of modern chemical industries cannot be over-estimated. It is the basic material for the manufacture of sulphuric acid, which again is



the starting point in the manufacture of a very large number of other acids and chemicals. In nature this mineral is found either in its pure form or in the form of metallic sulphides. The occurrence of neither pure sulphur nor sulphides in large workable quantities has been reported in India,<sup>1</sup> and the publications of the Geological Surveys of India offer little hope in regard to future discoveries. It is but natural to assume in these circumstances that, as in many other industrial countries including England, the chemical industries in India will be dependent on foreign countries for the supplies of this important raw material.

**Glass-making materials.**—The glass industry is also a large consumer of many kinds of minerals and mineral products, and of these quartz-sand and soda are of the greatest importance. Fairly extensive deposits of sand of great purity have been discovered at Lohra and Borgarh near Naini in the United Provinces and at Pedhanili and Sankheda in Baroda. These deposits will be described in detail in connection with the glass industry in a later part of this work: at this stage we may confine ourselves to the statement that, according to the Geological Survey of India, the Naini material contains on an average nearly 99 per cent.  $\text{SiO}_2$ , while the average  $\text{SiO}_2$  contents of the Baroda sands are

<sup>1</sup> According to the Geological Survey of India small quantities of sulphur are obtainable on the dying volcano of Barren Island in the Bay of Bengal, in the State of Kelat in Eastern Baluchistan, and on the Koh-i-Sultan and neighbouring volcanoes in Seistan and Eastern Persia. The Kelat sulphur mine near Sannai, which was formerly worked to some extent, has recently been examined and the available sulphur estimated at 10,000 tons; this is a conservative estimate, but even if the actual amount is several times greater, the deposit cannot be regarded as of serious potential value, since it represents little more than a year's supply. See records of the Geological Survey of India, Vol. LII, pp. 320-21.

said to be as high as 99·39 per cent. Sandstone, the chemical analysis of which does not appear to have been made, or at any rate the results do not appear to have been published, is found in the Bikaner State, and we have it on the authority of the Geological Survey of India that these deposits are capable of yielding large quantities of high-grade material. Natural soda (sodium carbonate) is found in small quantities in the Central Provinces and Sind : but the glass manufacturers all over the world have long since discarded the natural product in favour of the chemically-prepared article, and glass makers in India also will have to turn to the factory for the supply of this material.

**Clays.**—Of even greater industrial and commercial importance than the glass-making materials are the minerals generally described as clays. Some idea of their importance may be had from the fact that the value of these minerals annually mined and consumed in Europe and America amounts to several million pounds sterling, while the total value of the articles, in the manufacture of which they are directly employed, runs into hundreds of millions of pounds. They are employed in many industries for an extensive variety of purposes ; but their chief uses are the manufacture of refractory bricks, tiles, earthenware piping, porcelain, electrical conduits and insulators and ordinary earthenwares ; and from these industrial uses the true basic value of clays can be roughly estimated.

Almost all important varieties of clays are found in various parts of India. Apart from the common clays, which are found all over the country and which are used in the manufacture of tiles and cheap varieties of pottery, there are

to be found clays of finer qualities which are used in the manufacture of porcelain and electrical goods, fireclays which, as their name indicates, are used as refractory materials in the metallurgical and glass furnaces, and Fuller's earth which, among other industrial uses, is sometimes employed as a bleaching agent in the vegetable oil industry. Very little prospecting work has so far been done to ascertain the potentialities of clay deposits in India, but, even in the present state of incomplete surveys, the Geological Survey expresses the opinion that "there can be little doubt that India possesses also all the materials necessary for the manufacture of porcelain of the highest quality, such materials being found in the Jubbulpore district and the Rajmahal Hills".<sup>1</sup> The deposits of the latter area were examined in 1908 by Dr. M. Stuart, who described the materials obtained therefrom as most suitable for manufacturing porcelain and firebricks of the finest quality. Obviously enough, the value of these deposits is greatly enhanced by their proximity to the great coalfields of Bengal and Bihar. Fuller's earth of excellent quality is found in Jubbulpore (Katni) and in Marwar, and though the output at the present time is small in consequence of the absence of the various consuming industries, there are reasons to believe that even these known sources of supply can be safely depended upon for the satisfaction of all future requirements of the country.

**Mica.**—This is another non-metalliferous mineral substance which is extensively used in industry. It is being used on an ever-increasing scale as an insulator in the electrical industry, as a lubricant

<sup>1</sup> Ibid, p. 279.

(in a powdered state), in the manufacture of certain varieties of paints, and in decorative arts and industries. Scientifically speaking, there are two main varieties of mica known as phlogopite and muscovite. The distinguishing features, it seems, are physical rather than chemical ; but each variety has its own field of application in modern industry.

Indian mica is chiefly of the muscovite variety, and extensive deposits of the mineral occur in the Monghyr, Hazaribagh, Gaya and Sambalpur districts of Bihar and Orissa, and in the Nellore district of the Madras Presidency. It is also found in comparatively small quantities in the feudatory States of Ajmer-Merwara, Udaipur and Gwalior. In addition to the above-mentioned localities where muscovite mica is mined, the Travancore State is also a producer of the mineral, but in this case the product belongs to the phlogopite variety. The mineral being so widely scattered, India naturally occupies the foremost position among the mica-producing countries in the world. No attempt appears to have been made to compile the data relating to the production of this mineral in the country : but even if we ignore altogether the requirements of local decorative arts and industries, and take the export statistics as roughly indicating the magnitude of production, we find that during the first quarter of the present century India contributed on an average more than 65 per cent. to the world's total production, while the remaining 35 per cent. or so was produced in Canada and the United States. As deposits of great potential value have already been proved in many parts of the South American States, the Indian mica may find it very difficult to retain its present supremacy in the world's markets, especially if

the primitive methods of mining are persisted in ; there can, however, be no doubt that local industries can always rely upon the supplies of the indigenous material, and that with the modernization of mining methods India may even maintain its present position as the leading producer of mica in the world.

**Magnesite.**—A most valuable refractory material and also used as Sorel cement in the manufacture of certain varieties of artificial stones, magnesite is found in various parts of the Madras Presidency (notably Salem district) and the Mysore State. The quality of the Salem magnesite is said to be good, and during the war, when the Continental mineral was no longer available, large quantities were shipped from Salem to the United Kingdom. The production in this area amounted to only 399 tons in 1914, increased to 7,450 tons in 1915, and stood at 18,192 tons in 1917. The following year witnessed a sharp decline, and two years later the production of the mineral sank to the pre-war level. The industry suddenly revived during 1921, and in 1922 the production touched the 18,000-ton mark. This rate of progress has been maintained ever since, as we find that in 1926 the production of the mineral reached the record figure of 30,461 tons. The production of magnesite in the Mysore State, which was solely due to the activities of the Tata Iron and Steel Company, appears to have completely ceased on account of the competition of the better-grade Salem material.<sup>1</sup>

<sup>1</sup> The Company acquired these magnesite properties in 1913, when 2,112 tons of the mineral were produced. The output declined to 1,281 tons in 1914, and sank to the level of only 80 tons in 1918. The production remained at this level until 1925 when mining operations were discontinued.

**Other non-metalliferous minerals.**—Apart from the non-metalliferous minerals already discussed, there are many other minerals of this group which are used in fairly large quantities in modern manufacturing industries, and of these graphite, monazite, barytes, corundum, fluorspar, asbestos, borax and limestone may be mentioned. Graphite is used as a lubricant and in the manufacture of certain varieties of paints and pencils; monazite in the manufacture of pyrophoric alloys, incandescent mantles and certain kinds of optical glasses; barytes in the paper, paint and (as flux) metallurgical industries; corundum as an abrasive in the engineering industries; fluorspar as a flux in the steel industry and for the preparation of various fluorides, including the artificial cryolite which is a double fluoride of sodium and aluminium, and which is used as a solvent in the reduction of metallic aluminium; asbestos is chiefly employed in the manufacture of heat and fire-proof "textile" fabrics; borax in the preparation of a large variety of chemical compounds which are extensively used in medicine and various industries; and limestone is used in large quantities in the manufacture of Portland Cement and other building materials, and as a flux in metallurgical operations.

All these minerals, with the exception of borax, are found in various parts of India. Graphite of good quality is found "in the so-called Khondalite series of rocks in the Vizagapatam hill-tracts and adjoining Chattisgarh Feudatory States, in a corresponding series of rocks in Coorg, in the Godavari district of the Madras Presidency, in the Ruby Mines district in Upper Burma and in Travancore. It has also been discovered in Sikkim . . . (and) in Ajmer-Marwara

. . . .”<sup>1</sup> In spite, however, of the fact that graphite is so extensively distributed, the annual output of the mineral averaged only about 100 tons till 1920, and dwindling down to 25 tons in 1921 and 20 tons in 1922 ceased altogether in the following year. Limestone of excellent quality is also found in many parts of India, and is already being used on a large scale by the various existing industries. The occurrence of monazite, barytes, corundum, fluorspar and asbestos deposits has been reported in many parts of the country; but while in the case of asbestos the quality of the mineral is so poor and unsatisfactory that there is very little demand for the type of material available at present,<sup>2</sup> in the case of other minerals the poverty of the deposits militates against the starting of mining operations on a large scale.

**Mineral products : position reviewed.**—From the above concise survey of the mineral resources of India, it is but natural to conclude that the position of the country in regard to the supplies of mineral raw materials as a whole is eminently satisfactory. The only minerals whose inadequacy or absence will be seriously felt by Indian industrialists are copper, zinc and (if no new workable deposits are discovered) lead ores and sulphur, but as we know that the deposits of these minerals, excepting those of lead ore, are by no means universal, and that even some of the foremost industrial countries in the world are themselves dependent on foreign countries

<sup>1</sup> See Records of the Geological Survey of India, Vol. LII, p. 104.

<sup>2</sup> The Geological Survey of India reports that in the Seraikala State, Singhbhum, asbestos is found in long columnar masses, and that the quality of the material improves with depth, and so expresses the opinion that “this may prove to be the case in other localities also”. Cf. Records, Vol. LII, pp. 260-61.

for the supply of these minerals, we must assume that their absence will not be a serious obstacle in the way of the development of various dependent industries in India; in other words, there is no real danger of the position of these industries being weakened to such an extent as to make it difficult for them to face world competition. On the other hand we find that there are many minerals of the greatest industrial and commercial importance of which India is one of the largest, and in some cases the foremost, producer and exporter in the world. There are also certain minerals of both the metalliferous and non-metalliferous groups of which India is by no means a large producer, but the known deposits of which have been proved to be so extensive as to render the country almost completely independent of the foreign sources of supply when the various dependent industries are established on a national scale. In these circumstances even if we completely shut our eyes to the glamour of abundance in the case of some of the above-mentioned minerals, we find it difficult to abandon the belief that notwithstanding the deficiency of copper, zinc, lead and sulphur, India is in no worse position than any of the leading industrial countries in the world.<sup>1</sup> India's potentialities, however, are not to be judged solely by the extent of its known resources—except possibly in the matter of the four above-mentioned minerals of major importance—for it is a well-known fact that the mineral possibilities of some of the most promising areas in the country have not yet been systematically tested.

<sup>1</sup> For obvious reasons this statement is subject to the condition that the threatened political separation of Burma from India does not materialize. In the event of separation the supply of some very important mineral products will be lost to India.



In other words, while there are practically no indications—unless the observations and recorded conclusions of the Geological Survey can be proved to be hopelessly inaccurate—that large workable deposits of copper, zinc, lead and sulphur exist in any part of the country, there is a strong likelihood that intensive and systematic prospecting works will add to the known resources of those minerals which are already being worked in the country. These discoveries will not materially improve the position of the various dependent industries in India itself, but they will certainly go a long way towards strengthening the position of India as a supplier of mineral raw materials to other parts of the world. Progress in this direction can also be made merely by modernizing the methods of exploiting the known mineral resources of the country; for in most cases the prevailing methods of mining the minerals are, to say the least, barbaric and wasteful, so that there is no doubt that by the adoption of modern scientific methods not only can the life of the existing deposits be substantially prolonged, but also the present output can be increased without, in most cases, adding a farthing to the cost of production. As the mineral reserves of the country are after all limited, the Government must promptly take steps to suppress the orgy of reckless waste in the mining areas; if the mine-owner is so stupid as not to appreciate the advantages of conservation, it is the duty of the State to come forward with a corrective in the form of legislation.

**Conclusion.**—Before closing this discussion it may once again be pointed out that our enquiries in relation to raw materials will not be confined to their present sketchy form: as the quality

of raw materials is often reflected in the quality of the manufactured articles, and as in the face of international competition the manufacturing industries in a country always aspire, or at any rate ought to aspire, to achieve the superlative, in examining the prospects of various industries a detailed examination of the bearing of raw materials on their competitive ability, and therefore an investigation into every aspect of the local and foreign supplies of raw materials, will be necessary. Some of the important details, which have been omitted from the present discussion, will therefore be gradually unfolded in connection with the various basic and non-basic industries of major importance in other parts of this work.

The object of the foregoing inquiry has been to survey India's position as a source of raw materials for indigenous industries as a whole; and this survey has evidently yielded some unexpected and disappointing results. It has rudely shaken the belief so universally prevalent among the people in India that theirs is the country that produces raw materials suitable for almost all kinds of manufactured products, and that if these materials are not utilized for manufacturing purposes in the country itself, it is the fault of circumstances entirely unconnected with the supply of raw products. As we have just pointed out, in so far as the minerals are concerned, this belief is not altogether extravagant; nor, again to quote the conclusions arrived at above, can the suitability of India's soil and climate to produce almost all kinds of agricultural, forest and animal products to meet the requirements of organized industries in the country be questioned. But the main contention throughout the preceding pages has been

that, for one reason or another, Indians have failed to avail themselves of the great opportunities offered by the natural resources of their country, and the obvious result of this apathy has been that the production of a very large number of raw materials is either totally absent or is so inadequate and disorganized that large modern factories cannot rely upon indigenous supplies. This deficiency or apathy is in evidence in the case of all varieties of raw materials—vegetable, animal and forest—the production of which is to a large extent dependent upon the activities of Indians themselves. Yet in all cases the necessity of governmental action is evident: for even in highly-advanced countries. it is the government who guides the agriculturist in maintaining the balance of production, who finds ways and means of improving the quality of live stock, and who develops the country's forests by rendering them accessible for commercial exploitation. The whole-hearted co-operation of the commercial, industrial and agricultural interests is undoubtedly necessary, but in a backward and undeveloped country the initiative towards these necessary reforms should come from the government.

## CHAPTER II

### SOURCES OF HEAT AND POWER

**A historical survey.**—Wood is the chief organic fuel employed from the earliest times by mankind all over the world; while wind and waterfalls have been employed by civilized man for the generation of mechanical power from a time of which history has no record. The manufacturing industries continued to be dependent on these sources of heat and power even after the commencement of the Industrial Revolution in England: the cotton mills of Lancashire were originally driven by numerous little streams flowing from the hills into the Ribble and the Mersey, while the metallurgical industries had not yet completely given up the use of timber. And up to the present day various manufacturing industries of minor importance directly employ falling waters to drive the machinery, and charcoal is still used as a fuel for metallurgical and steam-raising purposes in those parts of the world where timber is abundant.

These sources of heat and power would have been altogether inadequate to meet the requirements of modern industrialism even in its early stages: on the one hand the scarcity of timber would have arrested the growth of the iron and steel industry and so almost brought to a standstill the expansion of various dependent industries, and on the other the absence of suitable water power sites would have militated against all efforts at extending the existing and establishing new factories. Necessity proved to be the mother of invention; the introduction of coke

solved the difficulties of the various metallurgical and engineering industries, and the invention of the steam engine smashed for all time the limitations hitherto suffered by the various power-consuming industries. Transport was also drawn into the orbit of these new inventions; and around the improvements that took place in this particular sphere has been written one of the most important chapters in the history of modern industrialism.

**Electricity as a source of heat and power.**—Up to about the end of the nineteenth century both industry and transport remained to a very large extent dependent directly on coal for the generation of heat and power. It was during the closing years of the last century that machinery for the conversion of mechanical energy into electrical power was perfected, and the possibilities of the application of electricity to industry and transport were investigated. The first electrical generators were no doubt run by steam, but attention was soon turned to large waterfalls. Numerous uses were soon found for this new source of heat and energy: lighting, transport, and chemical, metallurgical and other industries offered endless scope for its application; it rendered the manufacture of new metals and other articles possible; by its application the existing methods of manufacture in certain industries were changed and simplified, and the quality of the product in most of these cases was improved. For reasons which will be discussed in the following pages, waterfalls, both natural and artificial, were responsible for the generation of a very large proportion of electrical energy for industrial purposes all over the world: steam turbines did not come into prominence until recent years, and even

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now nearly half of the electrical power used for manufacturing and non-manufacturing purposes in the world is obtained from natural and artificial waterfalls. The total amount of heat and power obtained from electricity for manufacturing and transport purposes is still very small in comparison with that obtained directly from coal, but, as we are about to see, it is increasing so rapidly that the complete electrification of industry and transport is generally regarded as a question of time. Both water turbines and steam turbines are responsible for developments in this direction; but as water power sites are comparatively few and often inconveniently situated and sometimes costly to exploit, the utilization of coal for the generation of electricity is increasingly engaging the attention of power engineers all over the world, especially in those countries where water power sites are few and unsuitable but where coal is abundant and cheap.

**Liquid fuels.**—Of the other sources of heat and power for transport and industrial purposes which have come into prominence during the last quarter of a century, liquid fuels appear to be the most important. These fuels may be divided into two classes, viz. petroleum products and the products of coal-tar distillation. Both these fuels are capable of being employed in industry for the generation of heat and power, but they are so much in demand for transport and other non-manufacturing purposes and the supplies are so limited that rarely, if ever, is it found economical to employ them in large factories for the generation of heat and power.<sup>1</sup>

<sup>1</sup> Physically, liquid fuels may be divided into three classes, viz. heavy oils, medium oils and volatile oils. Heavy oils are used either directly under boilers or in semi-diesel engines; medium oils are used

**Coal and water power the cheapest sources.**—There are, then, four primary sources of heat and power known to industry at the present time, viz. wood, liquid fuels, coal and waterfalls. The possibilities of each of these in a given case are determined solely by its ability to stand the tests of cost and efficiency; cheap power is one of the essential conditions of success in modern industrial enterprise, and competition, both internal and external, demands that the cost per unit of heat and power employed in manufacturing operations should be as low as possible. When we apply these tests to mineral oil, we find that from the point of view of efficiency it is eminently suitable for industrial purposes; but compared with coal and water power it is more expensive, and as such cannot be employed in modern factories, except in times of emergency. These remarks are also applicable to wood which cannot be employed in modern industrial establishments, except in the neighbourhood of dense forests—and in India there are not many dense forests to supply fuel to industries on a large scale. In these circumstances we must at once dismiss mineral oil and timber from the present discussion, and confine our attention to coal and water power.

**India's coal and coal zone.**—It has already been stated in the preceding chapter that India's coal reserves amount to nearly 53,000 million tons,

in diesel engines; and volatile oils are used generally in internal combustion engines. Under the existing conditions all these oil-burning engines are generally employed for driving light machinery in small industrial establishments (diesel engines); or for driving agricultural machinery (diesel and internal combustion engines); or for the generation of power for land, water and air transport (diesel, semi-diesel, internal combustion and steam engines). For further treatment of the subject see Vol. II, Chap. V.

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of which nearly 52,000 million tons are accounted for by the deposits in Bengal and Bihar and Orissa; of this enormous total nearly 2,000 million tons are coking coals, while only about 20 per cent. of the coal in reserve can legitimately be described as first-class coal, or the coal which compares favourably with ordinary medium-grade foreign products. We need not describe all the physical and chemical peculiarities of Indian coals in these pages; for our present purpose it is sufficient to point out that the calorific value of the best Indian coals is on an average nearly 10 per cent. lower than that of ordinary British and American coals; that the proportion of fixed carbon is low while that of volatile matter is high; and that coking coals contain an excessive percentage of sulphur and phosphorus, which is very objectionable from the metallurgical point of view, and sometimes renders these coals altogether valueless for this purpose.

With these facts in mind we may now proceed to examine the value of Indian coals as a source of heat and power for industrial purposes. For the generation of heat and power, coal may be employed in three different forms, viz. in its natural and semi-coked forms for power-producing purposes, and as coke in metallurgical operations. We may at once dispose of the question of coking coals by saying that as the requirements of the iron and steel industry demand cheap coal, and as the industry can be established, save in exceptional circumstances, only in the neighbourhood of coalfields, the coking coals of Bengal and Bihar and Orissa cannot be employed for this purpose much beyond a radius of 200-300 miles from the mines. The problem of steam-raising coal is rendered extremely difficult by the complications arising out of the competition of other



sources of power supply and of the fact that in consequence of variations in the proportion of the total cost of production to the cost of heat and power, the permissible cost under these heads is different in different industries. High-grade coal being confined to the north-eastern areas, the price of coal in other parts of the country far off from the coal mines of Bengal and Bihar and Orissa will manifestly be swelled by transport charges. Some idea of the importance of transport charges as a governing factor in the price of coal in various centres may be had from the fact that while the average pit-mouth price of coal in Bengal and Bihar and Orissa stands in the neighbourhood of Rs. 5 per ton, the freight charges from the coal mines of Jherria and Raniganj to Cawnpore amount to Rs. 8 per ton, to Delhi Rs. 11 per ton, to Lahore Rs. 13 per ton, to Madras Rs. 10 per ton and to Bombay Rs. 15 per ton. To these freight charges must be added the charges for loading and unloading. When these transport and other charges are added to the pit-mouth price of coal, and when it is remembered that the calorific value of the so-called first-class Indian coals is nearly 10 per cent. lower than that of the medium-grade British, German and American coals, the pit-mouth price of which according to the present rate of exchange averages nearly Rs. 13 per ton, we are inevitably drawn to the conclusion that, other things being equal, the cost of coal for industrial purposes in India will compare favourably with the cost in Europe and America only within a radius of about 500 miles from the coal mines of Bengal and Bihar. The farther a manufactory is removed from this central area the more unfavourable will be the cost of coal and therefore power; and this disparity will increase at

the rate of nearly 14 annas per ton for every hundred miles.

In spite of this drawback, however, we find that cotton mills, woollen mills, paper mills, tanneries, glass works, cement works, sugar refineries, in short almost all kinds of industrial establishments have been set up all over the country hundreds of miles away from the 500-mile zone we have just identified. How they are able to carry on in spite of this handicap will be seen in the course of our future investigations; but their success, however contemptible it may be, suggests that the cost of power and consequently fuel, though a very important factor, does not by any means decide the fate of these industrial enterprises. On the other hand, there is no doubt that their condition and future prospects would materially improve if the cost of power could somehow be brought down to the level of that in the coal-bearing provinces. Unless the cost of power is substantially reduced, the manufactories in these parts of India will inevitably suffer, and the expansion of the old and the introduction of new industries will not take place—at all events not to the same extent as that prescribed by other factors of production and by the country's requirements. In these circumstances it is necessary that some other source of heat and power should be found so as to bring about the desired economies, especially as the present unfavourable cost is principally due to heavy freight charges for coal which, as far as we can see, are not capable of being materially reduced without subsidies from the State in the form of freight concessions. And on closer examination such perpetual subsidies will be found to offend against all principles of industrial and national economy.

**Water power and water power zone.**—Hydro-electric power, as we have just seen, is one of the most efficient substitutes for coal—in fact it is admittedly superior—and its application may bring the desired relief to the dependent industries outside the coal-bearing areas. Once again we must postpone the detailed study of the water power resources of India until we start our investigations on the industries of the basic order; at this stage we may content ourselves with the statement that according to the estimates given by the Hydro-Electric Survey of India, which are based on conjectures rather than on actual surveys, the water power sites in India are capable of yielding a continuous supply of more than 5½ million kilowatts. Of this nearly 1,200,000 kilowatts are accounted for by the areas actually investigated, nearly 1,100,000 kilowatts is the estimate for “known sites”, and the remaining 3,000,000 kilowatts is the conjectural estimate for sites which have never been investigated and about which nothing definite and reliable is known. In addition to these, nearly 500,000 kilowatts have already been developed, or are being developed, in different parts of the country for industrial and other purposes.

But it must not be assumed that all the water power sites in India, which are responsible for the above figures, are capable of being developed for industrial purposes. It is certainly true that they are scattered all over the country; but many of them are situated in inaccessible localities, and are so far removed from the existing centres of commerce and industry that, unless they are linked up by roads and railways, their development cannot be undertaken; there are others the development of which is so costly an affair that the power obtained from them cannot

compete with that obtained from various alternative sources; there is yet another variety of sites which though located in accessible places cannot be developed for industrial purposes, as other necessary factors of industrial development are not forthcoming in those localities. When due consideration is given to these useless sites, it becomes doubtful if more than half the available water power will ever be utilized in India.<sup>1</sup> We are in these circumstances left with just about 2·5 million kilowatts which will be available for industrial, transport and lighting purposes in the water power zone, or the area beyond the 500-mile limit around the coal-fields of Bengal and Bihar and Orissa.

**A separate study of the two zones desirable, but not practicable.**—It is obvious that the problems of the two zones will differ widely in origin and effect on account of differences in the technique of power production in the two cases, so that it would be desirable to examine their possibilities separately. But it is equally obvious that both these areas are mutually dependent from the view-point of the economic organization of the country as a whole. Naturally, industrial developments in one area will have their repercussions felt in the other, so that although science and technique demand that we should examine both of them separately, it is scarcely possible to discuss the problems of one zone without direct reference to those of the other.

**The potentialities of the water power zone.**—The fundamental problem before us concerning this area is to determine as accurately as possible

<sup>1</sup> For full treatment of the subject and actual figures on which this statement is based, reference may be made to Vol. II, Chap. IV.

the extent to which the various power-consuming industries can be developed while relying completely on water power. To begin with, it may be pointed out that so far as the growth of industries in this area is dependent on cheap power, it will be accomplished, for the reasons outlined above, only to the extent of about 2,500,000 kilowatts, and no more—unless of course the estimates offered by the Hydro-Electric Survey of India are utterly wrong and misleading.<sup>1</sup> How far these 2,500,000 kilowatts of water power will cover the gap caused by the absence of coal in Northern, Southern and Western India is a very moot point. Obviously a great deal will depend upon the extent of industrial activities in these areas and the nature of the industries established there, which again will be governed to a very large extent by the cost of water power and its total quantity available in any particular locality. The present requirements of industry in the water power zone are almost negligible, and as few among the existing centres of industry are situated within the transmission distance of any water power scheme—except of course those which have already been linked up with hydro-electric installations—we may completely disregard their requirements in measuring the possibilities of water power as a basis of industrial development. In other words

<sup>1</sup> It may be argued that the railways in the water power zone will take away large quantities of cheap electrical power. At first sight this objection may appear to be sound, but a closer examination would reveal that, since it is economical to electrify railways only in the densely-populated industrial areas, the policy of wholesale railway electrification will never be adopted in India. Only those lines on which traffic is heavy (such as suburban lines radiating from the large centres of population like Bombay and Madras) may be electrified with profit, but there are not likely to be many such lines in a country where agriculture is the chief occupation of the people, and where, consequently, large populous centres of industry and commerce are few and widely separated.

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new industrial establishments will have to be set up in connection with various water power schemes, and it is the extent of the activities of these establishments which we have to determine at this stage.

An examination of the various factors which determine the suitability of a locality for the establishment of different manufacturing industries shows that cotton, woollen and silk fabrics, leather, paper, sugar, rubber, vegetable oils, cement, glass, china and various electro-chemical products can be manufactured with equal ease in the water power zone and the coal-bearing areas of Bengal and Bihar and Orissa. The only possible exceptions to this rule are aluminium and soda, which (in case water power sites capable of yielding electrical power at a low cost are discovered) may be cheaper to produce in the water power zone. On the other hand the coal-bearing areas of Bengal and Bihar and Orissa are suitable not only for the establishment of the above-mentioned industries, but also for the manufacture of certain other articles, such as iron and steel, engineering products (both basic and non-basic), chemicals, especially coal-tar derivatives, and jute fabrics. These are the industries which cannot be established outside the provinces of Bengal and Bihar and Orissa without the certainty of being ultimately crushed by competition from these provinces.

We have thus three groups of industries: those for the establishment of which conditions are almost equally favourable in both the coal and water power areas; those for which the provinces of Bengal and Bihar and Orissa are more suitable than any other part of India; and those for which cheap electrical power is necessary and which is obtainable only in the water power

zone. The extent of the demand for power for electro-chemical and electro-thermal industries cannot be ascertained, as it depends more upon cost of power than upon any other factor of production. As the industries of the second group can be established equally well in both the water power and coal zones, it may be taken as certain that industries in the two areas will both directly and indirectly compete against one another, and this competition will ultimately determine the extent of the industries of this group in the two areas, and will therefore be the main factor in determining the power requirements of the industries of this group in the hydro-electric zone. Therefore, in order to form an estimate of the power requirements of industries in the water power area, we must determine the competitive position of industries in the two areas. This is apparently a complex problem involving a study of the whole industrial system likely to be developed in India (with direct reference to the requirements of both the local and foreign markets) and of the extent to which the various power-consuming industries can be developed as indicated by the quantities of raw materials locally available and by the possibilities of exporting these materials in the form of partly or wholly manufactured articles.

It is evident that the force of these limiting factors can under no circumstances be accurately gauged. There are certain industries which must be established just where the raw materials are found, or can be brought to the factory at a minimum cost, irrespective of the cost of fuel and power; and to this class belong the sugar, glass, porcelain and some other industries of minor importance. There is another class which follows the markets regardless of the cost of

raw materials and of the sources of heat and power, and the vegetable oil industry is the most important representative of this group. There is yet another class which tends to become localized owing to the specialization of labour, and in which the cost of raw materials is of primary importance; of this group the manufacture of cotton, woollen and silk fabrics, and the tanning of leather are the most important representatives. And finally there are industries for which it is necessary that cheap power should be available just in the neighbourhood of the locality where the raw materials are found, and this group is headed by the paper and pasteboard manufacturing industry. Apparently the establishment of these industries in a locality is dependent upon different factors, the force of which cannot be gauged in a half-developed country. One thing at any rate is fairly certain: the chief raw materials for the manufacture of sugar, glass, porcelain, oils, and to a certain extent paper produced in the water power area will be very largely converted into manufactured articles within the water power zone; while the coal zone, by virtue of its being the centre of almost all basic industries, will attract a certain proportion of the raw materials used in the cotton, silk, woollen and leather industries from the neighbouring water power areas of the United Provinces, Madras, the Central Provinces and Berar.

Although we now know roughly how the localization of industries will take place in India, we cannot in the present state of our knowledge hazard a guess as to the probable power requirements of industries in the water power area. If the conversion of all raw materials available in this area into manufactured articles for local as well as foreign markets be the final goal, the



extent of industries in this region will be ultimately determined by the quantities of raw materials available and the requirements of the local and foreign markets. But even this principle cannot be accepted as determining how far the various industries will be able to rely upon water power. In estimating the possibilities of this source of power due consideration will have to be given to the requirements of those industries which must be established in certain localities and nowhere else, and of those industries which cannot be established unless exceptionally cheap power is available. Of the former group sugar and oils, and of the second group various electro-chemical and electro-metallurgical industries are, as we have already stated, the most important representatives. But the cost of developing water power sites and therefore the cost of electrical power is a variable factor, so that the requirements of the last-named group of industries cannot be determined. On the other hand no information regarding the availability of water power in the sugar-cane producing areas and the extent to which the existing centres of industry and population can be linked up with hydro-electric installations is available. However, as will be seen in connection with basic industries, it is fairly certain that cheap power, which is a necessary condition for the establishment of electro-chemical and electro-metallurgical industries, is not likely to be available in large quantities in the water power area in India, and it is very doubtful if under the prevailing conditions more than 500,000 kilowatts (continuous) can be utilized for this purpose.<sup>1</sup> In other words the activities of these in-

<sup>1</sup> This statement is based strictly on the assumption that the cost of power continues to be in the present proportion to the total cost of

dustries would be limited to the extent of these available supplies of cheap power in the water power zone, and probably would not reach that limit.

Now if we assume that all the available cheap power will be utilized by the electro-chemical and electro-metallurgical industries (which is likely to be the case if industrial development takes place on normal lines in India), there will be only 2,000,000 kilowatts (continuous) available for other industries. Since this estimate is based on the total quantity of water available for the generation of power in various localities, we must assume that after allowing 20 per cent. for transmission losses and the same amount for non-industrial uses, more than 10,500,000,000 kilowatt-hours of electrical energy will be annually available for industrial purposes. This, it must be remembered, is strictly on the assumption that the cost of coal does not change one way or the other; an increase in the price of coal will evidently render the development of more costly schemes practicable and so increase the amount of water power available, while a fall in the price of coal from Bengal and Bihar will inevitably militate against the development of some of the sites on which the above estimates are based.

As the cost of coal in the water power zone is not likely to fall much below its present level without a corresponding fall in the mining and transport charges, it may be assumed with justification that 10,500 million kilowatt-hours of electrical energy will be available for industrial

electro-chemical and electro-metallurgical products. If, however, these products can stand a higher cost of electrical power, the demand for these products in India and in other parts of the world will render the application of more costly power, and therefore the utilization of more costly water power schemes for this purpose, practicable.

purposes over and above the requirements of various electro-chemical and electro-metallurgical industries. It must be reiterated in this connection that these available supplies of power will be used exclusively for such purposes as the manufacture of cotton, woollen and silk fabrics, sugar, oils, leather, paper and glass, and in the rice and flour mills; and relatively to the output none of these industries, excepting paper manufacture, consumes power on a large scale. No estimate can be offered for the power requirements of these industries, but we may reach our objective in an indirect manner by reviewing the power requirements of industries in the United Kingdom.

From the statistics occasionally issued by the Electricity Commissioners it appears that at the present time (1930) the output of electricity in England and Scotland amounts to nearly 7,000 million kilowatt-hours a year, and that the electrification of only about a third of industry has so far been effected. All this power, however, is by no means used for industrial purposes; a very considerable proportion is devoted to lighting, domestic heating, and transport and other non-industrial uses. Indeed the statistics issued by the Electricity Commissioners show that although the percentage of power used for these purposes varies from district to district, the average for the whole country is well above 25 per cent. It proves that not more than 5,000 million kilowatt-hours are annually used for manufacturing purposes at the present time; and as only about a third of industry has so far been electrified, we may take the power-consuming capacity of industry in the United Kingdom at the present standard of production as standing at about 15,000 million kilowatt-hours

a year.<sup>1</sup> It gives us an idea of the total requirements of all kinds of industries in the United Kingdom, including those for whose establishment conditions are not quite favourable in the Indian water power zone, and those with regard to whose requirements in India estimates have already been given.

In applying the figures for power consumption in the United Kingdom to the water power area in India, due allowance will have to be made for the power requirements of the industries we have mentioned above. These industries, of which the various electro-chemical and electro-metallurgical industries, iron and steel, chemical, engineering and coal mining are the most important, are the largest consumers of power, and these are the industries to which the remarks in the concluding parts of the above paragraph apply. In the absence of reliable information we are not in a position to say with certainty anything about the power requirements of these industries in the United Kingdom; they must be very large indeed seeing that these industries are being carried on in that country on a very extensive scale. From what Leonard Harvey<sup>2</sup> and Hugh Quigley<sup>3</sup> have written on the subject, it appears that the requirements of the iron and steel industry alone amount to thousands of

<sup>1</sup> The Electricity Bill of 1926, which aimed at increasing the output to nearly 21,000 million kilowatt-hours a year, was manifestly based on these estimates. After the completion of the scheme an annual surplus of nearly 6,000 million kilowatt-hours would be available; but it has been taken for granted by the authors of the scheme that the demand for power for non-industrial purposes will grow in the same proportion as the demand for manufacturing purposes. These expectations are fully justified in view of the fact that the consumption of electricity for domestic and other non-manufacturing purposes in Britain compares very unfavourably with the demand in the United States and some of the European countries.

<sup>2</sup> See his paper on "The National Economic Power of Solid Fuel in Relation to its Scientific Utilization".

<sup>3</sup> See *Electrical Power and National Progress*.

millions of units a year. Again, the requirements of the various engineering industries are also enormous, and when to these the consumption of power in electro-chemical and electro-metallurgical industries is added, and when the consumption of power in coal mines is taken into account, it becomes evident that more than one-third of the total amount of power scheduled as "power for industrial purposes" is consumed directly or indirectly by these industries. If we accept this estimate—which is inclined to be a little too much on the conservative side—the consumption of power in these industries must be equivalent to 5,000 million units a year. And so it transpires that under the present-day manufacturing conditions the consumption of power in other industries does not in any circumstances amount to more than the equivalent of 10,000 million kilowatt-hours a year, and is probably much less.

But we have seen that even after drastically reducing the scope of water power development in India, and after making due allowance for wastage, lighting, and electro-chemical and electro-metallurgical industries, nearly 10,500 million kilowatt-hours of electrical energy will be annually available in the water power zone for the industries whose power requirements in the United Kingdom we have just reckoned as standing at about 10,000 million kilowatt-hours a year. The available supplies of power for these industries in India's water power area will thus be somewhat higher than the estimated requirements of British industries. If these available supplies of power are reckoned to be inadequate to meet the requirements of industries in those parts of India, it must be proved that these industries can be developed to a greater extent

in India's water power zone than has been the case in the United Kingdom. But it has already been explained that the extent of most of these industries in India will be determined firstly by the requirements of the markets (both local and foreign) and secondly by the quantities of raw materials available in the water power zone in India. If we assume that the limitations imposed by the requirements of the markets will come into operation only in the case of those industries for which practically unlimited supplies of raw materials are available, e.g. glass, paper and cement, and that other industries will be developed fully to the extent of the supplies of raw materials, we have not the least hesitation in asserting that, as a study of the available supplies of the various kinds of raw materials, both indigenous and imported, would show, the water power zone in India will under no circumstances be able to utilize all its available power unless the supplies of cultivated raw materials are substantially increased, or the demand for those manufactured articles whose raw materials are available in unlimited quantities is increased manifold above its present level.

**The probable cost of power in the water power zone.**—It is indeed very difficult to say how the cost of power in the area under consideration will compare with that in Bengal and Bihar and Orissa (the coal zone in India) and various foreign countries. Apparently it will differ according to the cost of developing water power sites in different localities, and the distance of the generating station from the factory. It will be shown in connection with basic industries that the cost of hydro-electric power in the city of Bombay at the present time stands at 0·725 anna per

unit, and as it is doubtful if there are many water power sites in India capable of being developed more cheaply than those already developed in the Western Ghats, it may be taken as fairly certain that the cost of power all over the water power zone in India will average about the same as in the city of Bombay—provided there is as much demand for power for lighting and other purposes in other parts of the country as in the city of Bombay.<sup>1</sup> On the other hand if the demand for power for these purposes is not large—as is likely to be the case if factories are set up far from the existing centres of population—the cost in some cases will be substantially higher, unless the cost of development, transmission and distribution is smaller than in the case of hydro-electric works in Bombay.

**The electrification of industry abroad: its causes.**—We are not in a position to compare at this stage the cost of power in the hydro-electric zone with that in the coalfields and adjoining districts of Bengal and Bihar and Orissa, or with that in the United Kingdom and other foreign countries, without discussing in some detail the modern technique of the utilization of coal for heat and power production. We have already explained that electricity is now gradually displacing steam and coal in almost every industry, and that the complete electrification of industry has become the recognized policy of every industrial country in the world. In adopting this policy of electrification, both the consuming

<sup>1</sup> The power for lighting purposes is generally rated at a much higher level than the power for industrial purposes, and the amount overcharged goes to reduce the charges for industrial power. At the present time a considerable amount of power is used in the city of Bombay for lighting and other purposes, and the charge for this is nearly 4 annas per unit.

industries and nations at large have been guided by many important considerations. To begin with, it was found that electricity was capable of supplying industry with motive power which is somewhat cheaper and much more efficient, elastic and convenient than any other secondary source of heat and power. It is efficient in the sense that, as compared with steam, the energy actually utilized in this case represents a very high percentage of the energy generated, and that when used for heating purposes it is capable of producing higher temperatures than are attainable by any other means. These factors and the greater thermal efficiency of large modern generating units naturally bring about considerable savings in coal consumption. Apart from that it must be remembered that coal is the raw material from which a very large variety of chemicals and other valuable articles of great commercial and industrial importance are obtained, and in order to recover these articles coal must undergo a process of partial or complete distillation. When coal is fed direct under a boiler—as is done in the case of prime movers in ordinary factories—all these valuable products are lost, and as the utilization of coal in this manner has no compensatory feature, the loss incurred thereby is a direct loss to the country. In large modern generating stations, on the other hand, coal can be used under boilers after undergoing the process of carbonization without losing its heat-producing value. Not only that; as generating stations must be set up in close proximity to the coalfields, coal dust, inferior coal and other sorts, which are generally regarded as waste materials owing to their inability to stand the transport charges from the mines to the consuming centre, can be utilized



in these stations. So the electrification of industry has four different aspects, each contributing to the country's economic prosperity: it enables manufacturing industries to obtain a more efficient form of power at a cheaper rate than it is possible by employing the steam power directly, and so to reduce the cost of production;<sup>1</sup> by installing large generating stations the economic utility of coal is fully realized through the process of carbonization, and so various industries can obtain their supplies of basic materials cheaply; a very large quantity of waste from the coal mines is usefully employed; and the coal reserves of the country (which are in no case unlimited) are conserved.

From what we have said above it is evident that the electrification of industry involves wide and far-reaching national issues. It is by these issues that the policy of all the great industrial nations in the world with regard to the production of power for industrial purposes has been directed. In Britain this policy is enforced through various Electricity Acts which aim at the complete electrification of industry, agriculture and transport. In France, Italy, Switzerland and Norway hydro-electric power had until recently monopolized attention, but even in these countries steam turbines are being rapidly installed in those localities which lie beyond the transmission distance of the existing hydro-electric stations. In Germany and the United States the development of electrical power has taken place on the same lines as in the United Kingdom. The position of water power in

<sup>1</sup> Apart from lowering the cost of power, the employment of electricity brings about automatic control of power and machinery, which in turn reduces the cost of labour in certain industries to an appreciable extent.

Germany, especially in relation to the existing centres of industry, is little better than that in Britain, so that a very large percentage of power used in industry is derived from coal. The chief developments in that country took place during the war when the fixation of atmospheric nitrogen necessitated the erection of many super-power stations in Prussia, Saxony, Cologne and other areas. After the war all these power stations became available for industrial and other purposes, and were soon linked up with the centres of industry. In most of these and other cases both during and after the war the Reich itself participated in the financing of electrical power schemes ; while in others the works were either entirely owned by municipalities, or the local authorities played an important part in bringing these works into existence. It is interesting to note in connection with German electrical supply undertakings that the works which were set up during the war—and which incidentally are the largest in the country—are all lignite-fired stations situated in the immediate neighbourhood of the principal lignite deposits in Westphalia, Prussia, Saxony and Cologne. The importance of these lignite-fired stations may be judged from the facts that, owing to its low calorific value (on an average four tons of lignite are regarded as equal to one ton of ordinary black coal), German lignite or brown coal cannot be economically used in any other type of power plant, and that while only about 20 per cent. of electrical power generated in Germany in 1913 was obtained from lignite, in 1922 more than 40 per cent. was obtained from this source. These facts bear a convincing testimony to the claim that even the poorest varieties of fuel can be utilized with advantage in modern central gener-

ating stations. In the United States also far-reaching developments have taken place during the past twenty years. Water power being confined only to certain localities and being no longer available in desired quantities at a cheap rate, the great centres of industry like Cleveland, Chicago, Detroit and others had to be supplied with electrical power from steam turbines. Some idea of the importance of the part played by electricity in the industrial life of the United States and of the rapidity of the progress made towards the electrification of industry in that country may be had from the fact that whereas in 1912 the output had amounted to only about 11,500 million units, in 1922 it increased to 47,000 million units, and at that time the degree of industrial electrification had reached the high figure of 68 per cent.<sup>1</sup>

**Significance of changes abroad : a lesson for India.**—We need not go into all the details connected with the financing of electrical undertakings in the leading industrial countries of the world ; the cost in every country has amounted to hundreds of millions of pounds, and further developments are necessitating an annual capital expenditure which can be reckoned only in tens of millions of pounds in every country. It proves that the old, inefficient methods of heat and power production with all their attendant wastes and inconveniences are no longer to be tolerated by any industrial nation in the world. The Western countries have chosen electricity as a source of heat and power, because it is cheaper and more efficient ; it proves that the

<sup>1</sup> Cf. Hugh Quigley on "Coal and Power" in the *Review of Reviews*, May, 1926. Also his "Electrical Power and National Progress," p. 73.

application of electrical power to industry is justifiable on both economic and technical grounds.

Under the present-day competitive conditions the modernization of industrial equipment is one of the most essential conditions of success, so that it is necessary that industrial equipment, whether for the generation of cheap and more efficient power or for actual manufacturing operations, should be brought to the same level of efficiency in all the various competing countries. These aspects of the question have been completely ignored by all exponents of Indian industrialism: the Industrial Commission was content to take into account only the primary sources of power—coal and other materials—without taking the trouble of going into the details of their application, while other official and non-official authorities, including the various committees, have totally ignored the subject as of no practical importance whatever. It does not appear to have occurred to them that unless extensive and up-to-date arrangements are made to market coal in the form of electricity, industry in an area which has the greatest possibilities in the country and which is destined to be the future workshop of India, will be burdened with higher costs of production through using the more expensive and less efficient methods of power production. The electrification of industry is even more necessary in Bengal and Bihar and Orissa than in any other part of the world, as the reserves of first-class coal, or even all grades of coal taken as a whole, in India are only a fraction of those in other industrial countries.<sup>1</sup> If in spite of their enormous reserves

<sup>1</sup> For the estimated reserves of coal in various countries see Vol. II, Chap. III.

of better quality coals Great Britain, Germany and the United States deem it necessary to safeguard their future by the conservation of coal, it is imperative that every coal-saving device, of which the electrification of industry and transport is by far the most important, should be adopted in a country like India whose coal reserves are comparatively meagre and where on an average nearly 80 per cent. coal belongs to the low-grade variety.

**The extent of savings in India by electrification.—**It is very difficult to say with certainty what percentage of coal consumed in India at the present time would be saved by the electrification of industry in Bengal and Bihar and Orissa. We may, however, avail ourselves of the results of enquiries on the mining and conservation of coal in the United Kingdom, which are capable of being applied to India with certain modifications. Sir Richard Redmayne observed in his Presidential Address to the Institute of Mining and Metallurgy in 1925 that by the complete electrification of industry two-thirds of fuel consumed in industry at the present time could be saved. Again, Mr. Merz in the course of his evidence before the Coal Conservation Committee (1919) expressed the opinion that four-fifths of the coal consumed in colliery furnaces could be saved by the electrification of mines through their connection with central generating stations. The Coal Conservation Committee, however, appears to have viewed the matter with greater liberality; yet it could not escape the conclusion that nearly 55,000,000 tons, or more than 40 per cent. of the coal used for industrial purposes could be annually saved by the complete electrification of industry.

These figures regarding the waste of coal in a country well known for the superiority of its industrial equipment are full of significance. The waste of coal in Britain, it must be remembered, is not caused by the use of old stereotyped boilers and prime movers: it is due to the fact that small individual power plants, however modern and efficient, consume much larger quantities of fuel per unit of power generated than modern super-generating stations. In comparison with small power plants in British factories and mines, the power plants in Indian factories and mines are on the whole hopelessly inefficient and notoriously antiquated, so that if the electrification of British mines via super-power stations is calculated to result in an all-round saving of four-fifths of coal, and of industry as a whole in more than 40 per cent. of the coal consumed at the present moment, we must assume that the electrification of both mining and manufacturing industries in India will result in the saving of *at least* 50 per cent. of coal consumed at the present time.

This is, however, on the assumption that industries all over the country are electrified by means of power from coal. But as the existing industrial establishments in the hydro-electric zone will (unless they can be linked up with hydro-electric stations, which, as we have seen, is very unlikely) always remain dependent on coal, we cannot expect any substantial savings in this direction. We are not in a position to say what the requirements of industries in the water power zone are at the present time, but they and the railways cannot require more than 7,000,000 tons a year, or nearly one-third of the total estimated consumption of coal in the country. If we accept this estimate, the complete electrification of

industries (including the coal mines) in Bengal and Bihar and Orissa will result in a saving of nearly 33 per cent. of the total quantity of coal consumed in the country.

**The inferiority of Indian coal demands electrification.**—Apart from the conservation of coal reserves, the electrification of industry in Bengal and Bihar and Orissa is desirable on the ground that nearly 80 per cent. of coal in India belongs to the low-grade variety whose calorific value is low and which therefore cannot bear transport charges. Manifestly the most suitable locality for its consumption is the mining area, and the most economical form of employment is the generation of electrical power. So long therefore as large central generating stations—in which almost any kind of fuel can be usefully employed—are not set up, the sphere of the economic utility of some of the poorer varieties of coal will be unduly restricted, while considerable quantities will always be relegated to the waste heap.

**The necessity of electrification on technical grounds.**—The technical advantages of central generating stations to industry and the country as a whole are even greater than the direct economic benefits in the case of India. We have seen in the preceding chapter that Indian coals contain a very high percentage of sulphur and phosphorus. These impurities, which cannot be got rid of in coking operations, are highly undesirable in the manufacture of iron and steel and various ferrous alloys of great commercial and industrial importance, such as alloy steels (generally known as high speed steels), ferro-manganese, ferro-chromium, ferro-molybdenum and others, for

the manufacture of which there is an extensive scope in India, but which either cannot be manufactured on a large scale and in desired qualities in India by the ordinary blast furnace methods, or for the manufacture of which electric furnaces and therefore cheap electric power is essential. There is yet another factor of the greatest industrial and national importance that demands the setting up of large generating stations in the coalfields of Bengal and Bihar, and it is the development of various chemical industries dependent on coal distillation products. These products, which will be discussed in connection with the coal industry,<sup>1</sup> and which are the bases of modern synthetic dyes, explosives, fertilizers and many other basic products of great industrial and national importance, are largely obtained as by-products in the manufacture of coke in Europe and America. As we have already stated, efforts are now being made in all Western countries to increase the supplies of these basic products by subjecting the coal to partial distillation processes in carbonization plants before using it under boilers. Now, the scope for coke in India for metallurgical operations being very small, it is obvious that the basic coal distillation products cannot be obtained in requisite quantities under the prevailing conditions, and therefore the various dependent industries cannot be established unless alternative means of producing these basic substances on an extensive scale are adopted. Carbonization plants are the only suitable alternative, and these cannot be set up except in conjunction with large generating stations. Until, therefore, super-power stations are set up, these basic products will not be avail-

<sup>1</sup> See Vol. II, Chapter III.



able in large quantities; and unless they are available in fairly large quantities, the manufacture of dyes, explosives, and other coal-tar derivatives will not be undertaken in India. Apart from that, recent discoveries have led to the production of large quantities of mineral oils from coal, from which all the different derivatives, including motor spirit, lighting oils and lubricants can be obtained by subjecting the crude product to the processes of distillation used in the case of natural petroleum; and this fact is of far-reaching importance to a country like India whose indigenous supplies of the natural product are small and nearing exhaustion, and whose requirements show a marked upward tendency. Assuming that only 10 gallons of oil can be obtained by the partial distillation of one ton of coal—an assumption which in view of the well-known properties of Indian coals is by no means liberal—and further assuming that only 10 million tons of coal are annually treated in carbonization plants in India, not less than 100 million gallons of oil will be annually available, which is nearly 40 per cent. of the total requirements of the country at the present time.

**A review of the present position.**—It is on account of the reasons outlined above that large generating stations must be set up, and these arguments are weightier in relation to India than to any other country in the world. To sum up, the reserves of coal in India are small, and the quality of the material is inferior. The manufacturing industries have yet to be developed, and infant industries in the hands of novices require cheaper and more efficient power than industries with generations of skill and

experience behind them. And to crown it all, there are many industries which cannot be established in India unless large generating stations are set up. These are the problems to which the attention of the Government and the country should have been directed by those to whom the task of formulating the industrial policy of India was entrusted as well as those who voluntarily imposed this task upon themselves. For some strange and mysterious reason they overlooked the importance of the subject, with the result that the Government as well as the people regard central generating stations as suitable only to European and American conditions.

**The economics of power production.**—Before we proceed to consider how and where the new central generating stations ought to be set up in Bengal and Bihar, it appears necessary to outline the economics of power production. Briefly, in an average large-sized generating station, nearly 70 per cent. of the cost of power is composed of the cost of coal and interest and depreciation charges on the capital cost of the plant, while the remaining 30 per cent. is accounted for by the wages of labour, the cost of oil, water, stores, repairs and maintenance, and rate, rent, tax, insurance and management charges. The consumption of coal, and therefore the cost under this head, as well as the capital cost of the plant and interest and depreciation charges per unit of power generated vary according to the size of the generating units. The capital cost of the plant naturally varies from country to country, so that no hard and fast rules can be laid down with regard to the variations brought about by the size of generating

units; however, the estimates offered by various electrical plant builders in England (which are confirmed by the figures for capital outlay on some of the recent additions and new installations in the United Kingdom) tend to show that whereas moderate-sized generating sets of 15,000–20,000 kilowatt capacity may cost about £20 per kilowatt installed, the present cost of units with a capacity of 35,000 kilowatts upwards would amount to only about £15 per kilowatt. What the cost of super-generating units with a generating capacity of 50,000 kilowatts upwards would be, is not certain, as neither have such units been installed in Britain, nor do the British electrical plant builders undertake the manufacture of these colossal units. A comparison of the figures quoted by some American manufacturers shows that the downward tendency of the cost of plant per kilowatt installed is less pronounced in the case of units with a generating capacity of 50,000 kilowatts and upwards.

Our information regarding the variations in the consumption of coal per unit of power generated according to the size of the generating sets is somewhat conflicting. It has never been contested that the consumption of coal in small generating plants with less than 10,000 kilowatts per unit capacity is very large (amounting even in plants of modern construction to something like 2·5 lbs. per kilowatt-hour), and that the consumption of fuel rapidly decreases with an increase in the capacity of generating units. But European engineers in general, and British engineers in particular, contend—and their contentions are based on the returns for the plants working under exceptionally favourable conditions, especially with regard to load factor—that economies in fuel consumption are attainable in larger

units only up to a certain point, and that the consumption of fuel in a medium-sized plant of 20,000-25,000 kilowatt generating capacity can be brought down to about the same level as in super-stations with generating units of 60,000 kilowatts upwards. On the other hand, American engineers claim that, when operated under identical conditions, large generating units and therefore super-power stations consume much smaller quantities of coal per unit of energy generated than small and medium-sized stations, and they produce some most remarkable facts and figures in support of their contentions. On closer examination, however, it appears that the British and Continental engineers, more particularly the former, cannot substantiate their claims, except by juggling with the figures provided by some very favourably situated stations.

The case for large generating units and stations, however, can be established by studying the data collected by the Electricity Commissioners in Britain. The generating plants in Great Britain have been classified into five different groups according to their annual output, and this classification can therefore be taken as a rough sort of guide to show the size and capacity of the generating units employed in various cases. The examination of the statistics issued by certain representative electrical undertakings in Great Britain shows that in 1925-26, the consumption of coal in three small stations (Wallasey, Wigan and Bury) with an annual output of 10-25 million units, averaged 2.14 lbs. per kilowatt-hour, and that the average for seven stations producing 25-30 million units per annum also stood at the same level. There was, however, a marked fall in the consumption of coal in the case of stations with an annual output of 50-100 million

units, as we find that the average for 10 stations stood at 1·95 lbs. per kilowatt-hour—with Yoker heading the list at 2·15 lbs. per kilowatt-hour and the Grove Road and Percival Lane (Mersey Power Co.) Stations showing only 1·81 lbs. per kilowatt-hour. The consumption of coal again decreased in the group of larger stations (North Tees, Radcliffe and Dunston); the average in this case stood at 1·70 lbs., the two stations at Newcastle—North Tees and Dunston—giving the highest and the lowest returns with 1·51 lbs. and 1·92 lbs. per kilowatt-hour respectively. This decline in the consumption of coal according to the increase in the size of generating units went a step further in the case of the three largest stations in the kingdom—Barton (Manchester), Carville B. (Newcastle) and Dalmarnock (Glasgow)—with an annual output of over 200 million units. In this case the average stood at 1·62 lbs. per kilowatt-hour, and the consumption at Barton Station, which is the largest and the most up-to-date in the country, for the whole year showed the fine average of only 1·36 lbs. per kilowatt-hour generated, which is over 40 per cent. less than the average in some of the smaller generating stations.<sup>1</sup>

There is no doubt that as far as the consumption of coal, and therefore the thermal efficiency of the plant, is concerned, the figures for Barton Station represent the high-water mark of British achievements under the existing conditions. The capacity of the generating units at this station being only about 40,000 kilowatts, we must naturally expect a further reduction in the consumption of coal in the case of larger

<sup>1</sup> The figures relating to the consumption of coal were compiled by Mr. Hugh Quigley, and I am grateful to him for putting them at my disposal before their publication.

generating units, and some most striking figures are furnished, among many others, by the stations at Chicago (Crawford Avenue) and New York (Hellgate) in the United States. In some of these truly super-stations, generating units of nearly 80,000 kilowatt capacity are employed; so that it is not surprising to find that, with reasonably favourable loads, the consumption of coal has been brought down to the level of a little over 1·10 lb. per kilowatt hour, which is certainly a great improvement upon the rate of consumption at the largest and most up-to-date power station in the United Kingdom. When these facts are taken into account, we cannot fail to draw the obvious conclusion that the consumption, and therefore the cost, of coal is much lower in the so-called super-generating units of 60,000–90,000 kilowatt capacity than in the medium-sized and small units.

As regards the third chief factor in the cost of production, viz. the combined cost of labour, oil and water, and charges for management, rates, rents, insurance, repairs, maintenance, etc., we find it rather difficult to penetrate through the veil of mystery cast by the rival claims of the super-power and medium power schools without analyzing the long and complicated data furnished by them, and this we consider desirable to avoid in these pages, especially as we know that it will lead us nowhere, and that eventually we shall have to cut the whole discussion short by falling back upon commonsense methods. Briefly, we may accept the plea of the opponents of the super-cost theory that the cost of labour per unit of electrical energy generated under identical conditions is not any lower in super-stations than in medium-sized stations in consequence of the fact that these giant instruments of power pro-

duction require the services of men with equally formidable energy and knowledge to handle them, so that the economies of mass production in so far as labour charges are concerned are not realized in the case of the electrical industry. Again, it is contended by this school that in the case of the generating units of over 40,000 kilowatt capacity, the stresses on materials are abnormally high, and therefore the upkeep and replacement charges are higher than in the case of the stations employing smaller units. On these two points the supporters of the super-power idea are equally emphatic in pointing out the wastefulness of the medium-sized station; but as in no case the claims are based on a comparison of the two varieties of plants working under identical conditions, we may give the benefit of doubt to the weaker contestant by accepting the dubious claims of medium-sized stations, and henceforth regard super-generating units as in no way preferable in the matter of labour cost and repair and renewal charges. As regards the cost of oil and water, and rates, rents and insurance charges, neither of the two opposing parties seriously claims any advantage, so that we may assume—and this assumption is amply endorsed by an industrialist's every-day experience—that relatively to the output the charges on these accounts are not likely to show any appreciable difference with variations in the size of stations or of generating units. The charges for management are the only item in this group which, for obvious reasons, must go definitely in favour of large stations; but the advantage on this account is so small as to be of no consequence whatever in deciding in favour of large generating units. These facts, though shorn of all their complicated technical details, prove

beyond doubt that, to put it in a way highly pleasing and satisfactory to the opponents of the super-power school, in so far as the cost of water and oil, and depreciation, rate, rent and insurance charges are concerned, there is not much to favour the installation of super-power stations.

**Tendency towards centralization in foreign countries : its effects on India.**—Even on the above one-sided assumptions, the scales are turned definitely in favour of super-stations by the highly favourable cost of fuel and of the initial cost of the generating plant. The economies in these directions, as we have seen, are substantial, and therefore naturally bring about a very considerable reduction in the cost of power. When these facts are taken into account, the object of super-power stations in the United States, and the meaning of the present-day tendency in the United Kingdom and Germany (the two great industrial nations mostly dependent on coal for the generation of heat and power for industrial as well as domestic purposes) towards the concentration of power production in a few strategically situated large central generating stations become apparent. Indeed, it may be said that the day is not far distant when in these countries the entire field of industry will be dominated by large generating stations to the complete annihilation of both the so-called self-contained factory steam plants and small local generating stations. As this transformation is due to both technical and economic advantages which the employment of electricity, as distinguished from the direct employment of coal for the generation of heat and power, confers upon the manufacturing industries, it naturally follows that in these days of international competition Indian indus-



tries cannot afford to employ the wasteful and technically inefficient methods of production which their more enterprising foreign rivals have either already discarded or are about to discard. Indifference towards these developments will be clearly suicidal, and we have no doubt that the sense of self-preservation will, sooner or later, compel the industries in India's coal zone to fortify their position by adopting equally efficient and economical methods, i.e. by setting up large central generating stations of the same size and possessing the same degree of efficiency as those installed in the various competing countries.

## CHAPTER III

### SOURCES OF HEAT AND POWER (continued)

**Generating plants in the coal zone: interest and depreciation charges.**—A true and scientific comparison of the cost of power in India's coal zone and foreign countries can be effected only by comparing the cost of electrical power as produced by equally efficient and cheap methods in the two cases. In comparing the cost of power, the first two items to be taken into consideration are the interest and depreciation charges. It is convenient as well as scientific to analyse the charges under these heads a stage further by clearly separating the finances of the generating and transmission systems of an electrical power undertaking. Let us take the cost of the generating plant first. As for many years to come the power stations in India will have to be equipped with imported plant and machinery, the cost under this head in normal conditions should be anything between 10 and 20 per cent. higher than in various European countries and America: but it is a well-known fact that international competition in the electrical branch of the engineering industry has been so fierce for some time past, and the electrical plant manufacturers all over the world are so desperately anxious to secure new business connections in foreign markets that they often undertake to deliver the plant at the port of destination at a nominal cost. That the continuance of the prevailing conditions can be safely relied upon for a considerable time is indicated by the fact that, in the absence of any

pronounced supremacy in the matter of electrical plant construction technique in any country, the existing competition between the United States, Britain, Germany and certain other European countries is likely to increase rather than diminish with the passing of time, except of course in the event of an international combination in the industry, which, however, may reasonably be regarded as beyond the pale of actual possibilities. Anyhow, as in order to ensure success it is always desirable, and often necessary, to exaggerate rather than under-estimate the effects of the various adverse factors operating against an industry or the industrial system of a country, we may assume without being far too optimistic in our calculations that the capital cost of the generating plant, and therefore the interest and depreciation charges, will be about 10 per cent. more in India than in a foreign country manufacturing its own electrical plant and machinery. This, it may be noted, is the limit beyond which the adverse balance of initial cost cannot go, or at any rate should not be allowed to go.

**Factors determining capital outlay on transmission system.**—When we turn to the capital expenditure on the transmission system, we find ourselves facing a long list of factors which bring about endless complications in the procedure. To begin with, it must be remembered that capital expenditure on the transmission system varies directly in proportion to the distance of the consuming centre from the generating station, while the nature of the intervening area is also looked upon as a factor responsible for bringing about extensive variations in cost. The effect of variations in the distance between the consuming centre and the generating station

need not be explained in detail: obviously the length of the transmission line must correspond with the distance, and we may take it as an universally-accepted rule that an increase or decrease in the length of the transmission line brings about corresponding variations in the capital outlay, and therefore in the charges dependent thereon per unit of power produced. The nature of the intervening area affects the cost of transmission in a more complicated manner: overhead transmission lines can be employed in rural districts without any real danger, but in densely-populated urban areas they are a source of constant danger, especially when they are likely to carry power in high voltages. In the latter case it is essential to instal the much more expensive underground cables. Obviously a great deal also depends upon the intensity of demand in any particular area; for it may be possible to employ the overhead system in a locality without deriving a substantial benefit owing to the fact that the consumers of power are too widely scattered. The concentration of demand in an area, on the other hand, may necessitate the employment of short underground mains, and yet the total cost may be substantially lower than that in the case of the longer overhead transmission wires.

**Transmission costs in Britain.**—The above analysis of the factors that determine the capital outlay on transmission lines prompts yet another digression. It is obvious that no definite conclusions with regard to capital cost can be arrived at without at least a rough idea of the circumstances determining the location of power plants in India and in those industrial countries which will be ultimately chosen for comparing the

capital cost. The case of almost all industrial countries is identical and comparatively simple. Everywhere factories have been set up in a haphazard sort of manner, and around them have grown up the tenements to house the great crowds brought together by local industries. The result is that the electrification of these centres necessitates the laying of large and expensive underground transmission mains. Some idea of the consequences of these handicaps may be had from the figures given by Mr. Hugh Quigley in his "Electrical Power and National Progress". According to this author, while the capital expenditure on the generating plants in the power stations owned by the Clyde Valley Electricity Company, Mersey Power Company, Newcastle Electricity Supply Company and Sheffield Corporation stands at between £15·5 and £17·5 per kilowatt of generating plant installed, the capital outlay in connection with the transmission and distribution of power stands at £11·5, £15·4, £22·3 and £21·1 respectively in these cases. This upward tendency does not stop here, as the author tells us that the Manchester Corporation's capital outlay on transmission and distribution accounts has amounted to £25·2 per kilowatt installed, while in the case of Glasgow the expenditure under these heads has reached the enormous figure of £43·8, which is nearly three times the expenditure on the generating station itself. Even if we entirely ignore the heavier amounts invested by some of the electrical concerns in London, and even if we give a substantial margin to the fact that the capital expenditure on transmission and distribution accounts is adversely affected more by an increase in the number of consumers rather than by an increase in the quantity of

electricity consumed, we cannot get away from the fact that the cost in certain cases has been excessive, and should not have exceeded the more moderate figures given by Mr. Quigley had the factories in various industrial centres been set up with an eye on the possibilities of electrical power. These figures also show that while it is possible to form a rough idea with regard to the average national expenditure on the generating system merely by a glance at the figures for any of these important British stations, the figures for transmission and distribution cannot be interpreted except as strictly of local significance. However, the data furnished by some of the largest stations in the United Kingdom can be taken as representing the national trend in the matter of costs : and from these the only natural inference that can be drawn is that the average cost in the United Kingdom stands at nearly £25 per kilowatt installed : and this conclusion is fully capable of being accepted as highly conservative after an examination of the figures provided by various classes of generating stations all over the country and published in contemporary trade journals from time to time. These remarks are equally applicable to the various Continental countries and America : for industrial conditions in all these cases are similar to some extent, and the development of industries and industrial centres has taken place more or less on identical lines.

**Localization of industries in the coal zone in relation to power supply.**—In order to form an estimate of the capital outlay on transmission lines in India we must have some idea of the location of power stations and consuming centres in the eastern provinces of the country. This

problem is apparently full of complexities, and the extent of these complexities is realized to a certain extent when it is remembered that at the present time Calcutta is the only industrial centre of any importance in India's coal zone to benefit from the large-scale production of power, and that (for reasons to be discussed in connection with various basic and non-basic industries in other parts of this work) even this centre of industry cannot be looked upon as a suitable home for any of the national industries (except jute and to a certain extent oil and leather) for the establishment of which conditions in the coal zone are favourable. From this it naturally follows that if the location of industries in the eastern provinces is scientifically determined, new industrial centres, and not Calcutta, will be the scene of future industrial developments. We have thus to deal with two aspects or phases of electrical power development and transmission: that in connection with the needs of the existing industrial centre of Calcutta, and that dealing with the new centres of industry.

**Cost of transmission to Calcutta.**—As far as the cost of transmission to Calcutta is concerned, the position is comparatively simple. Assuming that the present power requirements of the city stand at about 200,000 kilowatts, and taking the average annual load at only 3,500 hours, it follows that these transmission lines will carry at least 700,000,000 units a year. As not less than 1·3 lb. of Raniganj coal will be required in a large modern generating station for the generation of one kilowatt-hour of electrical energy, it may be taken as fairly certain that not less than 400,000 tons of coal will be annually consumed in a generating station designed to supply

700,000,000 units of energy to the city of Calcutta. The site of the generating station can be determined only after a detailed technical examination of localities: but as the Raniganj coalfield is nearer to Calcutta than any other coalfield, it may be taken as certain that the generating station will be set up somewhere in the Raniganj area at a place which is suitable as regards water supply, communications and the establishment of factories in the neighbourhood. In these circumstances nearly 100 miles of overhead transmission line will have to be laid between the generating station and Calcutta, while in Calcutta itself the distribution of power will probably necessitate the laying of underground cables. That it would be more economical to set up the power station in the coalfield is proved by the fact that the cost of transporting 400,000 tons of coal by rail from the coalfield to the power station in Calcutta will, apart from loading and unloading charges, amount to over Rs. 12,00,000, while the interest and depreciation charges on the transmission line—assuming that the capital expenditure amounts to the enormous average of Rs. 1,00,000 per mile, and interest and depreciation charges stand at the more reasonable figure of 7·5 per cent.—will amount to only Rs. 7,50,000 a year. And so it appears that the electrification of mills and factories in Calcutta will not only necessitate the laying of the ordinary underground cables, but also a 100-mile long overhead transmission main.

The above estimates with regard to the capital outlay on the overhead transmission system are based on those for the Tata Companies' transmission mains on the Western Ghats. After adjusting various important factors, they can be completely depended upon without any great



risk. But when we come to the capital outlay on the underground transmission system, we cannot accept the figures for Bombay, or any undertaking in the United Kingdom, as applicable to Calcutta owing to the fact that the location and grouping of factories and mills has taken place on entirely different lines in all these centres. Anyhow, as our main object is to compare the cost in India and foreign countries, we may say without hesitation that as most of the jute and other mills are already grouped together in a somewhat compact area, as most of the other factories are small and are generally situated outside the city proper, and as the roads in Calcutta and its neighbourhood are not so elaborately constructed as those in Western cities, the capital expenditure on underground cables— notwithstanding the fact that cables will have to be imported—will be far less in Calcutta than in any old industrial centre in the Western world. And when in order to arrive at the total cost for Calcutta we analyse the capital expenditure on the overhead part of the transmission system, we find that the average of Rs. 50, or about £4, per kilowatt installed is so insignificant as to be made up by any of the numerous favourable items in the underground section. The conclusion at all events appears to be that the total capital expenditure on transmission cables will be lower in Calcutta than the average in Britain and other foreign countries, and that the extent of this advantage cannot be accurately determined without a technical examination of the conditions prevailing in Calcutta and the surrounding country.

**Cost of transmission to new centres of industry.—**The capital expenditure on transmission cables in the case of new industrial centres will obviously

depend to a very large extent upon the size of the centres, the nature of local industries, and the distance of these industrial centres from the generating stations. As these centres will be dependent on electrical power from the very beginning, and as the cost of power is an important item in the cost of production in most industries, it may be presumed that factories in these new centres will be set up close to the generating stations. If the setting up of factories in these new industrial centres is carried out on scientific lines, and if sufficient room is provided for the expansion of these centres, without unduly scattering the manufactories in widely-separated groups or patches, it may reasonably be expected that the cost of transmission per kilowatt installed will be almost negligible in these cases as compared with the colossal averages for any of the great industrial centres in the Western world.

**Total charges on capital cost account in India.—**As the capital expenditure on the transmission system is likely to be different in different cases, and as no estimate with regard to the average cost can be given in any actual or hypothetical case, it follows that our estimates regarding the total capital expenditure on the generating plant and machinery and transmission and distribution plant must be purely conjectural. The capital expenditure on the generating plant in the United Kingdom at the present time, as we have already stated, stands at something between £15 and £18 per kilowatt installed; while the information supplied by various electrical plant manufacturers in the United Kingdom leads us to the conclusion that even for an ordinary medium-sized station the capital cost should not exceed

£15 per kilowatt installed under the prevailing conditions. Assuming that 10 per cent. of the value of this plant will have to be added on transport and insurance accounts, we come to the conclusion that the capital cost of plant in India will not amount to more than £16 10s. per kilowatt installed. On the transmission side, whatever the total cost of the installation may be, it is not likely to be more than £20 per kilowatt in the case of Calcutta and about £7 in the case of new industrial centres, quite irrespective of the nature of industries and the size of industrial establishments in these centres. In these circumstances no amount of extravagance would pile up the initial capital outlay on the generating plant and transmission installation for the power supply of Calcutta beyond the average expenditure in any of the industrial countries in the West; while in the case of new industrial centres £24 per kilowatt may be taken as representing the maximum—provided of course the cost of plant and materials remains at the present level. And so it transpires that, no matter how recklessly the Indian power concerns mismanage their affairs, the charges on the capital cost account will not be any higher in the case of Calcutta than the average in any of the great industrial countries; while in the case of new centres of industry they will be substantially lower even than those in the most favourably situated foreign industrial centres, and are not expected to be more than about two-thirds of the average in foreign countries.

**Cost of coal in India.**—The second important item in the total cost of power is that of coal. In this case we have some definite data to work upon. The pit-mouth price of ordinary steam

coal in the British and German coalfields at the present time stands in the neighbourhood of 17s. 6d. per ton, while in the coalfields of Bengal and Bihar and Orissa the price (f.o.r. colliery) of selected coal is reported to be Rs. 6 per ton, of grade No. 1 coal Rs. 5 per ton and of grade No. 2 Rs. 4 per ton. Assuming that power stations in India employ grade 1 coal, and that the calorific value of these coals (without making any allowance for the effects of carbonization on these and foreign coals) is 10 per cent. lower than that of the ordinary foreign coals, the cost of coal will be just about 50 per cent. lower in India than in the United Kingdom and Germany—the two great coal-producing countries in Europe. This is strictly on the assumption that power stations are set up right in the heart of the coalfields in both cases. As it is, however, we find that the erection of power stations in the coalfields is an ideal towards the achievement of which little has so far been done in any country, although there is no doubt that coalfields will be the scene of most of the developments in the future which will tend to bring about the complete electrification of industry, transport and agriculture. To take the present-day conditions first, we find that the average cost of coal is about 240d. per kilowatt-hour in the British electrical installations, and as in every case the cost has been considerably over 200d. per kilowatt-hour, we cannot but assume that (taking the consumption of coal as standing at 1·5 lb. per kilowatt-hour) in not one single instance has a British power station been able to secure coal at less than 25s. per ton, which is obviously much higher than the nominal pit-mouth price. We may in these circumstances take it as certain that the cost of coal in India will be less than

one-third the present cost of coal in the British power stations; and this ratio, after slight readjustments, will also be obtained when the cost of coal in India is compared with that in the coal-fired stations in Germany and the United States. As regards the future, nothing definite can be said about the relations of the stations in the coalfields with those already supplying power to the centres of industry in foreign countries; but as far from scrapping the existing stations the extension of some of them at least is seriously contemplated, we may naturally expect little improvement in the situation. Apart from that, as far as we can see, even if some of the minor unsuitably-situated stations are scrapped and the dependent areas are linked up direct with the projected central generating stations in the coalfields, the advantage gained through the reduction of fuel costs will be largely offset by higher transmission charges and the various extra charges on the sub-station account. However, in calculations of this character—the calculations on which the ability of the various power-consuming industries to face foreign competition, and therefore their ultimate future, may directly or indirectly depend—it is always better to be prepared for the worst rather than to take an optimistic view; and acting on this golden principle we shall once again reduce India's advantage to the minimum, and proceed with our enquiries with the assumption that the cost of coal in India will not be any lower than about half the cost in the United Kingdom.

**Other items in the cost of power : a comparative study.**—Of the other items in the cost of power, the cost of oil, water and stores, and charges for repairs, maintenance, rates, rents, taxation, insur-

ance and management demand our attention. A study of the costs sheets of the various electrical undertakings in the United Kingdom shows that oil, water and stores charges are by no means important items in the cost of power, though they show considerable variations from station to station. In 1923-24 the cost under these heads amounted to only *·004d.* per kilowatt-hour in Glasgow, and *·020d.* per kilowatt-hour in Leeds, and these two figures eloquently speak of the difficulties of effecting a comparison. As these disparities are believed to be due mostly to the difference in the charges for water, we may drop this subject with the observation that cheap and abundant supply of water is necessary in the case of a super-station, and that power stations in India must be set up where, among other things, the cost of water is low. If this condition can be satisfied, there is no tangible reason why the combined cost under these heads should be higher than in any of the foreign stations—provided of course no variations in the cost of oil are brought about by the operation of the various factors that determine the total consumption and cost of oil in a modern generating station.

As the cost of labour is dependent upon the efficiency of workmen, the rates of wages and the type of plant employed at any particular power station, we may naturally expect considerable variations under this head. Apart from the Barton Station of the Manchester Corporation (where labour charges have been pushed up to an abnormally high figure in consequence of the operations of the plant for the carbonization of coal, and stood at *·154d.* per unit in 1923-24), the cost under this head may be taken as averaging about *·075d.* per kilowatt-hour in the large electrical undertakings in the United Kingdom.

As with the exception of the chief engineer in charge of the station and a few assistants the entire labour force at an Indian station will have to be locally recruited, and as the wages of these Indian workmen will be on an average less than 25 per cent. of the wages of workmen in foreign countries—Great Britain, Germany or the United States—we cannot but come to the conclusion that despite the comparative inefficiency of Indian workmen, and notwithstanding the fact that about half a dozen men with exceptionally high qualifications will have to be brought out from foreign countries for general supervision, the cost of labour will be much lower in India than in any Western country; indeed, if the works are efficiently managed, there is no reason why the cost under this head should not be at least 40 per cent. lower in India after the workmen have received adequate training in the handling of plant, machinery and materials.

Repair and maintenance charges are also subject to wide variations, and these variations, as the returns for the various British stations show, are due more to the character of the distribution system than that of the generating plant. Manchester and Glasgow with their widely-scattered areas of power supply spent as much as  $\cdot 153d.$  and  $\cdot 203d.$  respectively per kilowatt-hour in 1923-24, while charges under this head amounted to only  $\cdot 050d.$  per kilowatt-hour in Leeds,  $\cdot 092d.$  in Bolton and  $\cdot 102d.$  in Sheffield. And it may be remembered that, in spite of these figures, the Glasgow and Manchester stations undoubtedly possess the best and most efficient plants in the United Kingdom, and are easily among the ten finest plants in Europe. From this we may naturally infer that the high charges for repairs and maintenance are principally due to the size

and awkwardness of their distribution mains, while various degrees of savings on this account in Leeds, Bolton and Sheffield are brought about by the fact that they possess shorter distribution mains than Manchester and Glasgow. These figures are interesting as well as instructive: they show that since the existence of a dense power area in Calcutta cannot be proved, and as the capital expenditure on the distribution installation is not expected to be a great deal lower than the British average (which is certainly much lower than that indicated by the Manchester and Glasgow figures), we cannot but conclude that, the efficiency of the supervising staff and the quality of the plant and materials used being equal in both cases, the charges for repairs and maintenance in Calcutta, or the station supplying power to Calcutta, will not be much lower than the British average, while in comparison with Manchester and Glasgow they will be appreciably low. In the case of new industrial centres in Bengal and Bihar, on the other hand, as the generating stations will supply dense power areas—which in all probability will be denser and more compact than that represented by any existing centre of industry in the United Kingdom or indeed in any other part of the world—we must assume that other things, such as the nature of industries and the size of industrial establishments, being the same in both cases, the charges for repairs and maintenance will probably be much lower than anywhere in the United Kingdom; and, as the conditions in the old-established industrial centres all over the world are to a certain extent identical, they will compare just as favourably with the great centres of industry on the Continent and in the United States.



There is very little to be said with regard to rates, rents and taxes. In the United Kingdom they vary considerably from district to district: Bolton and Sheffield represent one extreme where in 1923-24 the combined charges under these heads amounted to only  $\cdot 037d.$  and  $\cdot 040d.$  per unit of electricity sold, while at the other extreme stood Glasgow with  $\cdot 179d.$  per unit. What the charges will be in India, is a very difficult question to answer. A great deal will obviously depend upon the functions of the local authorities within whose jurisdiction the works are set up. As, however, unlike the British stations, the power stations in India will not, or at any rate should not, be set up within the municipal limits of Calcutta or any other city, and as under the prevailing conditions local authorities in India have a more restricted field of social and economic activities than the authorities in Europe and America, we may naturally expect a corresponding reduction in the contributions to be made by power stations in India. Like the Tata Iron and Steel Works at Jamshedpur, power stations in the coalfields of Bengal and Bihar will be gradually surrounded by thickly-populated areas, so that it is difficult to see how they will be able to avoid altogether their contribution towards local taxation. But this contribution will be so small in comparison with that shared by even the cheapest districts in the United Kingdom, Germany and America as to be almost negligible. Land and building charges being low in rural districts in India, the rent charges will presumably be lower than anywhere in the West. Insurance charges on the other hand will be slightly higher in India owing to various causes that render property less secure in India than among the more advanced and

disciplined Western workmen and communities; but the extra expenditure on this account will be so slight as to have no appreciable effect on the situation. When all these facts are brought together, it becomes evident that the combined expenditure in connection with rates, rents and insurance will be much lower in India than the average in Western countries.

The management charges also differ widely in various cases in the United Kingdom. Sheffield and Oldham stand at the bottom with  $\cdot 036d.$  and  $\cdot 034d.$  respectively per unit of power sold, while Leeds and Bradford top the list with  $\cdot 130d.$  and  $\cdot 131d.$  respectively. Between these two extremes stand Manchester and Sheffield with  $\cdot 085d.$  and  $\cdot 084d.$  respectively. What these enormous variations are due to is not known for certain, but they clearly show the difficulties of effecting a comparison. In India the expenditure under this head can be kept within reasonable limits, notwithstanding the fact that for some time to come men well versed in power station management, or those responsible for directing the commercial side of power concerns, will have to be imported from Europe or America. In any case, the salaries of the lower grades of clerical and other staff being what they are in India, the total expenditure under this head should be lower than that in the municipal undertakings of Glasgow and Manchester, which, roughly speaking, represent the British average.

**Indian and British totals of working costs compared.**—The foregoing analysis of the various factors in the cost of power plainly shows that it is well-nigh impossible to present an accurate estimate of working costs in India. Some results of practical importance, however, can be obtained

by disregarding as far as possible the various obvious advantages under which the power plants in Bengal and Bihar are likely to operate. By these means at least some idea of the maximum cost can be obtained, and from the conclusions arrived at by directing the enquiry on these lines it should not be difficult to have a glimpse of the actual position in which the dependent industries in Bengal and Bihar will find themselves in the matter of power charges. With this end in view we may assume that the cost of coal per unit of electrical energy actually sold by the generating station set up in connection with Calcutta will not be less than  $\cdot 100d.$ , or about 50 per cent. of the average cost in the large, modern stations in the United Kingdom; that the cost of oil, water and stores will be about  $\cdot 010d.$  per unit, or about the same as the British average; that the cost of labour will amount to  $\cdot 050d.$  per unit, or equal to about the lowest among the large municipal-owned power stations in Britain; that repair and maintenance charges will correspond to the British average of  $\cdot 150d.$  per unit; that rates, rents and insurance charges will not be any lower than the British minimum of  $\cdot 040d.$  per unit; and that the management charges will correspond to the extraordinarily high British average of  $\cdot 075d.$  per unit. If these estimates can be accepted as the maximum possible under the prevailing conditions, it is difficult to see how the total working costs in a station supplying power to Calcutta can exceed  $\cdot 425d.$  per unit of electricity actually sold. For the estimates corresponding more or less closely to actual realities a considerable margin of relief may reasonably be expected from all these items, more particularly from the cost of labour and management, and rates, rents

and insurance charges, which have been rated in the above estimates a trifle too high. It may be mentioned that the 1923-24 data for the British power stations are the bases of these calculations, and that during the past few years an all-round decline in prices has resulted in a substantial diminution in the size of almost all items comprising the total working costs. But that ought not to affect our calculations one way or the other, as prices in India have also undergone a similar decline. In these circumstances  $\cdot425d.$  per unit may be taken as representing the maximum working cost for the Calcutta power supply undertaking; if in actual practice under the existing conditions this figure is ever touched, far less exceeded, the incident may be taken as heralding the approach of incompetence or corruption or both in some branch of the industry.

In forming an estimate of the working costs in the power stations set up in connection with new industrial centres in Bengal and Bihar, the possibilities of substantial savings on account of lower repair and maintenance charges cannot be disregarded. It is hardly thinkable that the cost under this head in a compact, scientifically-planned industrial area in the north-eastern provinces of India will exceed that in Leeds, which is often described as a dense power area in England. Even if we start our calculations with the conviction that no amount of human effort and ingenuity can succeed in improving upon the layout of an old-established industrial centre like Leeds, the cost of repairs and maintenance in these new centres of industry in Eastern India will not correspond to the British average of  $\cdot150d.$  per unit (which we have accepted in the case of Calcutta), but will be only about  $\cdot050d.$  per unit,

which automatically brings down the working cost for power in these new industrial centres to only  $\cdot 325d.$  per unit. How the working costs in these two cases, which are obviously the highest imaginable in a well-managed power station, will compare with those in Britain may be seen from the fact that in 1923-24 the Sheffield Corporation Station recorded the minimum with  $\cdot 462d.$  per unit, Bolton came a bad second with  $\cdot 540d.$  per unit, and the power stations of Oldham, Manchester, Glasgow and Bradford Corporations recorded  $\cdot 723d.$ ,  $\cdot 780d.$ ,  $\cdot 781d.$  and  $\cdot 853d.$  per unit respectively.

**Interest and depreciation charges in India.**—In order to get an idea of the total cost of power, the interest and depreciation charges will have to be taken into account. What the charges under these heads will be in India, will obviously depend upon the total capital cost of the generating plant and distribution installation as well as the rate of interest on the borrowed capital, or, in the case of joint-stock undertakings, on the amount of annual net profits. As the capital expenditure on the generating plant per kilowatt installed is about the same for all practical purposes, and as variations in the total interest and depreciation charges are brought about mainly on account of the transmission plants employed in connection with different power stations, it would be more scientific as well as convenient to examine separately the interest and depreciation charges on the generating plant and distribution installation.

As it is always more convenient to adopt the direct method of enquiry in such cases, let us proceed with our investigations by supposing that a 110,000 kilowatt station—which would

be the same as the Barton Station of the Manchester Corporation—is set up somewhere in the coalfields of Bengal or Bihar and Orissa. Assuming that the capital cost of the generating plant is as high as £17 per kilowatt installed, or nearly 15 per cent. above the British cost, the total expenditure on this plant in India will amount to £1,870,000 and the interest charges on this amount, further assuming that the rate of interest on this capital is as high as 7 per cent. per annum, will amount to nearly £130,000 a year. The depreciation charges are apt to show slight variations according to the nature of the plant and the hours of maximum and minimum demand for power; but under ordinary conditions these charges should not be more than 5 per cent. of the capital value of the new plant. If we accept this basis of calculation, not more than £94,000 will have to be annually earmarked for the depreciation fund. On these generous assumptions the total charges for interest and depreciation will amount to nearly £224,000 a year. Now we know that in 1923-24 the Barton Station of the Manchester Corporation actually sold more than 222 million units of electrical energy. As our generating station in India has been taken to be of the same capacity as the Barton Station, and as the dependent industries in India cannot, except under rare and exceptionally adverse circumstances, be expected to face a worse depression than that experienced by the textile and engineering industries in Lancashire during 1923-24, we may accept only 222 million units a year as the normal saleable output of electrical energy for the generating station in India. Even on this basis of calculation the interest and depreciation charges on the

generating plant should not exceed the limit of 240d. per unit in Bengal and Bihar.

There are, as we have seen, many uncertain points about the capital expenditure on the distribution installation, so that it is a very hazardous task to offer an estimate in regard to interest and depreciation charges. However, as in no circumstances the expenditure under this head can be more than £20 per kilowatt installed in the case of Calcutta (which is more than the average for electrical installations in the leading British industrial centres), we may assume that not more than £2,200,000 will be spent on the transmission installation laid in connection with Calcutta. As it is customary to make provision for the upkeep of the transmission system in the charges for repairs and maintenance, which we have already discussed, we have to take only the interest charges on the capital cost of the installation at this stage. If, as in the case of the generating plant, 7 per cent. is taken as the rate of interest on the borrowed capital, not more than £154,000 a year will have to be found to meet the interest charges. But as we know that not less than 222 million units will be annually sold by the undertaking under consideration, the charges under this head will amount to just about 160d. per unit. And so it appears that the total interest and depreciation charges for Calcutta's power supply will not be more than 400d. per unit.

In the case of new industrial centres in the vicinity of the power stations of the future, the comparative shortness of the distribution mains will naturally react upon the capital expenditure and therefore the interest charges on the distribution installation. As the capital expenditure on this installation is not expected to be, or at

any rate should not be, more than about £7 per kilowatt installed—an estimate which is based on the figures for various stations in England, and on the conditions affecting the cost of distribution in their zones of power supply—the total cost of the transmission installation for the type of power station under consideration should not be more than £770,000. The interest charges on this amount (@ 7 per cent.) will be nearly £54,000 a year, or, in a round figure, less than  $\cdot 060d.$  per unit. The total interest and depreciation charges in this case will therefore be less than  $\cdot 300d.$  per unit.

**Extent of safety margin in estimated costs.**—It will be seen that even in their grossly exaggerated form, as given above, the estimates for the interest and depreciation charges in India compare extremely favourably with those for the stations in the various British centres of industry. In 1923-24, Sheffield on account of its dense power area and consequent economies on the distribution side combined with a high load showed only  $\cdot 430d.$  per unit, while in Glasgow and Manchester the charges under this head amounted to the colossal figures of  $\cdot 698d.$  and  $\cdot 632d.$  per unit respectively. As our estimates are the highest under the circumstances, it will be found that in actual practice the combination of various factors, which in arriving at the above estimates have either been too highly overrated or altogether neglected, will render India's position in this respect even more favourable. Assuming that these power stations are owned by the local, provincial or central Government—and it is only the Government and municipal undertakings which can be set up with borrowed capital in the strict sense of the term—the rate of



interest on capital (as disclosed by an examination of the terms on which the Government of India have been able to obtain loans in India and abroad during recent years) need not be as high as 7 per cent.: in fact a saving of at least 1·5 per cent. should be possible, so that economy in this direction alone will automatically bring about a reduction of more than 20 per cent. in the estimated interest charges. This is quite apart from the possibility of a substantial reduction in the capital expenditure on the distribution installations both in the case of Calcutta and new centres of industry, estimates in regard to which as given above are likely to be too high. And finally, there is the load factor which is quite capable of bringing about a substantial difference in the interest and depreciation charges on each unit of power actually sold. In selling 222 million units, the Manchester Station was working at an average load of only about 22 per cent., which even in these days of industrial depression is considered to be extremely unsatisfactory, and our own estimates are based on the figures belonging to this period of trade depression. There is hardly any reason to suppose that industries in the eastern provinces of India will perpetually be under a depression which is the outcome of abnormal circumstances in Lancashire. Moreover, the effects of circumstances that render longer working hours in Indian factories not only possible but necessary, cannot be disregarded. Taken all round, it seems that 33 per cent. load will be easily obtained in actual practice in Bengal and Bihar, and this conservative limit will easily be exceeded if the industries requiring a continuous supply of power (such as nitrogen fixation, alkali manufacture and certain metallurgical industries) are set up in

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association with these power stations. Even with 33 per cent. load factor, the output of saleable electricity will be nearly 325 million units, and as the interest and depreciation charges will be met by the sale of this increased output, a reduction of 33 per cent. in the charges on the capital cost account may be expected. When all these facts are taken into account, it becomes abundantly clear that the estimated charges of 400*d.* per unit in the case of Calcutta and 300*d.* per unit in the case of new centres of industry are quite capable of offering a substantial safety margin in actual practice. But, as in the case of working costs, we are content to ignore the potentialities of the situation thus revealed.

**Total cost of power in India : some essential conditions relating thereto.**—The conclusion to which we inevitably come at this stage is that even in a hopelessly mismanaged undertaking in Bengal set up in connection with Calcutta's power supply the working costs and interest and depreciation charges should not be more than about 400*d.* per unit each, while in the case of the power stations set up in connection with new industrial centres charges under these heads should not be more than about 300*d.* per unit for each item. Even on these liberal assumptions the average total cost of power will be a little over 800*d.* per unit in the case of Calcutta, while in new centres of industry in Bengal or Bihar it is not likely to average more than 600*d.* per unit. It is hardly necessary to add that these estimates will hold good only in the case of the stations owned by the central or a provincial Government, or of the stations set up by the local authorities with funds borrowed directly from the Government, or of the joint-stock undertakings in which

charges for power are regulated by Government or local authorities by virtue of their controlling interests in these undertakings. In the case of independent joint-stock or private concerns the dividends under normal conditions may be expected to be a good deal higher than the rate of interest at which the central Government can borrow at home and abroad, and this will naturally be reflected in the cost of power. The same is true of the stations owned by local authorities who have been left to themselves to raise capital for the purpose by their own efforts and on their own meagre credit. In this connection the history of the various municipal-owned power stations in the United Kingdom may be read with considerable profit and interest. The high capital charges in all these cases, which we have already examined in detail, are directly due to dear capital: and in spite of the fact that none of the municipal authorities has ever shown an inclination to enrich itself by exploiting its power supply monopoly, dear money nevertheless has resulted in dear power.

**Demand for power for non-industrial purposes : its financial significance.**—At this stage it appears necessary to differentiate between the various classes of consumers of power, and to examine as briefly as possible the principles by which the charges for power are determined in each case. For revenue purposes, the consumers of electrical power are divided into two main classes: the non-industrial consumers and manufacturers. As a rule, the charges for power for domestic heating and lighting are much higher than for the power used in manufacturing operations; in other words the charges for power in the latter case are much lower than the actual cost of production, and

the difference is made up by correspondingly increasing the charges for power used for non-manufacturing purposes. How these differential rates benefit the manufacturing industries may be seen from the fact that in the United Kingdom during the past few years while only about 20 per cent. of electricity was sold for lighting and various domestic purposes, more than 50 per cent. of the total revenue was obtained by the power supply undertakings from this source. The actual significance of this statement would be more readily appreciated when it is illustrated by means of mathematical figures. If, for instance, we assume that 100 units are sold at an average price of 1*d.* per unit, the manufacturing industries pay only about  $\frac{1}{2}$ *d.* per unit for 80 units, while the charges for the remaining 20 units sold for lighting and heating purposes amount to more than 2.5*d.* per unit. Thus by the operation of these differential charges, the non-industrial consumer can be exploited for the benefit of manufacturing industries. If the maximum revenue limit is ever exceeded, the increase immediately reacts upon the demand for power and therefore upon the revenue from this source. If we assume that the charges in Britain do not represent the maximum revenue level, an increase of only 5 per cent. (from 20 per cent. to 25 per cent. of the total amount of power sold) in the proportion of power used for non-manufacturing purposes will, the charges for power remaining the same, further reduce the rates for industrial power by about 20 per cent., while a reduction of 5 per cent. in demand will result in an increase of nearly 20 per cent. in the charges for industrial power. It clearly proves the importance of demand for non-manufacturing purposes as a factor that exercises a

far-reaching influence upon the charges for power used in manufacturing industries.

It is very difficult indeed to forecast with any degree of accuracy the demand for power for non-industrial purposes in any locality, especially as we know that it is enormously influenced by the charges for power under given circumstances. But knowing the power requirements of Calcutta for non-industrial purposes at the present time, and remembering that in the event of central generating stations being set up the existing small generating stations in Calcutta will have to be converted into distributing stations, we have no doubt whatever that not less than 20 per cent. of the total requirements of a completely electrified Calcutta will be accounted for by the non-industrial consumers of power, and that the demand for power will promptly respond to a reduction in charges, which the consumer may confidently look forward to in the event of the suggested developments materializing. Now, as in the case of the United Kingdom, if about 50 per cent. of the total revenue is obtained by the power supply undertaking from the non-industrial consumers in Calcutta (and there is no reason why they should not contribute to this extent, especially as we know that the charges for electricity in Calcutta average well above 4 annas per unit at present the charges for industrial power will average only about  $\frac{1}{2}d.$  per unit, while the non-industrial consumer will contribute on an average only about  $2d.$  per unit. Once the demand for power for non-industrial purposes has been created, the charges for power may be increased without any danger of reaction, and the proceeds utilized in reducing the charges for power for industrial purposes. Even, however, if we completely disregard these distant possibilities, the

conclusion appears to be that industries in and around Calcutta can be supplied with power at less than  $\frac{1}{2}d.$  per unit, and this rate compares very favourably with the charges for power in most of the large industrial centres in the world.

The case of new industrial centres in the vicinity of the great power stations of the future is somewhat difficult. It is obvious that for a considerable length of time the power stations set up in connection with these centres will rely to a very large extent on local industries for their revenue. During the initial stages of development the non-industrial consumers will be some of the higher grade workmen and various types of trading and professional men who will be attracted to these centres in search of careers. However, the preponderating majority of the population in these centres will consist of lower grade workmen, and these men cannot be regarded as very good customers of the power supply undertakings. It is only by stages that they will give up their traditional conservatism towards new and comparatively costly modes of living, so that in the beginning it would not be altogether prudent and businesslike to depend on them as likely consumers of power on a scale worth reckoning. What proportion of the total output of power will be used by the various classes of non-industrial consumers of power in these centres is extremely difficult to calculate, but even if we assume that the nature of industries in these centres will not be any different from that in Calcutta, it may, in view of the above facts, be taken as a foregone conclusion that the demand and therefore the consumption of power will be far below the prevailing standard in Calcutta. Possibly, on the above assumption, not more than about 5 per cent. of power will

be used by non-industrial consumers in these centres for a long time after the setting up of power stations.

**The bearing of load factor on charges for power.—**In the new centres of industry, the charges for power will be profoundly influenced by the character of the industries established there. If industries requiring a high and constant load (such as electro-metallurgical and electro-chemical industries) are established in conjunction with these power stations—and it is in these centres and not in Calcutta or indeed anywhere else in the coal zone that they can be established—the consumption of power will be so large and the cost per unit so low that the charges for power will not be greatly influenced by an increase or decline in the demand for power for non-industrial purposes. The case of the north-east coast area in England, where, in spite of the fact that industrial centres are small and the consumers of power widely scattered, the average cost of power was at one time immediately after the war brought down to less than  $\frac{1}{2}$ d. per unit, chiefly as a result of high load consequent upon the presence of electro-chemical and electro-metallurgical industries in the area. If, despite the disadvantages of an extensive transmission system, the cost of power can be brought down to this remarkably low level in England, there is no reason why the cost should not be substantially lower in the new industrial centres in Bengal and Bihar where the generation and distribution costs would be lower than those attainable anywhere in the United Kingdom. It may be added that in the case of the north-east coast area, less than 5 per cent. of power is used for non-industrial purposes, so that

even if we assume that this meagre proportion cannot be realized in India, the cost of industrial power should still compare favourably with the figures for Britain's cheap power area.

**Comparison of average cost in India and abroad.—**

Let us now see how the cost of electrical power in India as a whole will compare with the cost in the various industrial countries in the world. For this purpose we may recall the conclusions in regard to the cost of electrical power in India's water power zone which were based more or less on evidence of circumstantial character recorded in the opening paragraphs of this chapter. In recapitulating the more vital parts of this evidence, it may be pointed out once again that the average charge for electrical power in the city of Bombay stands in the neighbourhood of 1 anna (1*d.*) per unit (.725 anna per unit from industrial undertakings) at the present time; and as the hydro-electric works in this case are by no means ideally situated with respect to the generation and distribution of power, and as the works are owned by ordinary commercial undertakings which are out in the field avowedly with the object of earning the maximum amount of profit—a course which, as we are about to see, should be avoided in the future at all cost in the interests of dependent industries—we may take 1*d.* per unit as the highest possible average for India's water power zone. That this is the highest possible estimate for the average cost of hydro-electric power in the country is indicated by the fact that the estimated charges for power in the case of the Pykara power scheme in the Madras Presidency are less than  $\frac{3}{4}$  anna ( $\frac{3}{4}$ *d.*) per unit, while in the case of the Mandi hydro-electric project in the Punjab also the cost is not expected



to average more than  $\frac{3}{4}$  anna per unit during the first stage of development ; and after the scheme has been fully developed, the charges for power will average considerably less. The charges in these cases, it must be remembered, are so low in spite of the fact that the length of the transmission mains will ultimately exceed 600 miles in each case, which is nearly five times the length of the transmission lines laid in connection with Bombay's electric power supply. The cost of development in other localities may be higher than the estimated cost at Pykara and Mandi, but even then it is difficult to visualize the circumstances in which an increase of more than 33.3 per cent. in the average price of electrical power can be claimed. On the other hand it is equally likely that the cost of development in some cases will be lower than the estimated cost in the case of the works in the Punjab and Madras, and the lower level of charges in the former case will at once bring down the national average to a new level. When these facts are taken into account, it becomes abundantly clear that  $\frac{3}{4}$  anna ( $\frac{3}{4}d.$ ) per unit is likely to be the average cost of power in India's water power zone, and 1d. per unit probably represents the upper limit which is not likely to be exceeded, at any rate under the prevailing conditions. However, as we have invariably done in all cases previously, we shall accept the above-mentioned maximum cost as indicating the average price of electrical power in India's water power zone.

Unfortunately, no recent figures with respect to the average cost of electrical power in various industrial countries in the world are available ; in fact we have no reliable data at our disposal except those compiled by Mr. Hugh Quigley (evidently from official sources) and published in his

“Electrical Power and National Progress”. According to this author, in 1922-23 the price of electrical power averaged 2·07*d.* per unit in Britain, 1·05*d.* per unit in the United States, 0·72*d.* per unit in Canada, 0·60*d.* per unit in Switzerland and 0·46*d.* per unit in Northern Italy. Mr. Quigley does not explain why the charges for power in Canada, Switzerland and Northern Italy are lower than those in Britain and the United States: but so far as we can see, this disparity is mainly due to the fact that in the former group of countries electrical power is obtained mainly from hydro-electric installations, while Britain and the United States are to a very large extent dependent on coal-fired stations for the supply of electrical power. The ascendancy of the United States over Britain in the matter of power costs is, as far as we can see, due to the fact that in the former country a much larger proportion of electrical power is obtained from hydro-electric installations, and that the generating cost in the case of coal-fired stations has in many cases been brought down to the lowest possible level by the creation of what are generally described as “super-power zones”. The average in Germany, in the absence of any reliable data, must be accepted as corresponding to that in Britain, especially as conditions with regard to the generation and distribution of power are almost identical in both countries.

But we have seen that changes of far-reaching importance in the field of power production are taking place in every country. The reorganization of the electrical industry in Britain is calculated to bring about a substantial reduction in the average cost of power; different estimates have been offered in this connection, but no one has ventured to predict that the final average would

be any lower than 1.25d. per unit ; and conditions being almost identical in both countries, these estimates would be equally applicable to Germany. In the United States on the other hand as the generation and distribution of power has already reached the highest degree of efficiency, any future developments in the organization of the industry cannot be expected to bring about a substantial reduction in the national average of cost. On the contrary, as the ever-increasing requirements of the country will in future be met to a very large extent by steam turbines, the moderating influence of cheap hydro-electric power on the national average of cost will gradually diminish, with the result that extensions and additions to the existing coal-fired stations will tend to raise the average cost of electrical power in the country.

As regards the charges for electrical power in Northern Italy, Switzerland and Canada, it may be said that as 0.46d., 0.60d. and 0.72d. per unit respectively represents to a very large extent the existing charges for power derived from hydro-electric installations, and as, having regard to the present and future requirements of these countries, the complete electrification of industry and transport cannot be achieved without the assistance of coal-fired stations or without developing new and more expensive water power sites, we must assume that with developments on these lines the national averages in all these countries will show an upward tendency. No one can say what the ultimate averages will be, but certain it is that they will be substantially higher than the averages obtaining at the present time.

Indian industries will also find formidable rivals in France, Belgium, Austria and certain parts of the former Austro-Hungarian Empire,

but unfortunately no reliable data in relation to the average cost of power in these countries are available. However, as we know that Austria and Belgium are, like Britain and Germany, dependent mainly on coal for the generation of power, and that the industrial districts of France, situated as they are mostly in the north-eastern provinces, will remain practically unaffected by hydro-electric power developments in the Pyreneese and other districts, the average cost of power under normal load conditions in these countries will not be much lower than that in the United Kingdom and Germany. And so it transpires that the charges for power in both the coal and water power zones in India will compare extremely favourably with the charges in most of the great industrial countries in the world.

**The problem of finding an agency for power development in connection with Calcutta.**—We have now to see how this dream of cheap power can be realized in India, i.e. how far it is possible under the existing conditions to set up large generating stations in the coal and water power zones in the country, and on what lines it would be necessary for the nation to proceed in order to achieve the desired goal. It is obvious that, as in other countries, the first fundamental condition for the development of electrical power in a locality, whether from coal or water, is demand; in other words, when there is no demand, existing or prospective, for power in a locality, the setting up of large generating stations cannot be looked upon as a profitable undertaking. When we apply this test to India, we find that so far as the existing demand for power is concerned, Calcutta is probably the only industrial centre of any importance which satis-

fies the various conditions for the production of power on a large scale. The city of Bombay has already got a fairly efficient power supply system of its own, while other industrial centres in the country are either too small to avail themselves of the facilities at their disposal, or are situated too far away from water power sites.

The absence of a large power supply undertaking in Calcutta is principally due to that lack of enterprise which is responsible for the non-existence of all those manufacturing industries for the establishment of which conditions in India are just as favourable as in any other part of the world. As there is already a large demand for electrical power in Calcutta, both for industrial and non-manufacturing purposes, there is no reason why a large power station, if set up on the lines we have already suggested, should fail to justify its existence and bring adequate financial reward to its promoters. Here then is an excellent opportunity for someone to make a beginning in the direction of "mass production" of power from coal in India. But who is to make the beginning, and who is best fitted to undertake this great task which may prove to be of the greatest industrial and economic importance not only to Calcutta and Bengal but to the whole country ?

**Guidance from foreign countries.**—In order to suggest some really practicable methods, we may seek guidance from the history of the electrical industry in various industrial countries in the world. In Britain, as has been pointed out already, some of the largest and most efficient generating stations in the Kingdom are owned and run by the municipal authorities in various centres of industry, while joint-stock

enterprise, in so far at least as the supply of power for industrial purposes is concerned, occupies a position of secondary importance. In Germany, generally speaking, the development of the electrical industry has proceeded on somewhat identical lines, with the difference that the central Government and some of the States in the Union have played a more important part in developing the industry than in any other country in the world. In a fairly large number of enterprises, of which Elektrowerke and Innwerke are the most important representatives, the Reich itself participated in the financing of schemes, while local authorities and some States have also been responsible for the financing of a number of schemes which were developed in the areas under their jurisdiction. It is a well-known fact that even in the case of the world-famous Rhenish-Westphalian electrical works the greater part of the capital was provided by the various local authorities directly interested in the development of the scheme. In France and Italy the municipalities have certainly played a less conspicuous part in developing the electrical industry, but in both cases this deficiency has been more than made up by the Central Governments, without whose direct and indirect assistance some of the greatest hydro-electric stations in Europe would probably have never come into existence.

**Local authorities not a dependable agency for power development.**—We thus find that, if the example of other countries is to be closely followed, Calcutta's electric supply may be undertaken by an independent joint-stock concern, or by the city Corporation, or by an undertaking (private or joint-stock) in which the Corporation

or the Government or both may acquire a financial interest. As nothing has so far been done, and is not likely to be done in this direction by private enterprise, the Government may cease to look round for precedents and may take independent action in connection with the provision of facilities for the supply of cheap power. As far as we can see, it is impossible for the Calcutta Corporation, or indeed any other local authority, to participate in any form in schemes of this kind. There are two chief difficulties which may be characterized as insuperable in the case of Calcutta. In the first place it may be pointed out that in order to participate in these schemes the Corporation can borrow funds at an economical rate of interest only from the Government, so that if the Government has got to raise a part of the capital in any case, it might as well invest it directly in the industry without depending too much on the business genius of the Corporation. To provide funds for a purely industrial venture without retaining or demanding any kind of control would be obviously unthinkable, especially when the borrower's credit and reputation in the business world leave much to be desired. The most serious objection, however, is that the Corporation and other local authorities have already more in hand than they can efficiently manage, and to assist them in acquiring control over a stupendous business organization would be nothing short of nursing incompetence and inviting disaster. On these grounds, apart from many others, the participation of local authorities in electrical power schemes cannot be countenanced.

**Private and joint-stock enterprise not desirable.—**  
To return to the question of private enterprise

in this field, it is obvious that as there is already a fairly large demand for electric power in Calcutta, the scheme presents unrivalled opportunities for profits. In ordinary circumstances it may be allowed to develop through this agency, but it must not be forgotten that whoever undertakes this task of supplying electric power to the industrial establishments in and around Calcutta will be the holder of a great monopoly: and there is an obvious danger that if this monopoly is owned by purely private interests, it may be ruthlessly exploited regardless of the effects of this exploitation on industry. That the danger is real and that its utter disregard is likely to lead to serious consequences (even to the defeating of the very object of electrification) is indicated by the fact that the cost of electric power per unit of work actually done in a mill or factory is certain to be substantially lower than the cost of steam power under the existing independent arrangements. It is more than likely that the monopoly-holders will be tempted to abuse their powers by progressively increasing the charges for power until the margin between these charges and the cost of steam power is reduced to the vanishing point. It may be argued that since the application of electrical power to industry is recommended on both technical and financial grounds, the industries will nevertheless be the gainers in the transaction, even though they will have to pay about as much for electricity as they had to do formerly for steam power. There is a certain amount of truth in this statement, but then that is exactly where the exploitation of the monopoly comes in. The first and the most important object of setting up central generating stations is to supply the industries with a more efficient form of power



as well as to encourage the growth of industries by offering these facilities ; yet the financial side of the business cannot be ignored, especially as we know that a reduction in the cost of power will materially improve the position of almost all existing industries, and will probably be of greater help in bringing about the desired industrial expansion than the mere introduction of a more efficient form of power. It is, in these circumstances, imperative that the charges for power should be kept at the lowest possible level ; and as this cannot be done without drastically cutting down profits, and as no business organization can be expected to make these financial sacrifices without compulsion, the advent of unbridled private enterprise in the field of power generation cannot be welcomed. The only point in favour of privately-owned concerns is that they are, as a rule, more efficiently managed than the concerns owned and managed by Government, but knowing how most of the purely Indian industrial enterprises are managed—or mismanaged—it is extremely doubtful if under the prevailing circumstances independent private electrical undertakings in India will be blessed with even this redeeming feature.

**Government enterprise equally undesirable.**—A purely Government enterprise in the case under consideration (which on account of certain peculiarities is altogether different from hydro-electric power development) would also be open to many objections, the most serious of which is that the State-owned industrial concerns lack that zeal and efficiency which is the chief characteristic of private enterprise. Government enterprise is quite practicable when it is undertaken in the interests of the Government itself,

and when its activities do not concern the public at large. But in cases when it is embarked upon in the interests of the public, when it is not immune from both direct and indirect competition, and when at every step and on every side the organization is brought in contact with private individuals and interests, neither the bureaucratic methods of control and business transaction (which these business enterprises generally inherit from somewhere) can be tolerated, nor are the unbusinesslike and retrogressive tendencies of these methods ever conducive to efficiency which is one of the essential conditions of success in industrial enterprises. Again, it must be remembered that purchases of enormous value will have to be constantly made; the by-products of coal carbonization (such as tar, liquid oils, pitch and other articles) will have to be disposed of; the economies of fuel consumption in the generating station will have to be carefully observed. But we know that none of these intricate and highly specialized functions can be efficiently performed by a crowd of disinterested officials who have had no business experience and whose careers are more or less assured. Against this, however, must be set the fact that the Government, when in the position of a monopoly-holder, can afford to overlook the possibilities of making the undertaking a source of revenue; it can afford to take the longer view and arrange the charges for power in a manner consistent with the ideal of industrial expansion and consolidation even, if at all necessary, by running the works without any profit during the initial stages.

**The participation of the State in private enterprise.**—It is thus evident that neither purely

private undertakings nor purely Government establishments can be expected to meet the peculiar requirements of Calcutta. It is also evident that the shortcomings of the one are not shared by the other. An ideal system, as far as we can see, can be evolved by the combination of the two, i.e. by the participation of the State in private enterprise. By these means the State can acquire a controlling interest in an electrical power scheme without taking upon itself the responsibilities of management. In this way the profiteering propensities of purely private enterprise can be brought under control and the numerous pitfalls which lie in the way of purely State-owned undertakings can be avoided. Another way in which this ideal can be achieved is that the Government-owned stations may be taken over by syndicates in consideration for fixed remunerations. This alternative is in no way inferior to mixed enterprise, provided a business organization capable of undertaking the vast responsibilities of management can be found in the country. But unfortunately the experience of private and joint-stock industrial undertakings which are being run by the business organizations known as the "firms of managing agents" is on the whole disappointing, and does not encourage one to rely too much on the efficacy of this course. If these firms of managing agents can so relentlessly mismanage the affairs of joint-stock undertakings, despite all the inducements of profit-sharing devices, it would be the height of stupidity to expect from them a more honest and businesslike behaviour in dealing with State-owned undertakings, especially as no profit-sharing agreements, which would obviously defeat the very object of State enterprise in an indirect manner, are possible in this case.

The participation of the State in joint-stock enterprise on the lines suggested by the German system appears to be the best and the only workable plan in these circumstances. As there is already a large demand for electrical power in Calcutta, it is obvious that, unlike other cases of power development which we are about to examine, there will be no uncertainty in regard to the profit-earning capacity of the project. The Indian investor has a peculiar and deep-rooted faith in the schemes patronized by Government, so that there is hardly any room for doubt that once the Government announces its policy and intentions to the country, it will receive an appreciative response from all sections of the community. As far as the Government's own interests are concerned, it is evident that they cannot be better served than by its participation in the project: for the Government itself is likely to be the largest consumer of power. Sooner or later some of the railway lines radiating from Calcutta will have to be electrified, and as most of these railways are owned by the State, it is but logical and fair that the profits accruing from the supply of electrical power should at least partly be shared by the Government.

**The necessity of State action.**—But in spite of these facts both the Provincial and Central Governments have been completely indifferent towards the provision of facilities for the supply of cheap power; in fact as far as we know, the very question of power generation in the coal zone has never been discussed in official or non-official circles. This indifference only shows how completely detached and unaffected the Government and the people in India are even towards

revolutionary movements in the world of industry outside India. The Government, upon whom the responsibility ultimately rests, may retort that there is absolutely no demand for these expensive equipments in the country ; but this excuse would not merit a moment's consideration when we know that the development of national industries is, or ought to be, the recognized policy of the Government, that industrial advancement under modern conditions is not possible without the employment of the most up-to-date methods and "agents" of production (of which the application of electrical power is one, and probably of the foremost importance), and that governments in even the leading industrial countries in the world have often taken the initiative in this direction without any pressure from the industrial community or the public at large. The news of the passing of the various Electricity Acts in Britain and of the rate of electrification in other countries (through State action and otherwise) should have opened the eyes of the Indian Government. But all things considered, it seems that people themselves in India are not over-anxious to improve their condition, and not unnaturally they have a Government who not only joins in the spirit of things but actually "goes one better" by insisting on clinging to the mediæval ideas as to its duties and functions. In a country where industries have to be carefully nursed and developed, the Government should be even more energetic in developing the electrical power industry than in a country where industries are already firmly established: for, as we have already remarked, manufacturing industries in the hands of novices require cheap and efficient power more urgently than the industries with generations of skill and experience behind them.

**New centres of industry in coal zone and State enterprise.**—The need for State action is also apparent in the case of new centres of industries in the coal zone. As Calcutta is after all not a very suitable and convenient place for the establishment of some of the industries of great national importance, the growth of new centres of industry appears to be inevitable. But it is certain that those centres will never come into existence, or at any rate their development will be unduly protracted, without cheap electrical power. The locality chosen for the establishment of a power station in connection with Calcutta's power supply may present facilities for the development of other industries; but in case it does not, and if it is not within a suitable transmission distance from a more suitable locality, a new and independent power station will have to be set up somewhere in the coalfields with an eye on these developments. As far as our information goes, this course has never been followed in any industrial country in the world, but there is no reason why in the interests of economy and efficiency it should not be tried in India. As during the initial stages, the railways and collieries in Bengal and Bihar and Orissa will be the chief consumers of power generated by this station, it will be clearly uneconomical to instal large generating units at the very outset. This would naturally mean either the absence of profits or expensive power. But expensive power will go all against the establishment of industries in these projected centres; moreover, as the concentration of industries in unsuitable centres like Calcutta, where the cost of production will always remain high, cannot be allowed to take place, it would be obviously necessary to attract industries to these

new centres by offering, among other facilities, cheap power. From this it naturally follows that for some time at least profits will have to be cut to the bone, or even if necessary the power station will have to be run at a loss. It goes without saying that private capital will never be available to finance these ventures. The only way out of this difficulty appears to be that the Government should not only provide a part of the necessary capital without any financial consideration, but also secure the support of private capital by offering a guaranteed rate of interest for a number of years during which the system is to be developed and organized. So long, therefore, as the Government does not proceed on these or identical lines, the localization of industries on scientific lines can never take place in the coal zone which, as we have explained, is likely to develop into the workshop of India.

**Government enterprise and hydro-electric power development.**—An even stronger case for State enterprise is presented by hydro-electric installations, especially by those the development of which is not likely to be a profit-earning proposition during the initial stages. In this case, unlike power stations in the coal zone, the schemes will have to be developed solely by the Government without the least *direct* intervention of private capital. The grounds on which this course is recommended will be examined in all their aspects and details when we start our enquiries on hydro-electric power in a later part of this work ; at this stage it may be pointed out that, for the reasons discussed in a preceding paragraph, private enterprise cannot be depended upon for the development of power

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schemes in the areas where the demand for electrical power is not adequate, and that in the case of hydro-electric installations the absence of various factors determining the efficiency of an industrial undertaking makes purely State-owned works immune from the drawbacks associated generally with the name of bureaucratic control. That it is altogether hopeless to rely upon private enterprise in this field, and that in order to encourage the growth of industries the Government may undertake the development of water power sites without being accused of incompetence in the discharge of these self-imposed duties, is proved by the fact that vast hydro-electric schemes have been and are being developed by the provincial Governments in Mysore, Madras and the Punjab. Indeed these schemes stand as a convincing testimony to the futility of relying on private enterprise and to the necessity of governmental action in the field of water power development.



## CHAPTER IV

### FINANCE AND MANAGEMENT

**The evolution of modern industrialism and its capital requirements.**—Before the dawn of “machine age”, manufacturing operations in every part of the civilized world were conducted on a small scale, sometimes by individuals and sometimes by groups of artisans. The financial requirements of industries under these conditions were naturally small, being confined to workmen’s maintenance charges, raw materials and simple and inexpensive tools and appliances. As may be seen in the case of handicraft industries in every part of the world up to the present day, these meagre capital requirements of artisans were sometimes met by their own resources, and sometimes the necessary capital was furnished by middlemen, who were also responsible for the marketing of finished products.

With the introduction of the factory system of manufacture, large capital outlay on wages, power plant, machinery, buildings and raw materials became necessary; as under these new conditions it was no longer possible for workmen to participate in the organization of these industrial undertakings and, moreover, as they could no longer compete with these new forces of production, their fall into a state of complete economic dependence and the eternal divorce of capital from labour became inevitable. So the two great superficially-antagonistic forces associated with the name of modern industrialism were born.

As the technique of power production gradually developed, and all kinds of manufacturing

machines capable of increasingly large output became available, the advantages of large-scale production were realized, and the extent of this realization was slowly reflected in the size of factories; and larger factories naturally necessitated correspondingly large capital outlay. The next stage in the process of modern industrial evolution was reached when the interdependence of industries was realized; and larger factories exhibiting perplexing diversities of manufacturing activities and, in certain cases, powerful trusts were the natural outcome of this knowledge: for it gradually dawned upon the world of industry that the concentration of manufacturing processes and the unification of financial interests and technical control were necessary in the interests of economy and efficiency. And so small factories gradually developed into modern giant manufacturing enterprises; while in the case of certain industries these giants of production developed into what may normally be described as groups of interdependent factories under the control and direction of one organization.

**The necessity of investing large amounts of capital in modern industrial enterprises.**—The results of these modern developments in the conduct of industry have been far-reaching: large-scale production—amounting in certain cases to mass production—is now the general rule all over the world, and this policy has necessitated the concentration of enormous amounts of capital in industrial undertakings. As we have just remarked, modern industrial establishments, by virtue of their size and of the diversity of manufacturing activities, can reduce the cost of production to a level unattainable except by the adoption of identical measures. In these cir-

cumstances no industrial concern can hope to survive in the face of competition with these large manufacturing establishments while clinging to the old wasteful methods of production. Thus the necessity of investing large amounts of capital in modern industrial enterprises becomes apparent.

**Indigenous and foreign capital in Indian industries.**—As will be shown in connection with the basic and non-basic industries in the following parts of this work, the development of the so-called organized industries in India has taken place more or less in accordance with the above-mentioned principles. There are cotton mills, woollen mills, jute mills, paper mills, sugar factories, tanneries,<sup>1</sup> iron and steel works, engineering workshops, cement factories, in short the representatives of almost every kind of industry, whose size and capacity, if these be the sole tests of efficiency, comply to a certain extent with the requirements of modern industrial practice.<sup>2</sup> But as may naturally be inferred from the famous stories about India's poverty and industrial backwardness, the country possesses but a few large industrial establishments, and even these few are by no means entirely indigenous enterprises. The detailed study of the financial resources and organization of various

<sup>1</sup> By tanneries in this case we mean those establishments in which modern methods and technique are practised, and which produce leather of the quality demanded by modern standards.

<sup>2</sup> As in the case of Europe and America, there are many industrial establishments in India which were originally started on a small scale, and which had subsequently to undertake vast extensions in order to preserve their existence. The case of the notorious iron and steel works at Jamshedpur may be cited to prove the futility of starting operations on a scale far below the safety margin, or of setting up works of a smaller productive capacity than that of the rival concerns in foreign countries. For full details of the case see Vol. II, Chap. II.

industries will be taken up in other parts of this work when we examine their present position and future prospects: for our present purpose we cannot but anticipate the results of these enquiries and say that the greatest achievements of indigenous capital in the field of industry are reflected in the cotton mills, steel works and water power installations with a few minor enterprises in addition, such as tanneries, sugar factories, paper mills, cement works and a few unimportant engineering and mining enterprises. Foreign capital, on the other hand, has found its field in the jute mills of Bengal, the woollen mills and tanneries of Cawnpore, the largest engineering works in the various manufacturing centres, and, what is of the greatest importance, the best and the most prosperous mining enterprises of all kinds in every part of the country.

**Amount of indigenous and foreign capital invested in industrial enterprises in India.**—It is almost impossible to form an accurate estimate regarding the amount of indigenous and foreign capital invested in the manufacturing industries in India. We know more or less accurately the amount of indigenous capital invested in joint-stock industrial undertakings in the country, but it is a well-known fact that many small and some of the large industrial establishments are private concerns, and as no official estimate regarding investments in these enterprises is available, the total amount of capital invested in organized industries in the country must remain an unknown quantity. Moreover, complications of considerable magnitude are brought about by the fact that in the Annual Reports on the Working of Joint-stock Companies in India no attempt is made to separate the statistics relating to the

trading and semi-manufacturing concerns from those relating to the purely industrial undertakings. In order, therefore, to calculate even roughly the amount of capital invested in the manufacturing industries in India, it would be necessary to sift and examine the official data as thoroughly as possible.

The results of these gleanings and siftings are given in Table A, which shows that in 1924-25 there were about 1,600 joint-stock industrial concerns registered in India with a total paid-up capital of Rs. 1,46,69,72,000. Apart from these there were 153 joint-stock companies with paid-up and debenture capital of £181,937,130 and £87,428,112 respectively, which were described by the Department of Commercial Intelligence as "incorporated elsewhere than in India but working in India," and which were supposed to be engaged more or less in purely industrial pursuits. But it must not be understood from these figures that such enormous amounts of capital as shown in connection with the "rupee companies" have been mobilized purely from indigenous sources, or that the capital shown against "sterling companies" has been actually invested in India. A very considerable proportion of the companies of the former group are either entirely foreign-owned concerns or are dominated by foreign capital—notwithstanding the fact that they are registered in India with rupee capital. The case of coal, manganese, lead, petroleum, tin and chromite mining, jute and woollen textiles, leather tanning, engineering, shipbuilding and some other industries of minor importance may be cited in support of this contention. In the light of the fact that some of the most prominent industries are almost entirely controlled by non-Indians, it would

be scarcely an exaggeration to suggest that at least one-third of the capital invested in the locally-registered joint-stock industrial enterprise in India belongs to non-Indians. In the second place the ambiguities arising out of the mixing up of industrial with purely trading concerns must not be lost sight of in determining the total amount of capital invested in industrial enterprises. A considerable proportion of the capital shown against various classes of companies has not been invested in manufacturing industries, but has to be set off in connection with purely trading operations undertaken, sometimes on an extensive scale, by small manufacturers. When due allowance is given to these facts, it becomes abundantly clear that, taken as a whole, not more than half the capital shown against rupee companies and actually invested in industrial enterprises belongs to the people of India: and that is probably the farthest limit to which we can go in forming an estimate of the activities of indigenous capital in the domain of industry.

The case of foreign or sterling companies is even more complicated. The figures given in connection with these concerns in Table A do not by any means indicate the amount of capital actually invested in various industries in India; many large and important industrial concerns shown in the table are in reality mere branches of larger companies working in foreign countries, and in most of these cases the figures relating to their capital investments belong to the parent concerns. Moreover, as in the case of rupee companies, their inclusion into the list of manufacturing concerns by the Department of Statistics or even their titles do not indicate correctly the real nature of their business; in

TABLE A. NUMBER AND CAPITAL OF MINING AND MANUFACTURING JOINT-STOCK COMPANIES IN INDIA IN 1924-25

CLASS OF COMPANIES	COMPANIES REGISTERED IN INDIA		FOREIGN COMPANIES WORKING IN INDIA		
	Number	Paid-up Capital	Number	Paid-up Capital	Debentures
<b>A. Manufacturing</b>		Rs.		£	£
Chemicals, etc. ...	91	2,10,41,700	18	22,461,080	10,000
Iron, Steel and Ship-building ...	40	5,15,18,148	16	88,872,811	5,472,238
Engineering ...	98	3,83,91,780	42	87,311,777	77,476,854
Leather Tanning, etc. ...	88	68,08,442	1	.....	.....
Canvas and Rubber ...	4	45,77,260	3	1,986,251	.....
Glass, Water, Electric Lights and Power, etc. ...	68	11,92,08,072	8	6,684,088	2,091,925
Cement, Lime, etc. ...	104	5,35,25,459	8	12,500	.....
Glass ...	14	17,39,585	8	50,288	.....
Soap, Candles, etc. ...	20	1,46,51,491	2	40,000	.....
Brass and Copper ware ...	11	11,08,438	.....	.....	.....
Aluminium ware ...	8	19,44,540	2	.....	.....
Matches ...	28	18,14,010	.....	.....	.....
<b>TOTAL ...</b>	<b>502</b>	<b>80,91,18,815</b>	<b>92</b>	<b>155,418,728</b>	<b>86,061,012</b>
<b>B. Mills and Presses</b>					
Cotton Mills ...	299	41,47,49,916	10	984,850	99,000
Cotton Ginning, etc. ...	115	2,41,72,213	2	150,000	86,000
Jute Mills ...	54	17,07,35,617	7	4,807,110	181,837
Jute Presses, etc. ...	96	1,65,02,572	.....	.....	.....
Mills for Wool, Silk, etc. ...	27	8,56,31,184	.....	.....	.....
Paper Mills ...	10	95,55,704	2	.....	.....
Rice Mills ...	70	2,29,04,708	.....	259,270	107,900
Flour Mills ...	88	1,32,12,206	.....	.....	.....
Saw and Timber Mills ...	20	92,18,572	1	10,000	.....
Oil Mills ...	57	2,16,81,858	2	.....	.....
Other Mills and Presses ...	28	42,11,108	2	.....	.....
<b>TOTAL ...</b>	<b>789</b>	<b>74,22,05,618</b>	<b>26</b>	<b>6,100,780</b>	<b>424,287</b>
<b>C. Mining and Quarrying</b>					
Coal ...	252	11,77,46,496	6	322,992	.....
Gold ...	4	8,20,570	8	1,951,618	.....
Iron Ore ...	8	10,72,98,780	1	50,000	.....
Petroleum ...	16	8,58,14,270	6	18,006,211	1,950,968
Manganese and Mica ...	16	28,07,434	1	450,000	.....
Others ...	67	15,18,70,572	11	1,877,891	2,000
<b>TOTAL ...</b>	<b>368</b>	<b>41,56,48,072</b>	<b>36</b>	<b>20,857,877</b>	<b>1,962,968</b>
<b>GRAND TOTAL ...</b>	<b>1,599</b>	<b>146,69,72,000</b>	<b>158</b>	<b>181,967,180</b>	<b>87,428,112</b>

fact, there is reason to believe that many of them, closely related as they are to foreign manufacturing concerns, are also engaged in trading operations on a large scale. In these circumstances it may be taken as a fairly accurate surmise that not more than 10 per cent. of the total amount of capital shown against sterling companies has been actually invested in manufacturing operations in India.<sup>1</sup>

From this brief survey of the prevailing state of affairs it is obviously difficult to present an accurate estimate with regard to the amount of foreign and indigenous capital invested in purely industrial enterprises in India. If, however, we accept the above bases of calculation—which in the present state of industrial development are very liberal indeed—we inevitably come to the

<sup>1</sup> A glance at Table A will show that some of these concerns are credited with paid-up and debenture capital of several million pounds sterling, while we know that none of these companies credited with these colossal amounts possesses manufactories of any consequence. The case of engineering companies is strikingly illustrative of the utter unreliability of official figures. In 1924-25 there were 42 foreign joint-stock companies in India which were supposed to be engaged in the various engineering industries, and whose paid-up capital and debentures amounted to nearly 166 million sterling. Although each of these engineering concerns had on an average nearly 4 million pounds at its disposal, not one of them was engaged in the manufacture of machinery on a large scale. Again, the paid-up capital of the 13 concerns engaged in the chemical and allied industries is shown as nearly 22½ million pounds, and although the average is again fairly high, the industry which they represent has not yet been properly introduced. Yet another important example is provided by iron, steel and shipbuilding group of industries, in which more than £42,000,000 is divided among only 16 concerns. Some idea of the magnitude of their manufacturing operations in India may be had from the fact that none of these so-called ship-builders has so far succeeded in launching anything more substantial than ordinary river-crafts fitted with imported machinery, and surely their achievements in the field of metallurgy, insignificant as they notoriously are, would not account for a large capital expenditure. Many more examples can be given to prove that only a small fraction of the capital shown against various classes of sterling companies engaged in manufacturing operations has been actually invested in India.



conclusion that, after making due allowance for the inflation of share capital due to periodical bonuses in the form of new shares (as in the case of petroleum companies), only about £27,000,000 have been directly invested by sterling companies in India in industrial enterprises, while the share of foreign capital in rupee companies on our 33 per cent. basis cannot be more than Rs. 50,00,00,000, thus bringing the total to nearly 900 million rupees. Indigenous capital having been assumed as being responsible for as much as 50 per cent. of the total paid-up capital of rupee companies, it must be taken as fairly certain that not more than about 750 million rupees have been contributed by Indians themselves towards joint-stock industrial enterprises in the country. In order to calculate, however roughly, the total amount of indigenous capital invested in manufacturing industries, we must also take into account the capital expenditure on privately-owned industrial establishments, but with regard to which neither any reliable data are available, nor have we any satisfactory basis to work upon. But as we know for certain that many large and small industrial establishments of this class are scattered all over the country, it would be scarcely an exaggeration to suggest that at least 100 million rupees have been invested by Indians of varying degrees of opulence in setting up and maintaining these concerns. If we accept these purely conjectural estimates, we must come to the conclusion that in all about 1,800 million rupees have been invested in purely manufacturing industries in India, and that although sometimes Indian and sometimes foreign capital dominates whole groups of industries in the country, their strength, in so far as actual investment is concerned, is about equal. But

the ultimate balance of power is on the side of foreign capital; for while the capital resources of purely Indian concerns are of necessity restricted by their own limited credit and by the comparative shallowness of the Indian money market, those of the joint-stock companies registered abroad but working in India are relatively extensive, as in times of need and emergency these concerns can invariably rely upon assistance from the money markets of their own prosperous countries, or, in the case of branch establishments, call for assistance from parent concerns in the country of origin. Thus the actual financial strength of foreign industrial concerns is much greater than that indicated by the amount of capital actually invested in India, and the consideration of this factor definitely puts the local resources in the background, and establishes the supremacy of foreign capital in the field of organized industry.

**Amount of foreign capital invested in India.**—This ascendancy of foreign capital to dominion over indigenous resources is not peculiar to organized manufacturing industries alone: it is even more pronounced in other fields of India's economic activities. The activities of capital, both foreign and indigenous, in commerce, banking and other non-manufacturing spheres do not directly concern us here, but as their consideration is of vital importance in gauging accurately the extent to which indigenous capital can be relied upon for the development of industries, it is necessary that we should acquaint ourselves with some of the more important aspects of the employment of foreign capital and with the part played by it in the economic development of the country. It is, however, extremely

difficult to form an accurate estimate with regard to the total amount of foreign capital invested in India directly by foreigners themselves through Government loans and through the agency of Indian industrial, financial and commercial houses. It cannot be disputed that the capital borrowed by the Indian Government and that invested in public utility undertakings (like railways and irrigation projects) has been imported exclusively from Great Britain, and that the sterling capital invested by industrial, commercial and other joint-stock and private concerns in India is also preponderatingly British; but even in regard to British investments in India no trustworthy estimates are available, and this deficiency is at the root of all difficulties in the way of conducting an investigation into the wider field of cosmopolitan investments in the country. However, according to the estimates given by the Associated Chambers of Commerce in their evidence before the Simon Commission, the amount of British capital invested in India stands in the neighbourhood of 1,000 million sterling. Probably in their anxiety to protect their interests the Associated Chambers have exaggerated things, but there can be no doubt whatever that British investments in India amount to nearly 800 million sterling at the present time. Of this total, nearly £400,000,000 are accounted for by Government and other public loans and guaranteed railway debt, and nearly £60,000,000 by investments in industrial and mining enterprises. We have a balance of nearly £340,000,000, and this is accounted for by investments in plantations, and in banking, insurance, trading and shipping enterprises. To this we must add the capital investments of other nations, which, however, are small, and are not expected to be more than

100 million sterling. And so it would appear that foreign investments of capital in India do not amount to more than 900 million sterling.

For the sake of comparative study the figures relating to the amount of foreign capital invested in various kinds of joint-stock enterprises in India need elucidation. As shown in Table B, there were altogether 789 joint-stock companies which were incorporated in foreign countries, but which were working in India during 1924-25, and their total paid-up capital amounted to £617,497,581, not including £155,288,157 in debenture stock. Thus we find that these companies alone are supposed to have involved a capital investment of more than 772 million sterling, which is far in excess of the estimates we have just offered. This discrepancy is fully explained by the fact that, as in the case of some of the joint-stock concerns engaged in purely manufacturing operations, only a small proportion of the capital of the joint-stock companies of banking, insurance and trading and manufacturing groups has been actually invested in India. A great majority of them are merely branch establishments of some of the most powerful concerns in the world, with representative establishments in almost every corner of the globe, so that the amount of capital involved in their operations in India is in some cases only a fraction of the capital shown against them in the accompanying table. On the other hand, as we have already seen in the case of mills and presses, a certain amount of foreign (mostly British) capital is invested in various classes of foreign-controlled joint-stock companies which are registered in India with rupee capital, but in relation to which no trustworthy data are available.

TABLE B. THE NUMBER, DESCRIPTION AND CAPITAL OF FOREIGN JOINT-STOCK COMPANIES WORKING IN INDIA, DURING THE YEAR 1925<sup>1</sup>

Companies (Main Commitment)	Number	Paid-up	Debitures
		Capital	
		£	£
Banking and Loan .. .. .	22	162,264,626	27,723,229
Insurance .. .. .	125	64,886,771	6,456,207
Transport and Transport .. .. .	34	74,865,824	21,664,563
Trading and Manufacturing .. .. .	262	274,264,534	24,647,084
Mine and Prospecting .. .. .	26	6,176,729	424,277
Tea and Plantations .. .. .	219	26,787,877	2,582,907
Mining and Quarrying .. .. .	35	26,271,877	1,662,963
Others .. .. .	15	3,177,063	679,266
Total .. .. .	580	612,879,861	102,812,127

India capital in joint-stock enterprises.—The difficulties in the way of estimating the amount of indigenous capital employed in large trading and other enterprises in India are even more formidable. It would require an accurate knowledge with regard to the amount of productive capital in the country, which, seeing that a greater part of the business in India is done by private individuals, or groups and families,<sup>2</sup> cannot be reckoned with any degree of accuracy. These difficulties are by no means diminished by taking into account the joint-stock enterprises alone owing to the entanglements of foreign

<sup>1</sup> Compiled from "Joint-stock Companies in British India and in the Indian States of Mysore, Baroda, Guzerat, Hyderabad, Indore and Yashwanter, 1924-25".

<sup>2</sup> The difficulty of the situation may be gauged from the fact that a very large proportion—possibly more than half—of the external trade of India is financed by private banking houses, which are run exclusively by families and groups. If these "business" could be induced to register their concerns as joint-stock companies, the figures for the capital investment in the enterprises covered by the heading "banking and loan" would certainly swell to a remarkable degree, and so correspondingly affect the base of comparison with foreign capital investments. Similarly many trading, mining, plantation and other types of concerns are owned by individuals, and any change in their character involving the habitues of participation in them or their ownership would certainly have a far-reaching influence on the visible total capital investment in the country.

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capital even in this field. As, however, the ultimate object of these enquiries is to estimate the potentialities of indigenous capital for the development of industries, we may form a rough idea of the tendencies of Indian capital by analysing the data relating to the joint-stock companies registered in India, and by comparing the results with the conclusions arrived at in connection with foreign capital investments in the country.

Let us start our enquiries by assuming that the capital invested in all sorts of joint-stock companies registered in India is purely Indian. Even on this extravagant assumption we find that, as shown in Table C, only about 2,755 million rupees have been invested in various kinds of joint-stock enterprises.<sup>1</sup> Now, for a comparative study, if we express the capital which is supposed to have been brought over by sterling companies in terms of rupees, we come to the conclusion that no less an amount than

TABLE C. THE NUMBER, DESCRIPTION AND CAPITAL OF JOINT-STOCK COMPANIES REGISTERED AND WORKING IN INDIA, DURING THE YEAR 1924-25<sup>2</sup>

Companies (Main Classification)	Number	Paid-up Capital Rs.
Banking, Loan and Insurance ..	1,002	20,48,93,364
Transit and Transport ..	217	22,36,43,610
Trading and Manufacturing ..	2,072	87,59,52,865
Mills and Presses ..	739	74,22,05,613
Tea and other Planting ..	500	10,81,95,301
Mining and Quarrying ..	358	41,56,48,072
Others ..	316	18,47,45,755
<b>TOTAL ..</b>	<b>5,204</b>	<b>2,75,52,84,580</b>

<sup>1</sup> In addition to this, certain companies have issued debentures, with regard to which no official figures are available. At any rate we may conveniently ignore this stock, as the capital involved is too small to influence our conclusions one way or the other.

<sup>2</sup> Compiled from "Joint-stock Companies in British India and in the Indian States of Mysore, Baroda, Gwalior, Hyderabad, Indore and Travancore, 1924-25".

nearly 6,500 million rupees of foreign capital has been invested in banking, trading, manufacturing and planting concerns in India. And the comparison of these stupendous figures with the 2,755 million rupees invested in those seemingly indigenous joint-stock concerns gives us an idea of the overwhelming supremacy of foreign capital in this wider field of capital investment in India. The position of Indian capital investments is further weakened by the fact that, as in the case of industrial concerns, the capital of joint-stock companies registered in India with rupee capital cannot be described as purely indigenous: a certain proportion, possibly more than 15 per cent. is foreign, so that its elimination from the above estimate would considerably reduce the size of Indian capital investments and correspondingly weaken its position in comparison with foreign capital investments in the country.

**Causes of the supremacy of foreign capital.—**From the Indian capitalistic point of view the history of foreign capital investments in India is extremely depressing. Indians had never understood the science of coal and ore mining, while foreigners had, and appreciating the potentialities of India's mineral deposits had invested more than £22,000,000 for their exploitation. In this field the Indians lagged behind because they had no knowledge of the technique of the mining industry, and because they utterly lacked courage, foresight and spirit of enquiry and enterprise. The same state of affairs is disclosed by tea, coffee, rubber and other planting enterprises in which more than £28,000,000 have been invested by foreign companies. Here again comparatively small amounts of capital are required

for individual enterprises, but as the extent of the industry and the quality of the products did not respond to the changing requirements of the world, the ignorance and apathy displayed thereby by Indians themselves naturally encouraged the growth of foreign capital investments in this field. An even greater degree of blindness was exhibited by Indians in not appreciating the potentialities of manufacturing industries like wool, jute, leather, engineering and others. Furthermore, an extensive field for the employment of foreign capital was opened up by the gradual development of the country's foreign and coastal trade. Harbours and dock-yards had to be built and extended with all modern facilities for the loading, unloading and repairs of almost all types of vessels. Ships for coastal trade had to be bought or built. And, finally, the growing export and import trade, of which the above-mentioned developments were a natural consequence, had to be financed somehow or other. All these enterprises required enormous amounts of capital, organization and up-to-date technical knowledge; but as the Indians had neither of these assets in the required proportion, foreign banking, insurance, shipping and all sorts of trading companies came into existence to exploit this lucrative field.

**Its lessons.**—From the above survey of the situation we cannot but draw the conclusion that it is chiefly owing to the non-participation of indigenous capital in these enterprises that foreign capital has come to occupy so lofty a position in India's economic life. After an examination of the facts recorded above, it appears that the apathy of Indian capital in these directions is principally due to the poverty



of the people in general and to the unenterprising nature of the Indian capitalists in particular; and these undesirable factors have been universally accepted in India and abroad as the root cause of the "tragedy" associated with the steady onward march of foreign capital in the country. Just as the inadequacy of capital, real or imaginary, and the lack of technical knowledge and business enterprise have been responsible in the past for encouraging the employment of foreign capital in the country, so in the future, it may be feared, these adverse factors will militate against the employment of indigenous capital in the development of the country's resources. In these circumstances it is necessary to inquire how far under the existing conditions can Indians themselves be relied upon for the supply of the necessary amounts of capital for economic developments on a scale consistent with the needs of their country; and with this end in view we must form a rough estimate of the total amount of capital actually available for investment purposes under the prevailing conditions and under the changed and more favourable circumstances.

**Estimate of India's financial resources : a digression.**—It is not possible to calculate with any degree of accuracy the amount of capital available for investment purposes in even a well-organized Western country, and in India the inadequacy of banking facilities and the habit of hoarding bullion and coins introduce almost insuperable difficulties. A good deal has been said and written during recent years about the former deficiency, usually with the object of proving that the lack of banking facilities in various parts of the country has directly and indirectly

resulted in retarding the productive employment of capital in India; and this verdict has been endorsed not only by almost every Indian and foreign writer on the subject, but also by the Holland Commission itself, whose findings and recommendations in this matter are based more or less on this idea. But as no estimate of a country's capital resources can be formed without an adequate knowledge of its banking organization, a digression from the main topic appears to be inevitable and necessary. When, however, we emerge from this digression, not only every detail of the financial organization of the country will have been examined, but also an accurate idea of the "liquid" financial resources of the country will have been formed. As a preliminary step then, let us proceed to examine the organization of banking in India, and see how far the resources of the existing establishments fall short of the requirements of the country, and how the extension of facilities offered by these institutions is likely to influence the development of industries.

**Money-lenders and the extent of their activities.**—Money-lending and banking trades have been known and practised in India from very early times: in fact they are said to be as old as the Indian civilization itself. Some of the surviving works of ancient writers show that banking and money-lending transactions had assumed large dimensions, and their minute and strict regulation had become necessary in India about two thousand years ago.<sup>1</sup> These ancient bankers, it seems, acted in much the same way as modern banks: "they took deposits on agreed rates of

<sup>1</sup> Cf. Professor V. G. Kale's "Introduction to the Study of Indian Economics", p. 412.

interest, and lent money on the security of moveable and immoveable property, preferably the former. In addition to that they sometimes acted as dealers in precious metals and as jewellers." Almost all customs and traditions have been preserved by these bankers up to the present day, and it is to a large extent owing to the simplicity of their business methods that they have been able not only to hold their own in the Indian business world but, with changing conditions, actually to extend the sphere of their operations and to adjust their methods to the requirements of the time. According to Mr. Findlay Shirras,<sup>1</sup> even before the British era they had combined money-lending and finance with all sorts of trading operations, and at that time the entire trade of the country was financed by them. And as far as these activities go, their position—making due allowance for minor adjustments in consequence of the advent of organized banking during the past seventy years—remains practically unchanged: for they are still to a very large extent responsible for financing the rural trade of the country, while even in large trade centres they play a very important part in ordinary commercial transactions. Their *Hundis* or bills are described by Mr. Findlay Shirras as "the most perfect portion of the purely Indian system", and these bills, unrecognized though they are by some of the banks controlled by foreigners, nevertheless play a more important part in India's internal trade than probably all the bank cheques and drafts put together. Indeed, it would be scarcely an exaggeration to say that without these bills and their drawers the internal trade of the country

<sup>1</sup> See Report of his lecture delivered in Calcutta in March, 1914.

would be half-paralysed under the existing conditions. In the absence of trustworthy estimates it is only from the above facts that we can form an idea of the total amount of capital involved in these indigenous banking operations, especially by comparing the extent of their activities with those of modern organized banks in the country about which reliable and fairly up-to-date official data are available.

**Organized credit institutions.**—The organized banking system of India is represented by four different types of banks, viz. (a) the Imperial Bank of India, (b) the foreign Exchange Banks, (c) the Indian Joint-stock Banks and (d) the Co-operative Banks. As the ultimate object of the present enquiry is to form an estimate of the liquid capital resources of the country, we may conveniently add to the above list the Post Office Savings Banks. All these different types of credit institutions are organized on widely different lines; they perform, in certain respects, different functions, and enjoy different degrees of confidence among the investing public. A detailed description of the control, management and functions of these banks is clearly beyond the scope of the present enquiry, so that we propose to confine our attention rigidly and exclusively to their resources and to the problems affecting directly or indirectly the financing of industry in the country.

**I. The Imperial Bank of India**, which in certain respects performs the functions of a central bank, was established in January, 1921, by the amalgamation of the three Presidency Banks of Bengal, Bombay and Madras according to the provisions of the Imperial Bank of India Act (XLVII of

1920). These Presidency Banks were joint-stock concerns, and the scope of their activities was confined to certain well-defined limits laid down in the Presidency Banks Act. Apart from performing the duties of bankers to the Government, they financed the internal trade of the country, took deposits and lent on certain kinds of securities, and discounted, bought and sold certain kinds of negotiable trade documents. In return for various privileges in connection with the handling of Government deposits, they were required to confine their operations to India alone, and, chiefly with a view to safeguard the interests of British exchange banks, they were not allowed to transact foreign business, or even to borrow money outside India for their legitimate business. The limitations imposed upon the conduct of the Banks' business by the Presidency Banks Act were evidently far too drastic, and, as explained by the head of a Presidency Bank to the Holland Commission, "the underwriting of industrial capital and investing in, or lending on, the security of industrial shares did not come within those limits".

We need not discuss in these pages the changes in the control, policy and functions of the new Imperial Bank which are based on much the same principles as those of the old Presidency Banks. The only change in the rules which is at all worthy of mention appears to be that the Bank was allowed to open a Branch in London under well-defined regulations, and was permitted to raise funds abroad on the security of its assets. On the other hand, the Bank was required to return the compliment by adding within five years 100 new branches to the existing 69 branch establishments of the Presidency Banks in various parts of India. It was probably on account of

this development that the private deposits amounted to over 778 million rupees in 1925—a figure only once exceeded by the total of the three Presidency Banks by a short margin during the inflation period. At the present time private deposits in this Bank average about 775 million rupees.

**II. The Exchange Banks** are foreign joint-stock concerns, with branches scattered all over India and sometimes in the Far Eastern countries. They confine their attention almost exclusively to the financing of foreign trade with the funds raised through deposits in India and other countries. In 1925 there were 18 such banks carrying on business in India with a paid-up capital of over £74,000,000, and their deposits in India during that year amounted to over 705 million rupees, which was also the average for the five previous years.

**III. The Joint-stock Banks** represent purely Indian capital and management. These banks confine their attention chiefly to the financing of the internal trade of the country, although during recent years they have shown a tendency to divert a small part of their resources towards financing the export and import trades. Their activities generally go “thus far and no further”, for it is their custom to advance credit on readily realizable assets, which obviously no one but purely trading concerns are in a position to offer.

The history of these joint-stock banks is short, but eventful and instructive. The banking records of the Department of Commercial Intelligence and Statistics show that these banks had hardly any significance in the world of finance during the eighties of the last century: of those

with a capital and reserve of Rs. 5,00,000 and over there were only two in 1870 with a paid-up capital of Rs. 9,83,000, and their deposits amounted to only Rs. 13,95,000 in that year. How these banks increased in number, and the rapidity with which the deposit side of their business expanded is shown by the contents of Table D, which need no explanation. It will be seen that the progress—if we are at all entitled to call it progress—during the seven or eight years preceding 1913 smashed all previous records. The accumulation of wealth consequent upon the opening up of canal colonies in the Punjab provided the necessary impetus, and banks of all sorts with high-sounding names began to grow up, so to speak, in every other street corner in north-western India. Doctors, lawyers, shop-keepers, landed proprietors and others soon “popped up”, as if from nowhere, to undertake the duties of directors and managing directors and bank managers. These gentlemen played havoc with their banks and deposits. They were a curiously mixed lot of fools and knaves, and their misdeeds, which cannot be described in these pages and which form the subject of the blackest chapters in the history of joint-stock banking in India, read like a modern version of the story of “Forty Thieves” in the Arabian Nights. Anyhow, they had to face their day of reckoning sooner or later, and when it came in 1913-14, not a trace of their existence was left behind—except a crowd of the victims of the giant crash. The reverberations of the catastrophe were felt all over India, and altogether nearly sixty banks with a total paid-up capital of more than 14 million rupees were involved. The extent of the damage done by these failures to the country in general and to the progress

of banking in particular cannot be ascertained, but it was far greater than that indicated by the losses suffered by the depositors in these banks.

This crisis, which resulted in the weeding out of undesirable elements in Indian joint-stock banking, and incidentally in destroying some of the reliable and well-managed establishments, was of a comparatively short duration. The deposits fell from Rs. 25,65,85,000 in 1910 to Rs. 22,59,19,000 in 1913, and touched the bottom in 1914 when they stood at Rs. 17,10,58,000. That this fall was directly due to the loss of confidence in these Indian-managed institutions is clearly shown by the fact that during the very years when deposits in Indian joint-stock banks diminished by nearly 30 per cent., those in the foreign-controlled banks like the Exchange Banks and Presidency Banks increased by nearly 10 per cent.<sup>1</sup> It proves that the crisis did not bring banking in general into disfavour among the people in India; it merely brought into light the corrupt and unreliable nature of the Indian-managed concerns. With the disappearance of most of the shady characters from the scene, however, the confidence of the

TABLE D. SHOWING THE PROGRESS OF INDIAN JOINT-STOCK BANKING

Year ending 31st December	Number of Banks	Paid-up Capital	Deposits
		Rs.	Rs.
1870 ..	2	9,83,000	13,95,000
1880 ..	3	18,00,000	63,37,000
1890 ..	5	33,50,000	2,70,78,000
1900 ..	9	82,12,000	8,07,51,000
1905 ..	9	84,57,000	11,98,92,000
1910 ..	16	2,75,66,000	25,65,85,000
1915 ..	45	3,26,77,000	18,78,64,000
1920 ..	58	8,98,44,000	73,48,10,000
1925 ..	74	7,53,79,000	57,90,76,000

<sup>1</sup> Cf. Statistical Tables relating to Banks in India, 1925.



depositors in Indian banks was gradually restored, and the change of attitude brought about thereby was reflected in the rapid growth of deposits in these banks. Every year from 1916 onwards recorded a substantial increase, until in 1921 the total reached the record figure of over 800 million rupees. Thereafter the deposits gradually declined owing, it appears, to the extension of operations by the Imperial Bank through its new branches,<sup>1</sup> and to the general deflation of currency during these years. At the present time the deposits in these banks average about 550 million rupees.

**IV. The Co-operative Banks** mark a comparatively recent development in India, having been established mainly to assist the agriculturist, and ultimately to bring about his deliverance from the clutches of the money-lender. The movement was started during the early years of the present century, but does not appear to have made much headway until after 1918-19 owing chiefly to the lack of organization and public support. For the purposes of the present enquiry, the extent of the progress made in this direction may be roughly gauged by studying the official data in relation to the larger banks with a capital and reserve of Rs. 1,00,000 and over. In 1916-17, there were only 23 Co-operative Banks of this type in the country with a total paid-up capital of Rs. 31,35,000 and the deposits and loans received by them from their members amounted to only Rs. 1,74,48,000 during that year. In 1920-21 there were 41 banks

<sup>1</sup> Private deposits in the Imperial Bank of India amounted to Rs. 65,77,99,000 in 1921, Rs. 67,00,57,000 in 1922, Rs. 74,19,51,000 in 1923, Rs. 78,71,22,000 in 1924 and Rs. 77,83,33,000 in 1925. The position of deposits in the Exchange Banks remained practically unchanged during these years.

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of this type in existence, and their total paid-up capital and deposits amounted to Rs. 83,88,000 and Rs. 4,78,28,000 respectively. From that year onward the progress has been continuous and rapid, the real extent of which may be gauged from the fact that in 1925-26 there were 108 large Co-operative Banks in the country with a total paid-up capital of Rs. 2,00,97,000, and at the end of that year no less an amount than Rs. 14,34,84,000 was shown in their loan and deposit accounts. As this movement is still in its infancy, and as it is receiving an ever-increasing amount of support both from the people and the Government, a still more rapid increase in the number of Co-operative Banks and their resources may be confidently predicted.

**V. The Post Office Savings Banks** were opened in all parts of India in 1882-83. They absorbed the District Savings Bank business in 1886, and that of the Presidency Savings Banks in 1896. The deposits in these Savings Banks form a part of the unfunded debt of the Government of India. The security and convenience offered by these banks to the small investor in all parts of the country, particularly those not served by commercial banks, have helped to build up their

TABLE E. SHOWING BANK DEPOSITS IN INDIA

Year	Number of Depositors	Balance of
		Deposits (inclusive of Interest)
		Rs.
1885-86 .. .. .	155,000	2,25,46,000
1890-91 .. .. .	408,544	6,34,87,000
1900-01 .. .. .	816,651	10,04,33,000
1910-11 .. .. .	1,430,451	18,91,88,000
1915-16 .. .. .	1,660,000	15,32,13,000
1920-21 .. .. .	1,877,957	22,86,22,000
1923-24 .. .. .	2,089,314	24,78,83,000

<sup>1</sup> Compiled from the Statistical Abstracts relating to British India.

popularity, and so to bring about an enormous increase in the number of accounts and the balance of deposits during the past forty years. In estimating the amount of active capital available from this source, therefore, frequent adjustments in relation to this rapid and continuous progress will be found necessary; but even if the figures for 1923-24 are accepted as representing the future averages, we must assume that at least Rs. 25,00,00,000 of indigenous capital will be represented by the Post Office Savings Bank deposits.

**Progress of banking reviewed.**—The above survey of the financial resources of India reveals the interesting and important fact that banking, or at any rate the practice of depositing the savings in banks, has made remarkable progress during the last quarter of a century. In 1900 the total deposits in the Presidency Banks, the foreign Exchange Banks, the Indian Joint-stock Banks, and the Post Office Savings Banks amounted to only about 410 million rupees, while in 1925 the deposits in these banks and those in the Co-operative Banks—which had since come into existence—totalled nearly 2,500 million rupees, thus showing an increase of nearly 500 per cent. during the comparatively short period under consideration. This progress has been made in spite of the fact that there has not been a corresponding increase in banking facilities, and that Indians themselves have done their best, or, what is more appropriate, their worst to alienate the growing sympathies of their countrymen towards banking enterprises.

**Banking facilities and the practice of hoarding.**—The figures given in the preceding paragraph

show that there is not so much scarcity of capital in India as most of the writers on the subject would have us believe. On the other hand if the capital represented by banking deposits is deemed insufficient to undertake a programme of large-scale industrial development, are the resources of the country capable of being further developed by the extension of banking facilities—assuming that the capital thus mobilized can be utilized for industrial purposes? We have already stated that the existing banking facilities in India are altogether inadequate for the present requirements of the country; and some idea of this deficiency is conveyed by the fact that although there are 2,675 towns in India with a population of 5,000 inhabitants and over,<sup>1</sup> up till about 1925 not more than about 300 of them could boast of a modern banking establishment.<sup>2</sup> It has been suggested by almost every writer on the subject that large hoards of wealth are lying hidden behind the walls of the towns which have not yet experienced the blessings of a bank; and there is no doubt that the argument is not altogether without a shade of truth. But as far as we can see, the exponents of the theory of “idle hoards” base their arguments upon the assumption that it is necessary that banks should go to the hoarders of wealth in order to induce them to employ their wealth in productive pursuits. In making this assumption they completely ignore the obvious fact that there are already nearly 11,000 Post Office Savings Banks in the country, which, under the present-day regulations offer every facility for the profitable investment of wealth. It must be remembered that

<sup>1</sup> See Statistical Abstracts relating to British India, fifty-eighth number. These figures are based on the census of 1921.

<sup>2</sup> See Statistical Tables relating to Banking in British India, 1925.

everyone in the country now recognizes that the Post Offices are more profitable and infinitely safer places for the keeping of surplus savings than private hoards; and if in spite of this realization the wealth of India is being constantly hoarded away, it is not exactly because of the inadequacy of banking facilities. The promise of a higher rate of interest on deposits by commercial banks may induce some of the hoarders to throw their usual care and discretion to the winds, and so to open their hoards to the local banker; but, then, it will be the "get-rich-quick" type of individual who will, so to speak, adopt such wild and reckless measures, and men of this stamp usually never hoard their savings. In these circumstances it is but logical to assume that the extension of banking facilities, however desirable from the commercial point of view, will bring about but a small change in the situation, unless banking institutions in the country enjoy the confidence of the public at large, or unless the extension of banking is undertaken by concerns with established reputations. But so long as banking failures remain a frequent occurrence in India,<sup>1</sup> this confidence cannot be restored; and banking failures will not disappear so long as the Government does not give up its apathy and introduce drastic changes in the banking law in respect of the use of capital and reserves, and so put effective checks upon the activities of desperate characters with whom the country appears to be infested. So long, therefore, as these conditions are not fulfilled, it

<sup>1</sup> How the curse of failures has dogged the footsteps of banking in India may be seen by examining the figures for the year 1925, which was in every respect a normal year. During that *normal* year, altogether 17 banks went into liquidation: "the Punjab accounting for 6 banks, the United Provinces for 4, while Bengal and Bombay accounted for 3 and 2 respectively". See Statistical Tables relating to Banking in India, 1925, p. 3.

would be idle to look forward to the extension of banking facilities as the herald of India's financial salvation.

**Potentialities of "hoards".**—It is impossible to offer an estimate with regard to the amount of capital lying dormant in these world-famous hoards, which are expected to be available when the banking institutions in India are developed on sound and confidence-inspiring lines. Many conflicting statements have been made during the last quarter of a century, but as they are all based on nothing more reliable than pure conjecture—as is always the case in such matters—it is by no means necessary to bring them into the present discussion. It is hardly necessary to point out that in forming an idea of the potentialities of these hoards, the results are likely to show wide variations according to the investigator's ideas and methods of procedure. If by the hoarding of wealth is meant the storing away of coins and paper currency and thus depriving them of some of their natural functions for any length of time, we must make it clear at once that the total amount involved therein is comparatively small, and that in all appearance some of the enquirers in this field have offered grossly exaggerated estimates. This exaggeration, it must be admitted, is not wilful, and appears to be partly due to an incomplete understanding of Indian psychology and economic conditions, and partly due to the influence of such extraneous evidence as the disintegration of a mixed currency system and the gradual disappearance of gold coins from effective circulation. Every Indian and foreigner, who has walked about in India with open eyes and who has made a critical study of the psychology

of the upper, upper middle and middle classes in the country will bear testimony to the fact that among these people hoarding has already disappeared, and that the only cash to be found in their private coffers is that for current expenditure; and by no stretch of imagination can this practice be described as hoarding. Then there are the agricultural population—those who are directly associated with the plough—and small artisans belonging to various trades, who together form more than 80 per cent. of the total population of the country. The artisan class may at once be dismissed out of the present discussion; for among those engaged in cottage industries we find that their crafts are already on the verge of collapse and artisans themselves are often under a heavy burden of debt to middlemen and money-lenders, while those who are engaged in organized industries are never so highly paid as to be able to hoard away their savings. Thrift is usually unknown to these men—such is the degenerating and demoralizing influence of the factory system in India—and a study of the conditions of labour in such widely-separated industrial centres as Bombay and Cawnpore suggests that those few who can manage to save invariably avail themselves of the facilities offered by the local *Shroff* or *Mahajan* and the Post Office Savings Banks. The condition of those directly engaged in agriculture is more difficult to analyse owing to the complications brought about by various factors which react upon the economic condition of not only families and localities, but also districts and provinces. Without, however, going into all the complicated details in connection with the economic condition of the agriculturist in various parts of India, we may say that no less a proportion than about

80 per cent. of the agricultural population is either already in debt, or is in danger of falling into the hands of money-lenders and is avoiding that fate merely by the expedient of confining the expenditure to the barest necessities of life.<sup>1</sup> And this statement is amply corroborated by the evidence collected by various Commissions appointed during the last 40 years to investigate into the causes of the poverty of the masses in India. In these circumstances we have to search for all those hoards of wealth among the remaining 20 per cent. of the agricultural population. As may be expected, even among these there are different grades, and though they are all in much happier circumstances than the agriculturists of the former group, very few of them are potential hoarders of the variety of wealth under consideration. Their standard of life is correspondingly higher in most cases, and quite a large proportion of what is actually saved is spent on ornaments for decorating the ladies of the family. Again, even among these people the practice of depositing in the Post Office Savings Banks is not altogether unknown, whilst quite a large number lend their savings to their less fortunate neighbours or deposit them with their local money-lenders. It cannot, however, be denied that some of the agriculturists of this

<sup>1</sup> The "necessaries of life" is a very elastic term in India, and should not be taken too literally in the above case. It is a well-known fact that the poverty of the masses in India, and especially the indebtedness of the agriculturist, is very largely due to the expenses incurred in connection with births, marriages and deaths, when custom demands large expenditure, which is often beyond the means of those who indulge in these celebrations. Although the failure of rains, and high taxation have often been blamed for bringing about this widespread poverty, yet it is a fact that debts have more frequently originated in these celebrations; and as the mentality of the masses is tolerant of these abuses, and society condemns their non-observance, we must regard expenditure under these heads as necessary. On a slightly different footing stand the women's ornaments in certain parts of the country where religion and custom prescribe their use.



class do indulge themselves in the luxury of hoarding coins, but men of this stamp are few, so that taken all round the agriculturists as a class have not much to contribute towards swelling the resources of banks in India.

Another class of men who may be suspected of hoarding money are traders and shop-keepers. Those who claim any acquaintance with the business methods of Indians engaged in trade will agree that those who are responsible for the running of large businesses have invariably connections with either a bank or a local *shroff* and the only business people who may reasonably be expected to possess hoards of some description are petty shop-keepers and others whose daily turnover is quick but small. In these cases savings are microscopic so that hoards grow but slowly. These savings are hoarded so long as they are small: but, as far as we know, even among these people it is customary to establish business relations with *shroffs* and others when hoards become so large that it is considered wasteful or unsafe to let them lie idle in those subterranean coffers.

The situation revealed in the above paragraphs must be very discouraging to those who have depended on these mythical hoards for India's economic salvation. It is evident that in every stratum of Indian society there are to be found the producers of wealth who for one reason or another prefer to hoard their savings rather than to employ them for the further production of wealth: but, taken as a whole, such men are comparatively few, and their means are generally so small that all their hoards put together are not expected to yield more than two or three thousand million rupees. This, of course, includes the savings of women, who, as is the

case all over the world, occasionally save for years, sometimes as a protection against financial adversities, and often to satisfy their insatiable craving for dress and jewellery.

**Hoarding of precious metals : its consequences.—**

But the jeweller's bill in India is not met by women's own savings : a very large part of it is paid by men, and this brings us to the second and infinitely more important form of hoarded wealth, viz. precious metals. Some idea of the potentialities of this reservoir of idle wealth may be formed by taking into account the annual consumption of gold and silver in the country. For that purpose we must not regard the imported gold and silver merely as commodities sent by foreign countries in exchange for a part of goods exported from India : we must consider them as representing annual additions to India's investable capital. Although the imports of coin and bullion are subject to fluctuations from year to year, some idea of the tendencies of the demand may be formed from the import statistics. During 1924-25 nearly 940 million rupees worth of bullion and coins were imported into India, while in 1925-26 and 1926-27 the value of the imports was officially declared as 520 million rupees and 592 million rupees respectively. Again, if we take the import statistics for the past 50 years, the average works out at well over 200 million rupees a year. It is certainly a most fascinating occupation to speculate on the true potentialities of wealth indicated by these figures. If we take the import statistics for 1924-25 alone, we find that by investing the capital represented by imported treasure, the extent of the existing industries, or the manufacturing capacity of the country,

could have been easily increased by about 50 per cent. If, on the other hand, we take the statistics for the past fifty years, we find that the manufacturing capacity of the country could have been increased ten-fold had these imported treasures been utilized for industrial purposes. Assuming that on an average only 5 per cent. had been earned on the capital thus invested, and further assuming that this income had not been utilized for productive purposes, at least 3,000 million rupees would have been added to India's capital resources, and this would have meant an addition of nearly 130 per cent. to the original capital outlay. If, on the other hand, this income had been again employed in productive pursuits, the increase would have been correspondingly rapid and extensive. As it is, however, these enormous reserves of capital have been employed for purely decorative purposes; and as Indian goldsmiths invariably employ unalloyed gold and silver in the manufacture of ornaments, we must assume that a substantial part of this wealth has been lost through constant wear and tear. And so we find that whereas this capital would have more than trebled in the hands of a more enterprising people, Indians have not only failed to keep it intact, but by their barbaric practices have actually brought about a substantial loss upon themselves. No one can calculate the extent of the loss suffered by India through the operations of these primitive practices, but it must be considerable—possibly more than a third of the total quantity of precious metals handled by Indians (which apart from imported bullion also includes gold and silver produced in India itself during the period, and that already in possession of the people fifty years ago) must be written off as a dead loss.

**Consumption of precious metals not justified.**—It has often been suggested that the consumption of precious metals on the present-day scale in India is not too great for a nation of 320 million people, and in support of this contention the figures relating to the consumption of gold in the United States, England and other countries for industrial arts are thrown in to tell their tale. This method of determining the consuming capacity of a nation by counting noses (as if precious metals were, like wheat or rice, the necessaries of life) cannot be accepted as scientific. The exponents of this theory are invariably the people who deplore the chronic poverty of India's millions, and yet they do not hesitate to put these millions on the same footing as the citizens of the United States and other prosperous countries. They completely overlook the fact that in the case of such expensive luxuries as the precious metals even national incomes cannot be taken as the basis of comparison between the consuming capacities of any two countries: only income per head can be used as the basis of comparison, and if this basis of calculation be applied to India, it will be found that Indians as a nation have no right whatever to consume on an average nearly 20 per cent. of the world's annual output of gold.

**The craving for precious metals.**—The most unfortunate part of the problem is that the people have not so far shown a tendency to adopt a more civilized method of decorating their persons. A certain class of people are, no doubt, slowly discarding these relics of barbarism, but on the other hand there are others who in all appearance are bent upon indulging in this orgy with all the recklessness permitted by their circumstances.

Is there a man in India who has not witnessed this demoralizing spectacle during the past twenty years ? The money income of the masses is steadily improving, and the first manifestations of this improvement are to be seen in the quality of the ornaments that are supposed to adorn women. The brass and white metal ornaments of the poor have almost disappeared during the last quarter of a century, and their place has been taken by silver ornaments ; whilst among the middle and lower middle classes in all parts of the country silver has been almost completely discarded in favour of gold.

It is obvious that these enormous hoards of wealth, whose existence is based on custom and fashion, cannot be opened up for productive purpose so long as this primitive mentality is in evidence in India. Legislative and fiscal actions in relation to the consumption of precious metals being impracticable, the Indian financiers and industrialists, in order to get hold of even a part of this accumulated capital, must wait for the dawn of the day when the masses in India would realize that it is more convenient and profitable to employ their savings in productive pursuits. But that day is not expected to come within the lifetime of the present generation.

## CHAPTER V

### FINANCE AND MANAGEMENT (continued)

**Amount of capital available for industrial development.**—The analysis of the financial resources of India as given in the preceding chapter may appear to be a trifle too long, but the discussion of all the minute details may be justified on the ground that sometimes it is not possible to explain anything without explaining everything. However, it is now abundantly clear that India possesses enormous amounts of potential wealth, and that the mobilization of even half this wealth would not only lead to India's economic progress in a manner demanded by the requirements of the country and consistent with the ideal of industrial expansion, but would also transform India from a debtor into a creditor country. But in the existing state of affairs and from the commercial and industrial points of view, it is only the deposits in modern banks and in the hands of country *shroffs* and money-lenders, and to a certain extent hoarded bullion and coins that actually matter; the enormous amount of wealth represented by jewellery and ornaments must be looked upon under the present circumstances as mere valuable commodities and not as investable capital. Assuming, then, that the entire amount of capital represented by deposits in various kinds of banking establishments and all the numerous hoards of coins can by some means be called out for industrial development, even this grand mobilization of the nation's capital will not lead to the investment of more than about 5,000 million rupees.

**Bank deposits as a source of industrial capital.**—But it must be remembered that the entire commerce of the country is being carried on with the help of deposits held by various kinds of banking institutions, and as their withdrawal for industrial investments will, under the prevailing conditions, lead to the scarcity of capital in the country, it would not be possible to withdraw a large percentage of these deposits without bringing about acute difficulties in the country's money market with all its accompanying consequences to trade and commerce. It is therefore difficult to say with absolute certainty what percentage of banking deposits can be invested in industry without unduly starving the trade in the country, but all things considered it seems that 25 per cent. is about the uppermost limit which can be reached with safety in the transference of capital. Even on this liberal assumption not more than about 600 million rupees will be available from this source.

**The hoarder of coins as an investor in industrial enterprises.**—As regards the potentialities of hoards as a source of capital for industrial development, it may be said that it is wrong and unscientific to assume—as has been assumed by all authorities, including the Industrial Commission—that the extension of banking facilities would render this capital available for industrial purposes. It cannot be denied that developments in this direction would increase the volume of capital for purely commercial transactions: but so far as the industries are concerned, their development and therefore the investment of fresh capital in them may be regarded as completely independent of the extension of banking facilities through ordinary commercial banks;

for these facilities cannot be regarded as influencing the attitude of the prospective investor one way or the other.<sup>1</sup> On the contrary, the much lamented absence of banking facilities may, in a sense, be regarded as a boon to new industrial flotations, for a potential investor with ready cash in his immediate possession may logically be expected to be more anxious to invest his capital than one with the same degree of enthusiasm but whose capital is already bringing him a steady income through the bank. The hoarder who is too timid to entrust his capital even to the care of a bank cannot be looked upon as a prospective investor in industries, so that the only possible advantage which can accrue through the extension of banking facilities to remote corners of the country will be an increase in the volume of capital for commercial purposes which may indirectly counteract the scarcity of capital for commercial purposes caused through the withdrawal of banking deposits for industrial development. Again, no one can say with certainty what amount of capital will the banks be able to dig out of these hoards by extending the field of their operations ; but unless it can be proved that the Indian hoarder is a more daring and adventurous specimen of humanity than he is generally supposed to be, we must assume that his response to the extension of banking facilities is not likely to be so generous as most of the authorities appear to believe. Regardless of all extensions, on the other hand, the

<sup>1</sup> Apart from this fact the requirements of agriculture cannot be ignored. It is evident that with the extension of banking facilities a certain amount of capital will come from those who are directly or indirectly associated with agriculture. And it is imperative that at least this capital should be employed in agricultural development, especially as the requirements of agriculture are more urgent than those of the manufacturing industries.



position may remain stationary, or may even undergo deterioration if banking failures continue to be an every-day occurrence in India.

**Scarcity of capital : its causes.**—In the above circumstances, 600 million rupees is about all that under the prevailing circumstances can be looked upon as the amount of capital available for industrial purposes. At this stage the question naturally arises : is this capital sufficient for the industrial development of the country at a normal rate ? In all appearance it is an imposing amount ; yet it is universally complained that there is a scarcity of capital in India. This scarcity is generally attributed to the unwillingness of Indians to participate in industrial enterprises. As this complaint has been whole-heartedly endorsed by no less an authority than the Holland Commission, it is necessary to see how far this endorsement is justified. We must make it clear at the outset that considerable difficulty has always been experienced by industrialists in raising the necessary amounts of capital for financing new ventures, or for extending the operations of old concerns, and the only time when no such difficulties were experienced was immediately after the war, when plenty of accumulated capital in the country—mostly swelled by war-time profits—was available for all sorts of ventures without any scrutiny as to their prospects. Now we know that the degree of response by the investor to appeals for new capital issues is determined to a very large extent by the confidence inspired by the schemes themselves and by the credit and ability of their promoters. Furthermore, the investing public all over the world is in the habit of examining the records of various industries and trades, and

on the results of these, which every potential investor takes good care to remember, the fate of new issues generally depends. Before, therefore, we condemn the attitude of the Indian capitalist towards industries, we must try to see how the records of previous ventures stand, and what inducement they really offer to the investor to take part in new enterprises.

For this purpose it is necessary that we should at once survey the whole field of joint-stock enterprise in India; for, unlike what we find in various highly-advanced countries, the attitude of the Indian investor towards new issues does not remain uninfluenced by events in other and completely unconnected fields: the echo of oil mill disasters may be heard in new mining issues, and that of import agencies in paper mill flotations regardless of the condition of the mining and paper mill industries or the prospects of new ventures. The Indian investors—who are either traders or professional men or Government and other officials—have yet to learn the significance of the issues involved in the movements of stocks both old and new. It is chiefly on account of this fact that in most cases promoters have to wait for favourable opportunities for the launching of important enterprises in India. However, to return to the original topic, if we go through the history of joint-stock enterprise in India, we find that during the decade ending 1924-25 not less than 2,484 joint-stock companies involving more than 443 million rupees in paid-up capital ceased to work. Of these, 294 were companies concerned with mills and presses, and 159 mining and quarrying companies, and these accounted for nearly 107 million rupees and 40 million rupees respectively. When to these are added various kinds of joint-stock industrial

concerns, which are "dumped" under the heading "Trading and Manufacturing" in the official report, and therefore with regard to which no trustworthy data are available, the inevitable conclusion appears to be that more than 33 per cent. of the losses suffered by the nation through these company failures are accounted for by the concerns directly connected with industries of one kind or another. And in a country like India, where joint-stock enterprise is still in its infancy, the failures of this magnitude cannot but be detrimental to future developments.

**Corruption and mismanagement.**—Closely connected with these failures, which destroy the confidence of the investor and so cause the scarcity of capital, there is another factor which tends to bring about the same result, and it is the lack of business genius and of competence and business morality in the country. Thousands of concerns which have perished may reasonably be supposed to have incurred that fate rather by reason of bad management, corruption and other unbusinesslike practices, and as such cannot be claimed as martyrs to the cause of pioneerism. Even to-day the very concerns on which the fame, or rather the notoriety, of India's organized industries rests, are by comparison moribund institutions: in some cases capital earns just ordinary interest available in joint-stock banks, in others the dividends are even lower and uncertain, while in others either dividends are unknown or the shows are actually being run at a loss. There are indeed very few cases in which the share-holders are given more than 6 per cent. on the invested capital. Taken all round it seems that company promotion and management in India has fallen to the lot of a

set of men many of whom may justifiably be described as crooks of the lowest order of intelligence, whose only qualifications are a sharp wit and the accident of birth in well-connected families.

**The liberality of Indian investors.**—And yet the Indian investor is accused of being unimaginative and unenterprising, and of holding the strings of his purse too tightly! It is a wonder that he has not altogether ceased to look upon that rubbish of charming prospectuses of new flotations: for the official records show that, in spite of this terribly black record, the registration of new companies and their total capital has enormously increased during the last quarter of a century. In 1900-01, there were only 1,366 joint-stock companies at work in India with a total paid-up capital of Rs. 36,27,56,630; in 1913-14 the number of companies and their total paid-up capital stood at 2,744 and Rs. 76,56,18,274 respectively; while in 1924-25 there were 5,204 companies and their paid-up capital amounted to Rs. 2,75,52,84,580. As we have already seen, quite an important percentage of the capital of these companies is foreign; but if we assume the ratio to be constant, the fact remains that both the number of joint-stock companies and their paid-up capital showed an increase of more than 100 per cent. during the 13 years preceding 1913-14, and during the following 11 years while the number of companies just doubled once again, their paid-up capital showed an increase of more than 250 per cent. during the same period. And so it would appear that while an increase of nearly 300 per cent. was recorded in the number of companies, their total paid-up capital had increased by nearly

700 per cent. during the first quarter of the present century. This marvellous progress, it must be remembered, has been made in spite of the fact that the existing companies have, on the whole, showed most disappointing results.

**Need for a thorough overhaul.**—The evidence recorded in the above paragraphs is conclusive, and proves beyond a shadow of doubt that the Indian capitalist is after all not so unenterprising as he is generally supposed to be, and that if capital is not forthcoming in desired quantities for financing the new as well as old industrial enterprises, the industrialists have to thank themselves alone for this misfortune. This undesirable state of affairs has been brought about by those who are, to say the least, incompetent in every conceivable way to be entrusted with the affairs of industry; and it is for the misdeeds of these men that others who, given opportunities, would entirely justify the confidence reposed in them, have to suffer. The first need of industry in India, therefore, is the weeding out of undesirable elements, and the introduction of men of the first calibre, who are now monopolized largely by services and to a certain extent by professions all over the country, to industrial careers. Nothing short of these radical changes can be expected to meet the requirements of the situation in a satisfactory manner.

**Investment of foreign capital: Fiscal Commission's verdict.**—Those who are acquainted with Indian temperament will agree that the fulfilment of these rather awkward conditions is not possible unless industry is in a position to guarantee careers; on the other hand there is obviously a danger that before industries in India

can lift themselves up to such a lofty position as to command the respect of Indians and foreigners alike, foreign capital, highly organized and ambitious as it is, may steal a march upon its mismanaged Indian rival, and pitch itself into the very field which the Indian capital is accustomed to regard as unassailable. The history of the jute, woollen, leather tanning, engineering and other industries suggests that the danger is real, and is likely to assume more serious proportions when the foreign manufacturers discover that it is no longer possible for them to compete in the Indian market from across the seas, or when the loss of the Indian market becomes imminent by the establishment of rival industries by Indians themselves in the country, or when India resorts to the imposition of protective duties to encourage the growth of new or to safeguard the interests of the existing industries. The question here arises: Is it desirable that foreign capital should be given a free hand to exploit the situation created by the disorganization of the country's own resources, or by the imposition of protective duties, or by the favourable cost of production mainly owing to lower overhead and labour charges? The Indian Fiscal Commission answered this question in the affirmative on the grounds that "apart from the intrinsic benefits of increased supplies of capital, the foreigner who brings his capital to India supplies India with many things of which at her present stage she stands greatly in need. It is, on the whole, the foreign capitalist who imports into the country the technical knowledge and the organization which are needed to give an impetus to industrial development. It is to him that we must look largely at first for the introduction of new industries and for instruc-

tion in the economies of mass production. By admitting foreign capital freely India admits the most up-to-date methods and the newest ideas, and she benefits by adopting those methods and assimilating those ideas. If she tried to exclude them, the policy of industrialization which we contemplate could with difficulty be brought to a really successful pitch. We hold, therefore, that from the economic point of view all the advantages which we anticipate from a policy of increased industrialization would be accentuated by the free utilization of foreign capital and foreign resources."<sup>1</sup>

**Fiscal Commission's recommendations examined.**—As the policy enunciated by the Fiscal Commission is now supposed to be the recognized policy of the Indian Government, and as its adoption is bound to have a far-reaching influence not only on India's industrial development but also on the entire field of her national economy, it is necessary to examine in detail the principles underlying this recommendation. First of all let us make it clear that foreign capital can be employed in India in two entirely different forms: it may be borrowed by Indians for the development of their country's resources, or it may be employed by foreigners themselves for these purposes. It is scarcely necessary to point out that in the former case the foreign capitalist gets bare interest on his capital and the bulk of the profits remains in the country, while in the latter case the entire amount of profits is taken away by foreign capitalists. From the economic point of view it is obviously desirable that foreign capital should be employed directly by Indians

<sup>1</sup> See Report, par. 289.

themselves. Whether under the prevailing circumstances it is absolutely necessary for India to import foreign capital for the development of industries by Indians themselves is a matter which the Fiscal Commission did not consider it worth their while to examine, apparently because they were convinced of the absolute necessity of letting the manufacturing industries of the country pass into the hands of foreign capitalists, so that from their experience the Indians may learn the modern arts of manufacture. Let us then see how far the employment of this dangerous method of instructing the nation is necessary, what its consequences are likely to be, and how far it is possible to achieve the desired object by these means.

The Fiscal Commission, as we have seen, believes that "it is on the whole the foreign capitalist who imports into the country the technical knowledge and the organization which are needed to give an impetus to industrial development". In other words, unless the foreign capitalist can be induced to impose upon himself the duty of *directly* extending his activities to India, the development of industries in the country, owing to the undisputed absence of "technical knowledge and organization", will either never take place in India, or the process of industrial development will be slow almost beyond endurance. It is difficult to guess what industries the Commissioners had in mind in pronouncing the above verdict. Anyone who can claim a little acquaintance with modern industrial technique and practice knows that with the possible exception of certain metallurgical (chiefly aluminium reduction) and fine chemical industries, which are controlled by giant trusts in almost every country, there is not one single



industry, or branch of industry, which can claim the monopoly—through patent rights or otherwise—of any kind of technical process. In the modern world of industry, technical knowledge has become an international property in the sense that the services of expert technologists are available to the highest bidder. If this were not the case, no nation in the world would have been able to claim equality with others in respect of technical achievements in the various fields of industry, nor could a nation introduce new industries or learn new processes of manufacture. The introduction of new and entirely unknown industries based on highly technical processes has been witnessed in India itself without the least intervention of foreign capital, and this circumstance in itself proves that the mischievous arguments put forward by the Fiscal Commission are either based on their ignorance, or constitute a deliberate attempt to misdirect public opinion and governmental action. Even if we assume that in certain industries technical knowledge is the sole monopoly of certain groups, is it not possible for Indian manufacturers to conclude working agreements with them without surrendering all interests in the industry? The offer of a certain percentage of shares (of course in return for cash), which need not be more than 40 per cent. in any circumstances, has often “done the trick” in other parts of the world, and there is no tangible reason why it should fail to work in India. The foreign manufacturers, needless to add, not only supply a part of the necessary capital in such cases, but also their experience and technical knowledge. By these means even in the worst possible cases industries can be developed in India without surrendering them entirely to foreign capitalists.

## 214. FACTORS IN INDUSTRIAL DEVELOPMENT

There is another important point which the Commission forgot to take into consideration, and that is in connection with the acquisition of technical knowledge by Indians from the manufacturing firms established in India by foreign capitalists. Could the Commission guarantee that these firms would willingly instruct local men in the technique of manufacture simply to please Indians and to enable them to set up rival works in the country? It would be evidently a suicidal step for them, which they could easily take at home without taking the trouble of crossing over to India. This training business gives rise to false hopes, to which no one but a fool can lend his faith, and which goes quite contrary to the examples set by the various foreign-controlled industries already in existence in India.

A further ground for hostile criticism is provided by the Commission when they say that it is to the foreign capitalist that "we must look largely at first for the introduction of new industries and for instruction in the *economies of mass production*". Apparently they recognized that in certain industries mass production was one of the essential conditions of success, and that India in order to compete successfully against foreign countries must adopt their methods in every detail. Now the Commission knew, or at any rate they ought to have known, that there is not much demand for the products of some of those industries in which mass production methods are applicable, and that a single factory set up on those lines will not only be able to meet the entire requirements of the country to the complete exclusion of foreign articles, but will have actually to find foreign markets for considerable amounts of surplus product. Thus once an industry is established in the country by the

installation of a giant manufactory, there will be no room left for a rival concern, and as such once an industry is controlled by foreign capitalists it will remain under their control for what looks like eternity.<sup>1</sup> In these circumstances what useful purpose is going to be served by instructing Indians in the economies of mass production ?

The assertion that "by admitting foreign capital freely India admits the most up-to-date methods and the newest ideas, and she benefits by adopting those methods and assimilating those ideas" is equally wrong and misleading inasmuch as it is based on the assumption that Indian industries can progress solely by travelling on the same path as industries in other countries, and that Indians as a race are congenitally incapable of producing original ideas, and of applying them to the methods and technique of industries. If the record of technical achievements be the sole test of a nation's capacity to develop an industrial system of its own, England would have been even to-day "the workshop of the world", and the United States, Germany, France, Italy, Japan and other countries would have been inhabited solely by shepherds and farmers: for there is no evidence to show that Germany, or France or the United States, or even Italy had to invite British capital in order to learn the arts of manufacture in a systematic manner, or that European and American capital had to invade Japan so that from

<sup>1</sup> The recent activities of the Swedish Match Trust in India may be studied with considerable interest in this connection. They give an idea of the magnitude of the problem which the activities of foreign capital in even one comparatively unimportant industry are likely to raise, and of the extent of the danger to the existing indigenous enterprises that follows the trail of foreign monopolistic enterprises in a country.

the smouldering ashes of semi-barbarism in the Far East might arise a rival nation within a quarter of a century equipped with all the modern and most up-to-date instruments known to science and industry. If it was unnecessary to invite foreign capital for the development of industries in these great countries, it is equally unnecessary in the case of India. Moreover, it is highly improbable that these industrial nations would have achieved their present greatness in the realm of industry by surrendering themselves to the mercy of foreign capitalists and their technologists; nations like individuals cannot make real and enduring progress in any field of activity while relying solely upon others for the very basic materials the achievement of which in itself constitutes the first step towards progress. If the goal in view cannot be achieved without a guide, then the nation can never be too careful in selecting one whose interests do not clash with those of its own at every step.

These simple but serious objections do not appear to have suggested themselves to the Commission on whose recommendations the foundations of India's industrial policy had to be laid, or their arguments in favour of foreign capital would not have been so woefully crude, clumsy and one-sided. However, even as it is, we find that the Commissioners or "the majority" had not the moral courage to speak according to their conviction; for after telling the country that without foreign capital the policy of industrialization cannot be brought to a successful pitch, they merely add that it is not desirable to put serious obstacles in the way of foreign capitalists anxious to employ their resources towards the development of industries in India. If the industrial salvation of

India cannot be achieved without the employment of foreign capital directly by foreigners themselves, and if it is in the interests of India, as undoubtedly it is, to develop her industries, it stands to reason that foreign capital should not only be encouraged but should actually be given preferential treatment. On the other hand if this preferential treatment is withheld for some reason or another, the Government and its advisers—including the Fiscal Commission itself—may logically be regarded as indifferent to India's industrial progress. All things considered, the truth appears to be that the Commissioners themselves had no faith in their own arguments; and in view of their recommendations, which in every respect run counter to these basic arguments, they stand condemned on the bar of reason as exceedingly bad and unfair judges.

**Disadvantages of the foreign control of industry.**—As far as we can see there is no ground whatever on which the direct employment of foreign capital by foreigners themselves in India can be recommended, except perhaps the flimsy pretext of the scarcity of indigenous capital and the necessity of speeding up the process of industrialization, and about these more will be said in the following pages. On the other hand, some very serious drawbacks and abuses are to be noticed in connection with the employment of foreign capital in the form under consideration. The most serious objection obviously is that if industries are controlled by foreigners, the profits necessarily leave the country, so that the only advantage which the establishment of the new and the expansion of the existing industries directly through foreign enterprise brings to the country is in the form of the wages of

labour of none too highly skilled variety. Consequently, therefore, the growth of capital which, to a certain extent, is the true measure by which an increase in the prosperity of a nation can be accurately gauged, which is one of the chief aims of industrial development, and upon which the ultimate future of a nation's industrial system is obviously dependent, must be regarded as almost impossible under the system of foreign-controlled industries in a country. The investor usually devotes a part of his earnings to new investments: and when there are no native investors and no dividends, the growth of industries, assuming that there are no further obstacles, comes to rest to a very large extent upon the activities of foreign investors. And apart from those already connected with industrial enterprises, other foreign capitalists are gradually attracted to this lucrative field, and with these movements of foreign capital from within or without the power and influence of the foreigner in the field of industry grows. And this overwhelming tendency is all the more in evidence in those new industries whose technique and organization the natives of the land are supposed to learn from foreign pioneers.

The opponents of foreign investments in industry frequently point out that these ventures are also pregnant with dangers of the first magnitude to the social and political tranquillity of the country. In support of this contention they simply turn the pages of India's history, and point out the cases in which the foreign capitalists, or their associates and representatives, have used through their powerful representative organizations their enormous influence to retard India's political progress. The effects of this hostile attitude on the political destinies of India

have probably been over-estimated ; nevertheless, the fact remains that foreign capitalistic interests have identified themselves with the forces of reaction, and that the country has some sort of grievance against them. At first sight these reactionary activities and resulting grievances may appear to be devoid of all economic significance, but a closer examination of the circumstances would show that they have a direct and important bearing on the problem under consideration. In their zeal to safeguard their interests, the representatives of foreign capitalistic interests have walked straight into the political arena in a spirit of unfriendliness towards the nation, and by their actions have alienated the sympathies of all thinking men in the country. There is no reason to suppose that with an increase in their power and influence they will change their attitude of hostility for one of friendliness—and it is difficult to conceive economic progress in an atmosphere of suspicion, bitterness and hostility.

There is another factor which will intensify rather than diminish the existing tension between the two rival interests, and tend to destroy the remaining shreds of social and political tranquillity in the country, and it is the dependence of Indian labour on foreign capitalistic enterprise. Dr. Gilbert Slater once expressed the opinion that “the combination of white capital and coloured labour is open to very serious objections on social and political grounds”, and added that this combination is “extraordinarily effective economically”.<sup>1</sup> The first part of Dr. Slater's assertion is a truism that hardly needs any explanation. The unrestricted invasion

<sup>1</sup> See the Report of his lecture on Indian protectionism in the *Asiatic Review*, April, 1923.

of foreign capital in the field of industry may at first sight appear to be an innocent and harmless affair, and may even promise some benefit to the labouring classes, but on closer examination it will be found that its effects will not be confined to the economic sphere: they will in course of time spread far and wide into every field of national activity, and ultimately create problems that no civilized nation in the world's history has been called upon to solve. The relations of capital and labour, even when the two forces meet on terms of racial equality, are far from satisfactory under modern capitalistic control of industry, and in India they are likely to present a formidable problem when, in addition to other issues, racial matters enter into disputes between the employer and employed, and when political and economic jealousies (which will be the inevitable outcome of the foreign domination of industry with all its political implications) prompt the whole nation to lend its support to its own men regardless of facts and consequences. This constant friction will have its reverberations strongly felt in the entire economic and political field, and, as far as we can visualize, will turn India into a veritable bear-garden. It is true that these complications have not yet been manifested, but then it has been possible to maintain the balance of power between the Indian and foreign industrial interests in the country, so that no real and pressing necessity has so far arisen for the active display of suspicions and jealousies towards foreign enterprises. Different, however, will be the state of affairs when the ascendancy of foreign interests becomes an accomplished fact; in that event few people will, human nature being what it is, have scruples to refrain from making political



capital out of these developments in the country.

**The problem of middle class employment.**—There is yet another question most intimately connected with the investment of foreign capital, and it is the problem of the middle class unemployment in the country. We have seen in the opening sections of this work that unemployment among the educated middle classes is rapidly assuming alarming proportions, and that in order to ensure peace and tranquillity it is necessary that new avenues of employment should be opened up by the development of industries. Indeed it may be said that a hundred thousand unemployed graduates and under-graduates are a greater menace to the political and economic institutions of the country than a hundred million illiterate paupers, and as such it is the former who demand the development of industries in India. Can we expect the solution of this difficulty from foreign-owned industrial establishments? What a hope to entertain! We wish we could believe that the people who import shop-assistants, salesmen and petty clerks in thousands into India would henceforth become so liberal as to offer first or even second-class careers to Indians in their factories. And we repeat that it is for the sake of these men that we demand the development of industries in India, and not for illiterate millions.

**Conditions for the investment of foreign capital.**—When these facts are taken into account, it becomes difficult to avoid the conclusion that it is not only desirable but necessary that the economic interest of the people should be safeguarded and violent upheavals in the political and social

organization of the country should be prevented by keeping the activities of foreign capital in India under control. But in devising measures for keeping the activities of foreign capital in check and in deciding what degree of control is actually necessary, certain factors relating to the demand and supply of capital for industrial purposes and to the effectiveness of measures aimed at defining the scope of foreign investments in Indian industries must always be kept in the forefront. Before we proceed further, it seems necessary to point out that by the supply of capital is meant not the actual quantity available in the country but the amount which is, or can be made, available for investment in any particular direction. For instance, the country may be willing to invest capital in cotton mills, while the mining industries may, regardless of their importance, remain in an undeveloped state as a result of the inadequacy of indigenous capital. In a case like this if the people in the country are blind to the advantages and importance of mining industries, and if foreign capitalists come into this neglected field, the nation has no grounds for complaint—on the contrary the country should be thankful for the intervention of foreign capital, provided it can be proved that foreign enterprise has benefited the country directly or indirectly. On the other hand, if this necessary condition is not fulfilled, the advent of foreign enterprise must be regarded as pure and simple exploitation. In this case the absence of indigenous enterprise is no excuse for the intervention of foreign capital; the interests of the nation demand that the State should discourage and, if at all possible, arrest the growth of foreign interests in these fields by all legislative and executive means at its disposal.

**Different degrees of economic advantages.**—In devising measures with a view to discourage the growth of foreign industrial interests in India and in determining the scope of these measures, it is necessary that the requirements of the situation should in each case be ascertained as accurately as possible. In the first place it must not be forgotten that though the investment of foreign capital is equally detrimental in all cases from the investor's point of view, there are varying degrees of indirect economic advantages associated with almost every kind of foreign industrial enterprise in the country which accordingly tend to neutralize the disadvantages inherent in the foreign control of industry. There are two chief economic advantages which the country may derive even from foreign-owned industrial undertakings, and these are represented by the wages of labour and the lower cost of the locally-manufactured articles. The value of these redeeming features will determine the desirability of introducing measures to check the growth of foreign industrial interests in the country, and will also be a deciding factor in determining the strength and scope of these measures.

The industrial history of India itself provides ample material for thought and action. Let us first take the case of mining industries. As in all these cases the profits of the industry inevitably go out of the country, there is indeed very little to choose between them from the investor's point of view. But in all these cases the country has enjoyed varying degrees of indirect economic advantages. At one extreme we have the case of the coal-mining industry in which a very large proportion of the cost of the product is composed of the wages of labour. Apart from that the coal-mining industry has

played a very important part in the economic development of India : it has rendered the establishment of various manufacturing industries possible, or at any rate has materially improved their condition and prospects ; it has considerably cheapened travel and transport, and so conferred upon the country the moral and economic advantages the true value of which cannot be measured. Clearly these indirect advantages outweigh the disadvantages associated with the employment of foreign capital—in fact from this point of view the country has no cause to regret the advent of foreign capital in the field of coal-mining ; on the contrary the nation owes a debt of gratitude to the foreign pioneers.

At the other extreme stands the mineral oil industry, which is second only to the coal-mining industry in importance. This industry has been developed and is controlled almost exclusively by foreigners, so that there is no doubt whatever that the profits of the industry are shared exclusively by foreigners. It is certainly true that, as in the case of coal, a very large percentage of the product is consumed in India itself, yet it would not be far wrong to assert that the benefits associated with the indigenous supplies of a commodity are entirely absent in this case. In this connection it must be remembered that India accounts for less than 1 per cent. of the total output of crude mineral oil in the world, that the consumption of various petroleum products in India far exceeds the local supplies, and that the price of these products is not governed by the actual cost of production but by the world-price of these products, which in turn is determined by various factors which are entirely unconnected with the actual cost of production. In these circumstances it is difficult to see how the

development of India's mineral oil resources has benefited the country even indirectly, or how the absence of foreign enterprise would have adversely affected the interests of the people. In the absence of any advantage in the direction of the price of petroleum products, the only way in which the country would have gained something is by the sharing of profits (which, as in other parts of the world, have reached stupendous figures) and through the employment of labour; but while profits had to leave the country owing to foreign control of the industry, the country could not even gain to the extent of the earnings of labour owing to the fact that in the case of petroleum mining, refining and packing only a handful of men are required even in a large undertaking. One may be accused of selfishness and bigotry for advancing these arguments, nevertheless they are based on facts and figures, and as such prompt the question: Should the foreigners be allowed to exploit the mineral wealth of the country when this exploitation is devoid of even the semblance of any moral or economic advantage to the country itself? Unless it can be proved that these resources would otherwise remain undeveloped to the end of time, no disinterested authority would answer this question in the affirmative.

Between these two extremes stand the various mining and manufacturing industries which, as we have seen, have attracted large amounts of foreign capital, but which have offered nothing more substantial to the country than the wages of unskilled and semi-skilled labour, and in some cases slightly cheaper articles. The profits, on which the growth of capital and consequently the development of industries mainly depends, have left the country, while these activities of

foreign capital have brought no relief to the educated unemployed. And we repeat once again that it is not for the sake of a hundred million uneducated paupers or to bring about a slight reduction in the price of manufactured articles that we demand the development of industries in India : it is to stem the fast-advancing tide of revolution by finding work for the educated unemployed. Foreign enterprise does not, and cannot, stand this crucial test.

**Checking the growth of foreign industrial investments : means and methods.**—It is certainly true that the advantages of foreign investments in industry differ according to the circumstances of the case, so that individually all of them cannot be condemned with equal severity ; but it is equally true that, taken as a whole, the various political, social and economic disadvantages associated with the direct investment of capital by foreigners themselves outweigh those purely economic advantages which cannot be claimed as of any lasting benefit to the country. It is thus evident that the interests of the country cannot be adequately safeguarded without imposing some sort of check upon the activities of foreign capital in India. Not only that ; in some cases the requirements of the situation may justify even the introduction of measures designed to shut out foreign capital as completely as possible in the circumstances. But unfortunately it is extremely difficult to regulate the activities of foreign capital in a country by legislative means. Evidently the origin of the trouble lies in the fact that, as pointed out by Dr. Gilbert Slater in his lecture we have already referred to, " Indian capital can just as easily be undersold in competition with European capital as European

labour can be undersold by Indian labour". But as far as we can see, the dearness of Indian capital is not, as understood by Dr. Slater, due to the fact that "India is a land of greedy borrowers and rare economizers", but is the natural outcome of the scarcity of active capital in the country, and this scarcity, as we have seen, is more a result of the absence of security in the field of investment than of some inborn defects in the mentality of the Indian capitalist classes. Witness the keenness and anxiety of Indian "capitalists" to invest their capital in undertakings that promise fairplay and safety. Surely the fact that the Government of India has been able to raise as much as 4,159 million rupees in loans in India (which was the outstanding balance on the 31st March, 1928) at an average rate of interest of only about  $5\frac{1}{2}$  per cent. does not suggest that India is a land of "rare economizers". If the investor refuses to entrust his money to the industrialist, it is because the latter has proved himself by his past misdeeds to be woefully incompetent and untrustworthy. The first step towards the solution of the problem therefore lies in mobilizing the capital resources of the country by offering security to the prospective investor. How this goal can be achieved, will be discussed in the following pages; at this stage it may be remarked that even when Indian capital can no longer be undersold in competition with foreign capital, it will be found just as necessary to check the growth of foreign industrial interests in the country. Is it then possible to check this undesirable growth? If so, by what means can this goal be achieved? Dr. Gilbert Slater expresses the opinion of the majority of the economists, who have given thought to the problem of cosmopolitan finance, when he says

that "any political measures devised to keep the foreign capitalists out of India will be either defeated or evaded, and this will happen quite irrespective of any political development". There is no doubt that it is well-nigh impossible to keep the foreign capitalists out of the country altogether, and that measures devised with this end in view will be evaded by some means or another; but then our object is not to shut out completely foreign capital, but merely to keep its movements under control, and there are many sound methods of enforcing this control, provided the Government has the will and capacity to enforce them. For instance, is it impossible for the Government to check the investment of foreign capital in industries dependent on the exploitation of the mines and forests of the country, especially when the Government is itself responsible for the grant of concessions relating to mines and forests? Or is it impossible to deny the advantages of bounties and protective duties to the industrial concerns under foreign control? The case of bounties is simplicity itself; but as a good deal has been said and written about protective duties and their bearing on the growth of foreign industrial interests in the country, one cannot but answer the criticism by saying that if Government had the courage and patience to impose and collect counter-vailing excise duties on cotton, it can just as easily display these virtues again by adopting similar methods in the interests of protected industries. The details of this policy will be discussed in connection with our enquiries on the functions of the State in relation to industries in a later chapter, but it might as well be remarked at this stage that the State aid to industries, whatever form it takes, will defeat



its own ends and will do more harm than good to the country if steps are not taken simultaneously to debar foreign capitalistic interests from taking advantage of the situation by transferring their factories to India.

**Investment of foreign capital in "rupee companies".**—It is evident that these restrictive measures will not completely deprive the foreign capitalists of all the advantages of participation in Indian industrial enterprises, for it will still be possible for them to appear in the field as "junior partners" in Indian industrial concerns. If they adopt this course, there will be nothing to prevent them from gaining all the advantages of the various forms of State assistance. It may be deemed desirable to deny them these advantages but it will be found that it is not possible in actual practice. As regards the activities of foreign capital in other fields of industry, it may be remarked that no matter what the conditions are, a very large proportion of foreign capital will be invested in industries in India through the agency of joint-stock concerns. Is it then, as suggested by numerous authorities including the members of the Fiscal Commission responsible for the minutes of dissent, not possible to achieve the object in view by compelling the foreign joint-stock enterprises to be registered in India with rupee capital, and so requiring of them to give equal opportunities to Indian investors? This is the least, and also probably the most, that can be done under the existing conditions to arrest the growth of foreign industrial interests in India. By these means not only will the activities of foreign capital be brought under control, but also a part of the profits of the undertakings will be retained in the country.

Even if in the beginning of an undertaking's career Indian capital does not avail itself of the opportunities thus offered, it will always be possible for Indians to acquire control of these undertakings by the acquisition of shares in the open market, as has already been done to a certain extent in the case of jute mills. It may be objected that the acquisition of stock by this method is a costly process of acquiring control of an industry; but then Indians cannot have it all their own way: if they cannot develop industries themselves or even take part in their development, they must not grumble when they have to pay the price of this development to foreign pioneers who undertake this arduous task. Anyhow, it is always better to be able to acquire control at some future date than to have all possibilities in this direction cut out.

✓ **The "bogey" of foreign capital invasion via private companies.**—It may be objected, as has been objected by the Indian Fiscal Commission, that these tantalizing measures will encourage the investment of foreign capital in India through private companies whose activities cannot be regulated by ordinary legislative means. On studying the methods of financing industrial undertakings in Britain and other countries, it becomes difficult to avoid the conclusion that the dangers arising out of the diversion of capital from joint-stock enterprises into private companies have been grossly exaggerated. It is a bogey of which few people, apart from the Fiscal Commission and its little satellite, the External Capital Committee, seem to be afraid. This danger is particularly absent in the case of the industries in which the employment of mass production methods has come to be regarded as

customary. The capital requirements of industrial undertakings in this case are so large that private companies, with all their limitations, will never be tempted to invade this field.

**Capital investment in industries : past and future.—**

After all is said and done, it will be realized that it is infinitely better that Indians themselves should be given a chance to carve, however slowly and clumsily it may be, the industrial destinies of their country. For the achievement of this ideal, however, it is necessary that there should be sufficiency of active capital to ensure steady progress, and that Indian capitalists should be willing to participate in the work of industrial development. As far as the amount of available capital is concerned, a good deal will depend upon the rate of industrial expansion. If the rapid industrialization of the country advocated by the Fiscal Commission, whatever the term may imply, is aimed at, no amount of capital would suffice to make the industrialization of a vast continent like India proceed at a pace really pleasing to the Fiscal Commission and the rest of the crowd of speed-maniacs in the country. It may be asked: Has industrial progress in India been satisfactory in the past? A part of the answer will be furnished by the fact that in 1900-01, mills and presses for cotton, jute, wool, silk, hemp and other textile materials, and paper, rice, flour, timber and other mills accounted for 368 joint-stock companies with a capital of Rs. 18,39,65,073, while in 1924-25 there were 739 companies in existence and their capital amounted to Rs. 74,22,05,618. Again, in 1900-01 there were only 58 mining and quarrying companies with a capital of Rs. 1,77,45,501, while in 1924-25 not less than 358 companies with

a capital of Rs. 41,56,48,072 were in existence. These figures amply prove that the rate of progress in the past has not been altogether unsatisfactory. The figures relating to all classes of joint-stock companies are even more encouraging. In 1900-01, there were only 1,366 joint-stock companies in existence in India with a total capital of Rs. 36,27,56,630 ; in 1924-25, there were not less than 5,204 companies in existence, and their capital had reached the enormous total of Rs. 2,75,52,84,580. This progress, it must be remembered, has been made in spite of the fact that not many trading companies and a few manufacturing concerns have succeeded in showing satisfactory results. Moreover, as we have already pointed out, company failures have been more frequent than, perhaps, in any other country, and this sad spectacle has naturally been all against the creation of confidence in joint-stock enterprise. If, however, it is deemed necessary to accelerate the process of industrial expansion within reasonable limits, as no doubt it will be on account of the reasons we have already discussed, larger amounts of capital than those now available will be annually required for the purpose. Before, therefore, the programme of industrial expansion is drawn up and put into operation, it will have to be proved that the country already possesses, or can secure, adequate amounts of capital, and that this capital will be available for industrial purposes. But from what has already been said in the preceding pages it must have been concluded that in so far as the expansion of industries at a normal rate is dependent upon the amount of capital in the country, the conditions in India are fairly satisfactory, and this conclusion is bound to be endorsed by every investigator in this field.

**Conditions governing the investment of indigenous capital.**—The position, however, assumes an entirely different aspect when it is asked if this capital will be actually available for industrial purposes. It is a common complaint in India that great difficulties are experienced by industrialists in raising capital for the current as well as the initial finance of industries. These difficulties are generally attributed to what is loosely described as the shyness of capital in the country. We have, however, seen that capital in India is shy solely because it has been bitten too often. The Indian Industrial Commission itself admits that “the difficulty in raising capital for industries is mainly the measure, even in India, not of the difficulty or inaccessibility of money, but of the opinion which its possessors hold of the industrial propositions put before them”. The Indian investor is as, if not actually more, anxious to make the best of his resources as the British, or American, or German investor, but when like the rest of his class he refuses to look upon worthless or doubtful projects, he is accused of being devoid of the spirit of enterprise and adventure. It seems that in order to induce him to open his purse, it will be necessary to convince him first that this time he is not dealing with greedy tricksters, but with plain, honest, intelligent, hard-working men who are out for business, and in whose minds the interests of their business occupy the first and foremost place. But as he has learnt by experience that appearances are most often deceptive, especially in the Indian business world, the Indian investor would naturally require of these industrialists to produce some more substantial evidence in support of their claims, and this the industrialists can do only by mending their

ways and subsequently showing the record of their achievements. In other words, in order to rehabilitate themselves in the investor's favour, the industrial enterprises in India will have to be controlled by men who have the requisite amount of intelligence for the task, who are willing to work hard, and whose honesty is beyond a shadow of suspicion. So long as these essential conditions are not fulfilled—and they are by no means fulfilled at the present time—it will be impossible to solve the problem of industrial finance in India.

**The extension of ordinary banking facilities : an ineffective remedy.**—Yet in spite of these facts, it is said that the solution of the problem lies in the extension of banking facilities. It is difficult to see what useful purpose the mobilization of money through the extension of banking facilities would serve when the investor has no confidence in industrial propositions, and when industry has yet to be swept clean of corruption and incompetence. The only way in which ordinary commercial banks may be of some assistance to the manufacturing industries is by providing funds to meet current expenses, and even this function they cannot discharge without considerable risk. As far as the initial finance of industries goes—and it is evidently upon the initial finance that the growth, as distinguished from the working, of industries depends—the extension of ordinary banking facilities will prove to be a totally useless expedient. What is really required for the development of industries in India is an organization capable of bringing all the available capital in the country directly or indirectly under its control, and of directing these resources towards the development of in-

dustries in a way conducive to honesty and efficiency. This organization may be nothing more complicated than an ordinary industrial bank supported and organized by the State.

**Industrial banks abroad and their lessons.**—How all these highly complicated functions can be performed by an industrial bank, is shown by a study of their methods, ideals and achievements in Germany and Japan. It would be hardly an exaggeration to say that the foundations of Germany's industrial supremacy were laid by the establishment of her industrial banks: it was, so to say, in partnership with and under the guidance of these banks that German industry was born and developed, and these relations remain the basis of the functions of these banks up to the present day. It would be clearly superfluous to describe in detail the functions of these banks; they cover a vast field, but the flotation of new industrial enterprises and the underwriting of loans and issues deserve special attention. They maintain a staff of expert advisers who are responsible for examining the technical aspects of every proposal put before them. By virtue of their organization, influence and prestige these banks invariably succeed in launching schemes of even the greatest national importance: in fact, any kind of direct or indirect support by these banks is accepted by the investing public in Germany as the hall-mark of the soundness of new propositions. In all new flotations backed by industrial banks, the bankers themselves retain varying degrees of interests, so that their responsibility does not begin and end with the successful launching of a new concern: more often than not, they, as the holders of stock, are represented on the boards of these undertakings,

and by these means are enabled to take part in their management. They thus play the triple rôle of partners, financiers and advisers in their relations with the industrial enterprises they come in contact with. It is a well-known fact that in some cases these banks had from the very beginning of their careers the backing of the Reichs Bank and the German Government. The industrial banks in Japan also work on somewhat identical lines, with the only difference that in some of these banks the State holds a considerable amount of share capital, and is therefore entitled to appoint its representatives as directors. There is, consequently, a good deal of State control, but it is all for the good of the banks themselves as well as industries and investors.

**The establishment of industrial banks in India as a remedy.**—As far as we can see, it is not possible for India to attain industrial salvation except by following in the footsteps of Germany and Japan. If it was possible to achieve the goal by these means in those countries, it should be equally possible in India. It must be remembered that the success of the system depends upon the confidence which it inspires in the public mind. In Germany this confidence is inspired by the banks' power, influence and record of successful achievements, while in Japan in addition to these factors the banks have the prestige of the State behind them. As an institution of this kind in India will have nothing to its credit during the initial stages, except its resources, to inspire confidence, and as the Indian investor has little faith in the integrity of claims put forward by, or on behalf of, the undertakings dealing directly or indirectly with industries, it will be extremely difficult to achieve the desired goal



without the assistance of the State. The participation of the State in these undertakings will serve a twofold purpose: it will at once inspire the confidence of the public, and will be a sort of guarantee against corruption and incompetence. There is no doubt that the bank itself, if organized on these lines, will be a successful institution.

Let us now see how it will be helpful in developing the industries of the country. We have seen that [the first fundamental condition of the restoration of public confidence in industrial enterprises is the elimination of corruption and incompetence.] How this object will be achieved by industrial banks in India will become evident when it is remembered that whenever a bank takes part in the launching of a new industrial enterprise, it will, as is the case in Germany and Japan, retain a certain amount of financial interest in the scheme, so that it goes without saying that the Government will be able to exercise a certain amount of control over these undertakings in an indirect manner through the bank. The effects of this control will be far-reaching: as the bank will be able to examine the prospects of new industrial projects through its staff of expert advisers (which by virtue of its resources and the extensiveness of its activities it can well afford to maintain), no unsound and hazardous proposition will be put before the public through the bank, so that the dangers arising out of the initial mistakes in the organization of new industrial concerns will be reduced to the minimum. Again, as the bank will take part in the management of these concerns, it will be able to exert its influence in maintaining a high standard of efficiency and integrity. It is obvious that in the course of time the investing

public will come to regard the association of the bank with an industrial project as a guarantee of genuineness and safety. These are the only practicable means by which the confidence of the investing public can be recaptured, and so the development of industries in India take place on sound lines. If industries are left to themselves, as they are at the present time, it will be impossible to bring about the desired acceleration in the pace of expansion.

The establishment of an industrial bank offers another great advantage, and it is the utilization of foreign capital in the development of industries in the country. As none of the disadvantages of the employment of foreign capital by foreigners themselves is present in the case of industrial loans and debentures, it would be clearly an advantage to enlist the support of foreign money markets. This course, as far as we can see, will be difficult to avoid when the establishment of industries requiring very large amounts of capital will be under consideration. The only other way in which funds can be obtained by private bodies from foreign countries is by loans on the security of readily realizable assets, but as in most cases the valuation and realization of industrial assets presents many difficulties, they cannot be relied upon as a likely means of raising large amounts of capital in foreign countries. Moreover, any restrictions in the way of foreign capital investment in the field of industry will render industrial assets practically valueless in foreign countries. On the other hand, a State-aided bank will always be able to raise loans in foreign money markets without much difficulty. Thus through the agency of an industrial bank not only the financial resources of India itself can be mobilized, but

also capital from foreign countries can be attracted and utilized in developing the industries of the country without surrendering their control to foreign capitalists.

## CHAPTER VI

### LABOUR

#### INTRODUCTORY

**Complexities of the subject.**—In examining the possibilities and prospects of the modern system of manufacture in an industrially backward country, an investigator's imagination and resourcefulness are never put to such severe tests and strain as by the problems of labour. He finds himself dealing at once with human and inanimate materials: with human feelings and emotions on the one hand, and the psychological bearing of material objects and surroundings on the other. Again, racial and individual characteristics have to be taken into account; cultural peculiarities have to be studied; physical and mental powers have to be measured and translated in terms of commodities; the interests of society at large have to be weighed in terms of, and yet distinguished from, those of the individual. The results of these abstract sides of the enquiry exercise a profound and far-reaching influence on its more concrete aspects. The estimates regarding the number of men willing to take up factory work would vary according to our conceptions of want and adaptability; our ideas regarding efficiency and output would be influenced directly by our estimate of the influence of the surroundings and the physical and intellectual capacities of a race of men; even our calculations with regard to wages would show variations according to our understanding of racial mentality—the light in which an average individual regards the improvement of his economic condition and the amount

of discomfort he is willing to endure under any given circumstances in order to improve his prospects.

These abstract ideas, which in the long run determine the accuracy of concrete and measurable results, would differ according to the psychological leanings of the investigator himself as well as his knowledge and estimate of human nature and racial characteristics. And as no two investigators are likely to approach the subject in the same spirit, and as they are not likely to show exactly the same degree of aptitude in understanding racial psychology, we cannot expect them to arrive at similar conclusions. But at the same time as the broad principles underlying the various manifestations of human nature are the same everywhere, we should not, if due sympathy is shown to these basic principles, expect wide and startling dissimilarities in results. However, some of these factors which have no apparent value reveal the complexities of the subject, and urge the desirability of avoiding the commonplace mechanical methods of enquiry.

**Scope of the present enquiry.**—It is obviously impossible to analyse and examine in all their details such an extensive variety of problems as we have noticed in the foregoing paragraphs: indeed a full and exhaustive treatment of all these problems would be a lifelong occupation. As, however, the primary object of the present enquiry is to establish, with as much precision as is humanly possible, the bearing of labour on the development of factory system in India, we must concentrate our attention only on some of the salient features of the problem.

The immediate goal of our enquiry may briefly be described as the determination of numbers

and cost. The labour requirements of industries in India will obviously increase according to the rate of development; in other words, as labour is a necessary factor in production, the rate of industrial development will be governed among other things by the number of suitable men actually available for employment in new industrial establishments. Again, as Indian manufactured articles will have to compete with the products of foreign countries, and as the cost of labour is an important item in the total cost of production, the fate of industries in India and therefore the rate of industrial development will to no mean extent be governed by the cost of labour. But as the cost of labour is to be reckoned in terms of output per man, the examination of the productive capacity or efficiency of labour would be necessary.

These main branches of enquiry have extensive ramifications, so that it would be impossible to deal with them without direct reference to some of the problems immediately connected with them. The supply of labour will not be governed entirely by demand: the conditions of work in the factory, the amenities of life enjoyed by workers in industrial areas, the present economic condition of the would-be factory labourer and the esteem in which he holds the improvement of his prospects would be the governing factors, and as such it would not be possible to avoid them under any circumstances. Again, we know that the cost of labour is relative to its efficiency and output; but as efficiency itself is dependent upon a variety of factors connected with the physical and mental capacities of the worker, as well as his education, his habits and customs, his standard of living and the nature of the surroundings in which he lives and works, it would

be impossible to form an idea of the cost of labour without an examination of these determining factors.

#### INDUSTRIAL LABOUR AS IT IS

**Labour in organized industries: its estimated strength.**—It is extremely difficult to form an accurate estimate with regard to the total number of men employed in the so-called organized industries. Our difficulties arise out of the fact that no accurate and reliable data regarding the industrial establishments in India are available; some of the establishments described as factories by the Department of Commercial Intelligence and Statistics are more of trading organizations than manufactories, while others represent a number of artisans plying their crafts by old, antiquated methods. Many chemical works, engineering workshops and metallurgical concerns belong to the first-named group, while to the latter class belong such establishments as leather tanneries, oil presses, sugar factories, carpet and textile factories, and the representatives of other manufacturing industries of minor importance. Evidently neither the cottage workers nor the staff of the trading organizations can be taken as exerting any direct influence on the organized industries of the country, so that it would not be unscientific to drop them out of our calculations. But unfortunately we have no means of ascertaining their numbers even roughly, and as such there is no other course open to us but to accept the official returns as the basis of our calculation.

According to the Department of Commercial Intelligence and Statistics,<sup>1</sup> there were 7,704

<sup>1</sup> See *Large Industrial Establishments in India, 1922*. Ninth Issue.

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large industrial establishments in India in the year 1927, employing 1,680,702 hands. The following table shows the number of men employed in each industry:—

Industry	Number of persons employed
Textiles .. .. .	740,323
Engineering (including Shipbuilding, Railway Workshops, etc.) .. .. .	268,380
Minerals and Metals (including Petroleum Refineries) .. .. .	61,002
Food, Drink and Tobacco .. .. .	177,869
Chemicals, Dyes and Allied Industries .. .. .	54,817
Paper and Printing .. .. .	44,175
Processes relating to wood, stone and glass .. .. .	66,898
Processes connected with skins and hides .. .. .	6,262
Gins and Presses .. .. .	219,017
Miscellaneous .. .. .	41,959
<b>TOTAL .. .. .</b>	<b>1,680,702</b>

But in order to form an estimate of the number of persons engaged in organized industries we must also take into account nearly 250,000 persons engaged in various kinds of mining operations. On this basis of calculation the total requirements of organized industries in India amount to roughly 2,000,000 hands.

### **The migratory character of industrial labour.—**

It would be wrong to assume that the figures given in the table above are also indicative of the number of persons who are wholly or partly dependent on organized industries for their livelihood. Unlike what one may expect to find in some of the highly-industrialized countries, a very small percentage of men—probably not more than 20 per cent.—described as industrial labourers have been completely industrialized, or, like factory labourers in other countries, are entirely dependent on organized industries for their livelihood. The fact that nearly 80 per cent. of the two million men engaged in organized industries in India have subsidiary occupations



is full of significance, and has implications which will gradually come to the surface in the course of the present enquiry. One thing, however, is evident even at this stage: if the average requirements of organized industries in India amount to nearly 2,000,000 hands at the present time, the number of men claiming connection with these industries must be substantially larger. No definite estimate can be offered; but an examination of various factors connected with the demand and supply of labour at certain times of the year would lend support to the surmise that a grand mobilization would yield more than 3,000,000 persons who are in varying degrees supported by organized industries.

The dependence of more than three million persons on organized industries, while the requirements of the latter do not exceed the two million mark, is rendered possible by the fact that various circumstances have prevented the Indian industrial labourer from completely severing his connection with agriculture—his hereditary occupation—and thus devoting his whole time and attention to work in the factory. The industrial atmosphere has not succeeded in destroying his love for and connection with the land: it is not by choice but by necessity that he is a factory labourer. His home is in the village and not in the factory area, and very often he leaves his family behind in the village. It is not for a career that he seeks employment in a factory or mine, but to supplement his income from the land—always keeping in the forefront the ideal of reverting to his old occupation. He, therefore, returns to the village whenever he finds it convenient or necessary—sometimes to recuperate his health (which is often damaged by long hours of work and by his unsober, unclean and

unhygienic ways of living), but more frequently to enjoy life among his relations and friends. There is thus a continuous influx and efflux of labour: men habitually return to their homes in the country for varying lengths of time, and their place in the factory is taken by those whose "holiday" has come to a close for lack of funds, or by those who are compelled to seek work in the factory to enable them to tide over some sudden and unexpected difficulty.

**Sources of labour supply.**—From what has been said in the foregoing paragraphs it must have been concluded that there are two main types of workmen engaged in organized industries in India: those who are dependent entirely on industrial employment for their livelihood and those who devote a part of their time to agriculture or some other subsidiary occupation. The former group which forms only a small part, probably less than a fifth, of the labour force in the country is composed of those who have, through economic or social causes, lost touch with agriculture. In this group there are to be found men who were formerly artisans, landless agricultural labourers and village menials, as well as those whose holdings had become too small (by subdivision) to be of any interest, or who have been deprived of their share in the soil by the money-lender. The formation of this class of workmen in every centre of industry was but inevitable; indeed the progress in this direction would have been more rapid had not these industrial centres been the scene of various anomalies which we are about to discuss in the following pages.

In tracing the origin of the workmen belonging to the more important "semi-industrialized"

group, we have to take into account some of the economic tendencies which are in evidence in rural areas at the present time. The first and most important of these is the decline in the economic self-sufficiency of the village. In spite of a great decline in rural industries the village artisan can somehow manage to make the two ends meet, though his services are not so indispensable now as they used to be; but the village is positively without prospects for his children—especially if he happens to have more than one, and if in addition their minds are showing signs of revolt against the inadequacy of the customary remuneration. There is obviously no alternative for these superfluous artisans but to make themselves scarce and to find employment in factories where their hereditary skill is likely to stand them in good stead. If these men habitually return to the village at long or short intervals it is because of their family ties and their longing for the old familiar atmosphere; the village becomes a sort of holiday resort for these people, though there is always a tendency to combine business with pleasure by taking these trips during the harvesting and other busy seasons of the year.

The lot of the landless agricultural labourer is distinctly more precarious. Although he is to a certain extent tied to the land, even the slack periods in the village are sometimes long enough to warrant an exodus; and when wholesale crop failures are imminent, it becomes necessary for him to migrate to the factory area.

The subdivision of land into small uneconomic holdings is also responsible for compelling a large number of men to seek their fortunes in the factory. These men have a definite and well-established connection with the land, so that the village remains their home as long as this con-

nection survives. However, as their holdings would not expand or yield more, they find themselves permanently, though partly, dependent on factory work for their livelihood.

There is also a tendency among the village menials in all parts of the country to assert their self-respect, and to avail themselves of the opportunities offered in various industrial areas. Of course conditions differ according to the mentality of the worker himself and the severity of social disability he has to suffer in his native village; the rule in this case appears to be that the intensity of the desire to migrate from the village is in direct proportion to the intensity of social persecution on the one hand and the enlightenment of the depressed classes on the other. Social persecution, however, follows them in a different guise even in their new surroundings: direct contact with them is resented and avoided by workmen belonging to the so-called higher castes, with the result that it is only in certain industries or certain departments of an industrial establishment that they can be employed—such is the tragedy of an utterly soulless, degenerate and degraded civilization!

In order to complete the list it is necessary to mention small land-owners who either suddenly or occasionally find themselves in financial difficulties. When crops do not come up to expectations, and taxes, rents and interests on old debts have to be paid as usual, even fairly well-to-do peasants are sometimes compelled to seek refuge in mills and factories. But from the manufacturer's point of view they are a very undependable crowd of men: their needs are occasional and irregular, so that their advent tends to introduce the element of instability into the labour market.

The representatives of all the various classes

mentioned above are found in every large centre of industry in India. But, contrary to what might be expected, it is not always from the neighbouring rural areas that the supply of labour is obtained: in many cases the employer has to go further afield in search of workmen. And as it is either the poor or the ambitious who seek employment in industrial establishments, the geographical sources of labour supply change from place to place according to the economic condition and the mentality of the people in the districts adjoining an industrial centre.

To begin with, we find that in Bengal, which is the most densely-populated province in India but where the agriculturist is comparatively well off, the various organized industries are run chiefly by men from other provinces. The census of 1921 revealed that at that time only about 39 per cent. of skilled labour in Bengal was local, while the remaining 61 per cent. was of non-Bengali origin. An even greater disparity is indicated on the unskilled side, where Bengalis and "foreigners" stand in the ratio of 30 and 70 respectively.<sup>1</sup> If we take the jute mills of Calcutta separately, the activities of the natives of Bengal diminish beyond all proportion. According to the Indian Industrial Commission "the Bengali is taking a smaller and smaller share in the openings for manual labour created by the mills. In a Government report on labour in Bengal (1906) it is stated that twenty years earlier all the hands in jute mills were Bengalis, but that at the date of the report two-thirds of them were immigrants. At the present time about 90 per cent. of the labour is imported".<sup>2</sup>

<sup>1</sup> See Report, Census of India, 1921: Bengal Industrial Statistics, Table XXII.

<sup>2</sup> See Report, par. 15.

The "foreign" skilled labourers employed in the industrial establishments of Bengal are chiefly the natives of Bihar and Orissa, the United Provinces and the northern districts of Madras. These areas, along with Chota Nagpur, are also responsible for the supply of unskilled labour to the mines in Bengal.<sup>1</sup>

Quite different is the state of affairs in the Bombay Presidency which is the home of the cotton industry in India, and where other industries—such as leather tanning, engineering, oil and flour milling, chemical and glass manufacture—have come into prominence during recent years. This province is more self-supporting than Bengal in the matter of its labour supply. The census of 1921 revealed that nearly 85 per cent. of the skilled and unskilled labour employed in the leading centres of industry in Bombay belonged to various districts in the Presidency. But among the remaining 15 per cent. of the workers there were to be found men from almost every province, although the Central Provinces and Berar and the Baroda and Hyderabad States were, by virtue of their geographical position, able to contribute a larger share.<sup>2</sup>

This comparative self-sufficiency of the Bombay Presidency is explained by the fact that family holdings in many parts of the province are too small, and, unlike what we find in Bengal, the yield is too poor even to afford bare subsistence to an ever-growing family. It is the greater intensity of need and not the difference in the conditions of work that accounts for this glaring disparity between the condition prevailing in

<sup>1</sup> See Report, Census of India, 1921: Bengal Industrial Statistics, Table XXII.

<sup>2</sup> See Report, Census of India, 1921, Vol. VII, Pt. II, pp. 404 and 426.

Bombay and Bengal, while due consideration must also be given to the mentality and social customs of the people in the two cases.

But in spite of these favourable circumstances the city of Bombay has not been able to create a permanent labour force of any considerable magnitude and importance. According to the census of 1921, not less than 84 per cent. of the inhabitants of the city were born outside the island of Bombay. In these circumstances we cannot but assume that at least 80 per cent. of the industrial workers have their permanent homes outside the municipal limits of the city. In Ahmadabad and Sholapur, however, conditions are more favourable. In these two centres of the cotton mill industry over 60 per cent. of the inhabitants are reported as having been born and brought up within the municipal limits, nearly 15 per cent. belong to the neighbouring districts, while the remaining 25 per cent. or so come from other parts of the country—chiefly from Baroda, Hyderabad (Deccan), the Central Provinces and Berar.<sup>1</sup>

In the United Provinces the chief centre of industry is Cawnpore, whose cotton mills, woollen mills and leather tanneries rank among the finest and most up-to-date in India. It is, however, a small centre, and the labour requirements of its barely a dozen large mills and factories are but a fraction of those of the great centres like Bombay and Calcutta. Being situated in a densely-populated area—which has become a large supplier of labour to all the great centres of industry in India—it is dependent almost entirely on locally-recruited labour. Cawnpore has been even more successful than Ahmadabad

<sup>1</sup> Census of India, 1921, Vol. VIII, Bombay Presidency, Table XXII.

and Sholapur in creating a permanent labour force. The great majority of the permanent workers in this centre were originally low class village labourers. As regards those birds of passage, the casual workers, no official information is available ; but there is reason to suppose that they all hail from the thickly-populated rural area surrounding the city.

The most important industrial centre in Bihar and Orissa is the newly-built town of Jamshedpur, where large iron and steel works with their various subsidiary establishments are situated. Nearly 30,000 workmen are regularly employed in the factories and workshops of Jamshedpur at the present time. No recent data regarding the share of various provinces are available, but at the time of the last census in 1921, only about 45 per cent. of the skilled labourers had been locally recruited, nearly 10 per cent. came from Bengal, nearly 14 per cent. from the United Provinces, and the remaining 30 per cent. or so were drawn from other provinces. As regards unskilled labour, nearly 64 per cent. belonged to one part or another of Bihar and Orissa, while no less a proportion than 28 per cent. was provided by the Central Provinces.

The province of Bihar and Orissa has extensive deposits of coal, iron ore, manganese, mica and other minerals, whose exploitation necessitates the employment of more than 120,000 hands. Nearly 88 per cent. of the skilled and unskilled workers engaged in coal mining in this province are locally recruited, while in the case of iron ore, manganese and mica mining the proportion is even higher. However, even the coal mining industry, which gives employment to more than 100,000 persons, has not succeeded in creating a class of permanent miners : most of the workers



are small agriculturists whose interest in the industry is often seasonal and temporary.

Some mills and factories have also been set up in the cities of Madras, Nagpur and Delhi. Their requirements are small so that they seldom feel the necessity of looking far beyond the adjoining villages for the supply of both skilled and unskilled labour. And in this circumstance lies the explanation of the fact that despite their youth these centres have succeeded in creating the nucleus of a permanent labour force.

**Methods of recruitment.**—The methods of labour recruitment practised at various centres of industry in India are, except in minor details, remarkably similar. Unlike what we find in Europe and America, the labourer does not always present himself for work directly at the factory or at an employment bureau: he is recruited by a person who is at once a recruiting agent and an employee in a mill or factory. In Bombay it is the duty of the jobber or foreman to supply his department with the requisite number of workmen; he usually knows all about the haunts of men who belong to his particular department or industry. But his activities are not confined to the city area: in times of acute scarcity he finds himself compelled to shift the scene of his operations to the countryside where his personal influence and coaxing combined with all sorts of wild promises usually succeed in attracting the requisite number of workmen. This, however, happens in very exceptional circumstances; usually when labour is plentiful and trade dull or not exceptionally brisk, it is the workman who has to tempt and coax the foreman or overseer by gifts and promises.

But while in Bombay the selling of jobs is only a seasonal affair, and by no means usual at that—at least that is what we gather from the evidence recently offered before the Royal Commission on Labour in India—this practice is a recognised part of the whole labour-recruiting procedure in Calcutta. Here, as in Bombay, the overseer or *sardar* is the recruiting agent, but it seems that he is more dashing in his methods and less scrupulous in his demands. On February 10th, 1930, the Whitley Commission heard some very interesting evidence on the subject in Calcutta—and, it is said, they marvelled visibly. They were told by men like Mr. K. C. Roy Chowdhury, M.L.C., and others that it was almost impossible for a man or woman in certain mills not only to get a job but even to retain it without bribing the *sardar*. It was further alleged that even the higher supervising staff was in collusion with the *sardars*, and a case was quoted in which a *sardar* actually bought his lucrative post for Rs. 1,000 from a mill manager. The demand for gratuities for providing a job, and the extortion of wages for retaining that job, does not exhaust the list of their misdemeanours; it was alleged that they have no scruples even about exploiting little children by accepting bribes from their mothers for “unlawfully getting their children an extra shift in another mill”.

This systematized and regularized corruption may at first sight appear to have an air of mystery, and may rightly be supposed to be the work of inhuman forces; however, the true explanation of these mysterious and monstrous happenings is to be found in the problems relating to the demand and supply of labour, in the economic condition of the worker and in the

perversion of the Indian mind and character. As we have seen, Calcutta attracts men from all the poorer neighbouring provinces, and often the supply of labour exceeds the demand. Being far from his home and dependent for his living on his wages alone, the immigrant cannot afford to wait and look round; he must get some work immediately or starve; and not unnaturally he enters into all sorts of difficult contracts with the "recruiting officer", who, realizing the needs of the poor stranger, fixes the price of his "favour" according to the condition of the labour market. The Bombay foreman may by comparison appear to possess a large stock of human feelings, but it seems he is not made that way by nature: in showing restraint he rather proves himself to be the victim of circumstances.

The same system of labour recruitment is practised in Ahmadabad, Sholapur, Cawnpore, Delhi, Madras, Nagpur and the various mining centres, with the difference that the practice of buying and selling the jobs is not much in evidence. Here and there some sort of control over labour recruitment is exercised by the employers, but that control is illusory, for the recruiting overseer, if he knows his job and understands the situation, can easily circumvent it, and make his services and advice as indispensable as is the case in Calcutta or Bombay. Conditions are undergoing a change in every industrial centre in India, but as far as our information goes, Jamshedpur is the only place where the recruiting overseer has been completely ousted by the establishment of a labour employment bureau. This development, as explained by the Tatas, was inevitable in the case of an extensive manufactory situated in a wild and sparsely-populated locality. Moreover, in the interests

of economy and efficiency every effort had to be made to secure the most suitable men and to retain them as far as possible.

**Foreman class and its recruitment.**—As the degree and nature of control over the activities of ordinary workmen show wide variations from industry to industry, we cannot expect any uniformity of procedure with respect to the recruitment of men to the foreman class. In most of the cotton and jute mills the foremen rise from the ranks of ordinary labourers. But it is not always the most efficient or most popular, or the best educated workman who receives promotion; the personal relations of a man with the higher staff, his social status, and even his religion determine his fitness and eligibility for promotion. The woollen mills of Cawnpore and Dhariwal are known to take merit and record of service into account, but then they have to maintain a higher standard of efficiency than other textile mills on account of the various technical difficulties involved in their manufacturing operations.

In some of the more up-to-date engineering establishments in Bombay and Calcutta (which are mostly European-owned) preliminary technical training, general education and record of service are the factors that (so it is claimed by their managing staff) determine a workman's eligibility for promotion to the foreman's grade. The departmental foremen are, however, mostly Europeans or men with European experience and qualifications; but it is difficult to quarrel with them for adopting this policy, especially when they point out that the presence of an European supervisor has a healthy influence on Indian workmen. These elaborate precautions are also rendered necessary by the nature of

manufacturing operations: lack of efficient and effective guidance and supervision adversely affects workmanship—and bad workmanship tends to ruin for ever an engineering establishment.

In some of the large modern tanneries of Calcutta, Cawnpore and Agra there is now a tendency to train workers especially for the positions of foremen. They catch them immediately after they have qualified in a local school of tanning, and proceed to prepare them for the job by giving them a course of intensive practical training. These experimental measures are said to have yielded some excellent results, but as far as our information goes no attempt has been made to introduce this system in other centres of the leather tanning industry.

However, it is at Jamshedpur that the most daring and up-to-date methods of recruitment have been introduced. Unlike the Bengal Iron Company's works at Barakar, the Jamshedpur works could not, on account of severe foreign competition, afford to adopt the easy-going practice of importing workmen of this class from abroad. In the absence of trained Indians they had to depend on European foremen during the early stages, but little time was lost in making the most up-to-date arrangements for the training of local men. Educated men were recruited and trained under the guidance of the European staff. By these simple and commonsense methods a large number of good, reliable foremen have been gradually trained for various departments.

The methods of recruitment followed in other industries (such as paper, sugar, cement, glass, pottery, vegetable oil and others) are as unprogressive and antiquated as those we have

described in connection with the textile (cotton and jute) industries; it is partly due to the fact that the duties of a foreman are imperfectly understood in these industries in India, and partly because educated men are not, for one reason or another, available for these jobs. As in all these industries a properly trained and efficient foreman must be thoroughly acquainted with the technique of work in his department, it is necessary that he should possess sound technical knowledge and preferably also some general education. Technical knowledge can be acquired in the factory, but not the general education. This question of the intellectual equipment of ordinary workmen is, therefore, a factor of far-reaching importance to industry.

**Mental equipment of Indian labourers.**—It has been shown that so far only a few Indian factory workers have been permanently industrialized and that the great majority of them are agriculturists who were born in the village and would prefer to die in the village. Now we know that more than 90 per cent. of the people of India are illiterate; and as primary education has not made much headway in rural districts (where nearly 90 per cent. of the people live), we must assume that a very insignificant proportion, possibly less than 3 per cent., of the people in the villages can read and write. The percentage must be dwindling down to the vanishing point when factory workers are taken into account, as it is most often the people that belong to the poorest sections of the rural community who swell the ranks of factory labour in India. In spite of this fact, however, the evidence given by the representatives of labour before the Whitley Commission tended to show

that nearly 20 per cent. of the labourers engaged in the textile mills of Bombay were literate. As no official data are available, we have no means of ascertaining the accuracy of this claim; but as only about 20 per cent. of the workmen are supposed to belong to the city of Bombay itself, and as it was not till 1918 that the Compulsory Education Act was passed in Bombay, we cannot but infer that the claims of labour in Bombay with regard to its literacy are somewhat exaggerated. And the same is true of labour in Ahmadabad and Sholapur—notwithstanding the fact that nearly 50 per cent. of the workmen in these centres have been completely industrialized.

The position is distinctly more deplorable in Calcutta and its suburbs, partly because a very large percentage of workmen come from the backward districts of other provinces, and partly because most of the mills and factories are situated too far away from the city of Calcutta to enable the workmen and their children to avail themselves of the existing educational facilities. Some arrangements for the education of children have certainly been made in the jute mill area during recent years, but they are far from adequate, and, moreover, are not designed to meet the requirements of the people from other provinces. The result is that, as shown in the evidence given before the Whitley Commission, less than 5 per cent. of the workmen in Bengal (including those engaged in the coal mining industry) can read and write.

Nothing definite is known about the conditions prevailing in the smaller industrial centres like Cawnpore, Nagpur, Madras and Delhi. But as the Compulsory Education Acts did not come into force in various provinces till about 1920, and as they do not apply to the rural districts,

the proportion of factory labourers who can read and write must be very small.

In the matter of education, as in other directions, Jamshedpur leads the way. Primary and technical schools have been established, which provide day and evening classes for workmen and their children. The results of these efforts, however, will be apparent only when the younger generation comes into the field. But even as it is, it may be said that while most of the skilled and semi-skilled workers are literate, the tendency at Jamshedpur is towards the universalization of education by affording all possible facilities for the education of even unskilled workmen. Seeing that a very large number of workers in Jamshedpur are permanently settled there, it would not be an exaggeration to suggest that within the next fifteen or twenty years illiteracy at Jamshedpur will completely disappear from among the younger generation of workmen.

But no such hopes can be entertained in connection with other industrial centres which have to deal with migratory labour. Although Bombay and Ahmadabad claim that 20 per cent. of their workmen can read and write, and even if other centres succeed in proving that they are not far behind Bombay in this respect, they have no occasion to be proud of their achievements; for the mere ability to read a prayer book only or to write a letter does not in any way indicate a standard of mental development. It would scarcely be an exaggeration to suggest that more than 75 per cent. of the so-called educated labourers in India are indebted to the family priest for their supposed literacy: and the indigenous system of education as practised at the present time in India is, to say the least, incredibly inefficient. It does not open their minds



or give them a broader outlook on life and worldly affairs. In these circumstances the educational achievements of ordinary labourers cannot be regarded as an asset to industry.

The education that modern industry demands is that which enables men to develop their faculties and to become "men of the world", and not that which prompts them to begin their young lives by spending half their time in meditation and preparation for the life beyond—meditation that breeds idleness and lack of ambition and effort. It is a mechanic's and not a dreamer's or an ecclesiastic's mind that modern industrialism requires: in this age of machinery it is better to know how to handle a screw-driver or to drive a nail straight than to know all the scriptures by heart; and the system of education in India, either indigenous or modern, does not foster these necessary qualities in the youth of the country. How, in these circumstances, can we assume that any industrial centre, Jamshedpur apart, can produce even 2 per cent. of workmen who would pass as educated persons anywhere outside India?

The old lethargy, of which the present state of affairs is a product, was first broken in Bombay in 1918, when the Primary Education Act was passed, whereby municipalities were empowered to introduce compulsory education within the areas under their jurisdiction. Other provinces followed suit, and by the end of 1920 they had all armed themselves with similar Acts. As all the various industrial centres are municipal towns, we may naturally expect some change in the desired direction. But unfortunately very little has been done to improve the system of education. To be more explicit, the system does not aim at the development of mind; it

goes no further than the training of eyes and hands to read and write. Those useful things, screw-drivers and hammers and nail are neglected, in fact avoided as if they were powder magazines. The theory underlying this system is that screws and nails and inkpots cannot get on well together! It is not difficult to see that from the industrial point of view this show of compulsory education is not likely to yield far-reaching results. Moreover, these Compulsory Education Acts are not applicable to rural districts, and it is chiefly by men born and brought up in the country that most of the mills and factories in India are being run to-day, and will be run for many years to come.

**Standard of living.**—The intellectual backwardness of the factory worker is reflected, among other things, in his mode and standard of living. In order to be able to understand the problem more thoroughly it would be useful to begin by casting a glance at the conditions prevailing in the village—the ultimate source of labour supply in India. Life in an Indian village is simple, in fact primitively simple, and naturally its requirements are few. These village homes are small thatched cottages; they contain no furniture of any description—unless cots, which are usually worth a few pennies, can be described as such; and a few cooking utensils, some cheap primitive clothing, and a few odds and ends comprise the entire stock of the belongings of a family: and their total value does not usually exceed twenty or twenty-five rupees. Their food is equally poor—poor in quality and variety, and often even in quantity.

This deplorable state of affairs is no doubt the direct outcome of poverty; but when a man is

born and brought up in this depressing atmosphere, it cannot fail to exercise a profound and far-reaching influence on his whole outlook on life and on his character. In this fact are to be found some of the causes of the Indian factory labourer's low standard of living, which, except in the matter of food, is a faithful representation of the standard in the village. But then a man's mentality is changed and reshaped to a considerable extent by material environments. Why is it not so in India? Why is factory life in India barren of all progressive influences? It seems we must look for the additional causes of the mental stagnation of Indian workmen in the nature of the material and social surroundings in the factory area.

**Industrial housing.**—It may be taken as almost axiomatic that a man's standard of living is reflected in the place where he dwells. But his dwelling place is something more than a mirror: it exercises a powerful influence in improving or deteriorating the standard of living. And the working class tenements in India are no exceptions to this rule.

A good deal has been said and written about industrial housing in India, not in hostility towards the system that tolerates a certain state of affairs but with a genuine desire to help. Those who are not likely to get an opportunity of studying the conditions on the spot should refer to the ghastly pen-portraits by Messrs. Kelman and Hurst in their excellent monographs on the subject, and so see through the eyes of trained and competent observers the abominable conditions in which the Indian industrial labourer is condemned to live. Some years ago, Mr. Lloyd George set the whole British nation gasping with

horror when he made his famous "discovery" that the miners' dwellings in Wales were supplied with open drains instead of the usual underground ones! What if he had found that, as is the case in every centre of industry in India except Jamshedpur, most of the tenements did not have any drain at all, and that the entire road was at once a drain and a dump of filth? What would have the British nation said if he had revealed that, as in Bombay,<sup>1</sup> 97 per cent. of the working class families lived in single rooms without a kitchen or bath, and that the average number of persons per one-roomed tenement was 4.03?

Yet that is exactly what industrial labour has to put up with in India. Of course the worst and gloomiest side of the picture is provided by the city of Bombay, where land is scarce and expensive, and where single-roomed tenements are found clustered together in dark, narrow alleys. The Industrial Commission's description of these working class quarters is mild and merciful, yet even that description is graphic enough to convince a man, who is familiar only with Western conditions, that the pig-sties and dog-kennels in Europe are cleaner, healthier, are more comfortable quarters than the *chawls* in the larger centres of industry in India.<sup>2</sup> The very fact that plague is seldom absent from the slums of Bombay speaks volumes in support of this contention. And the city of Calcutta is

<sup>1</sup> Bombay Working Class Budgets: 1921-22, pp. 23-24.

<sup>2</sup> According to the Indian Industrial Commission "the worst type of *chawl* consists of a two, three or four-storeyed building, with single room-units either placed *back to back* or separated by a narrow gully two or three feet wide, usually traversed by an open drain. The rooms, especially those on the ground floor, are often pitch dark and possess very little in the way of windows. . . . The ground floors are usually damp owing to an insufficient plinth. . . . Water arrangements are insufficient and latrine accommodation is bad, though the latter is being steadily improved. A most insanitary smell hangs round these buildings. . . ." See Report, par. 241.

not far behind Bombay in this respect—they are tweedledum and tweedledee and might easily pass for one.

In the smaller centres of industry like Ahmadabad, Cawnpore, Madras, Nagpur and the suburbs of Calcutta, the state of affairs is less appalling. In these centres land is cheap, so that it is possible to erect groups or rows of single-roomed huts in the neighbourhood of factories. These groups of huts, known as *bustis*, are generally as overcrowded and filthy as the *chawls* in large centres, and if they are at all preferable to the slums of Bombay and Calcutta it is because of their rural surroundings and because of the plentiful supply of light and fresh air. And the same is true of the mining areas where land is even more plentiful and cheap and where huts are provided sometimes by the mine-owners and sometimes by the labourers themselves.

It is only at Jamshedpur that we find a more satisfactory state of affairs. Instead of allowing their labourers to take care of themselves or providing them with the usual *chawls* and *bustis*—as might have been done by less imaginative and enterprising employers—the Tatas had the sense to build commodious and well-ventilated houses for their workmen. And when we compare the two and three-roomed family quarters (for ordinary semi-skilled labourers) and their excellent water and sanitary arrangements with even the most up-to-date Government-built *chawls* in Bombay, we cannot withhold our admiration for the Tatas: in this as in many other fields they not only lead the way but are actually infusing a new spirit.

**House-building activities: history and achievements.**—Let us now see what has been done to

improve housing conditions in the various centres of industry. As might have been understood from what we have said in the preceding paragraphs, the difficulties of providing accommodation for the working classes have always been more acute in the city of Bombay than anywhere else in India, chiefly because the city is built on an island which is too small to meet the requirements of an ever-increasing population. Efforts have been made during the past thirty-two years to reclaim land from the sea and to build new houses for the working class population.<sup>1</sup> This work has been entrusted to the

<sup>1</sup> As far back as the nineties of the last century the situation had become so desperate that an Improvement Trust had to be established in 1898, in order to undertake the reclamation of land from the sea and to build new houses for the working class population. The Trust proceeded to condemn blocks of tenements and to build new and "improved" ones according to its own ideas. The progress, however, was so slow that the industrial boom during and immediately after the war once again brought matters to a head. During this period of boom the Development Directorate of the Government of Bombay outlined a scheme for industrial housing, which ultimately aimed at the construction of 50,000 *one-roomed* tenements designed to accommodate 250,000 people. This programme had to be executed by the end of the year 1928. The work of demolishing and reconstructing the working class "homes" was now begun in right earnest; but no sooner was it begun than the price of land and therefore rents started coming down with a crash. Then came the famous (or infamous) Back Bay reclamation scandals which put the whole house-building machinery out of gear. By the end of 1928, however, the Development Directorate had completed the construction of 16,524 rooms, while the Improvement Trust had, at the end of March 1928, the rebuilding of 9,523 tenements to its credit.

The recommendations of the Indian Industrial Commission in connection with the problem of industrial housing were of a far-reaching character. The Commission had the foresight to realize that the salvation of Bombay lay in its expansion towards the mainland and in the gradual lightening of pressure within its existing boundaries. With this end in view they recommended that suitable new localities should be found and set apart for industrial purposes, that no new factories (except in special circumstances) should be set up on the island, that the railway workshops should be removed to a distant site, that efforts should be made to build new suburbs and to improve communications, and that the standard of accommodation in the new working class districts in and around the city should be improved.

As far as we can see, these recommendations had little influence upon the actual achievements of the Improvement Trust, except in so far as the reclamation work is concerned. But the prohibition

Bombay Improvement Trust and the Development Directorate of the Government of Bombay. Some land has been reclaimed from the sea, and new *chawls* (or slums) have been set up either in new localities or on the site of old tenements. By the end of 1928 nearly 26,000 one-roomed tenements had been built by the two above-mentioned building authorities.

It may also be mentioned that the Bombay Municipality, the Port Trust and the railways have been indirectly helpful in solving the problem of industrial housing by building quarters for their employees. But it is a significant fact that very few mill-owners have done anything in the direction of providing accommodation for their workmen; in fact as a class they have been singularly unenterprising. Some idea as to how far they are interested in the convenience and welfare of their workmen may be had from the fact that they could not even see their way to accepting the extremely generous offer of the Improvement Trust with regard to the acquisition of some of the newly-built *chawls* merely by paying the cost in fifty years.

In other centres of industry very little has been done by way of providing better and more sanitary tenements, and even that little, contrary to what has happened in Bombay, has been done not so much by Government or local authorities as by employers themselves. Some of the European firms in Cawnpore and Madras have been particularly active, but even they have not succeeded in providing accommodation for

relating to the setting up of new factories in the city, and the vast development scheme at Ambarnath (which has as its ultimate object the creation of a new industrial centre on up-to-date lines with every modern facility both for the mills and their employees) are due directly to the recommendations of the Industrial Commission.

all their workmen. The city and suburbs of Calcutta are probably the most backward areas in India ; but the unfortunate part of it is that in this centre all the three parties, viz. the employer, the labourer and the Government, are equally indifferent towards progress.

It is now obvious that what has already been done in the direction of providing improved accommodation is, when compared with the total requirements of the country, only a drop in the ocean. But lest the quality of even this tiny drop be over-rated, we must hasten to give a few facts about these so-called improved tenements. The Bombay Improvement Trust, whose activities have been so widely advertised, has built *one-roomed* tenements only, and each of these tenements is expected to accommodate not less than five persons. In so far, therefore, as overcrowding is concerned, the position is not far different from that in the older slums. The streets in these areas have certainly been broadened and the water supply has been improved ; but those who have seen these works of " builder's art " must have marvelled if human hand and mind were capable of creating a more dreadful and forbidding structure. No wonder nearly 60 per cent. of these tenements are reported to be lying unoccupied. And the same is also true to a certain degree of the houses built by employers in Ahmadabad, Cawnpore, the jute mill area near Calcutta, Nagpur, Madras and the various mining centres. In all these cases, as in Bombay, single-roomed tenements are the usual style, but with the difference that while in Bombay there is no courtyard attached to working class homes, in the various above-named centres open spaces and verandahs are invariably provided. This little difference, while ensuring



privacy, is said to make the country-born factory labourer more happy and contented. However, we should not expect these "modern" tenements to make a direct contribution towards improving the standard of comfort—an improvement which, as we are about to see, is one of the greatest needs of industry in India at the present time.

**Conditions of work in mills and factories.**—The conditions in which the factory labourer works are about as appalling as the conditions in which he lives. Most of the mills and factories in India are built with utter disregard of local climatic conditions. Both their general layout and arrangements for ventilation are notoriously defective. In most of the mills and factories various machine units are so thickly crowded together that workmen find it difficult to move about freely. With all this overcrowding of machinery and labour—and in India a larger number of men per machine unit are required than in any Western country—bad ventilation and natural heat, the atmosphere in the factory becomes painfully depressing. And to crown it all there is the eternal dust: indeed in certain industries the labourer works in a sort of perpetual dust storm. Needless to add, very little is done to keep the atmosphere clean and cool by means of cold blast and suction pumps and other modern methods. The conditions of work are particularly appalling in most of the cotton mills where lack of scientific control of so dangerous a process as artificial humidification creates an atmosphere that ultimately plays havoc with the health of the operatives. And all this is in evidence in spite of a fairly elaborate system of factory inspection and the appointment

of an expert on humidification processes by the Government.

Nor are any amenities of ordinary life provided by the employers for their workmen. The Indian factory labourer is not expected to be over-careful about his toilet, and therefore it is only a few super-enlightened employers who have done anything by way of providing facilities for washing. In some mills and factories, as was complained by the representatives of labour in their evidence before the Whitley Commission, there is no adequate arrangement for the supply of drinking water. Of course dining sheds are a rarity, and are met with only in a few up-to-date industrial establishments; in the absence of proper arrangements workmen are often compelled to eat their meals either in the adjoining lanes or under the machine sheds.

**Hours of work.**—The length of time for which men, women and children have to work each day in these dismal surroundings varies from place to place and time to time. The hours of work at the present time are based on the provisions of the Factory Act of 1922, which prescribed eleven hours per day and sixty hours per week as a maximum in the case of adults (both men and women), and six hours per day in the case of children below fifteen years of age.<sup>1</sup> The Act also prescribed a rest interval of one hour after six hours' work in the case of adults and after four hours' work in the case of children. Mills and factories, however, do not adjust their hours of work according to these statutory limits. In Bombay, where workmen are better organized and are often in the limelight, the hours of work

<sup>1</sup> The age limit for children prescribed by the Act of 1922 is between 12 and 15 years.

are actually less than those prescribed by the Act of 1922: in fact even before the passing of the Act the employers had been forced to reduce the hours to ten per day. The jute mills of Bengal and cotton mills in Madras, Ahmadabad and Nagpur have also shown the same tendency during recent years, while in most of the Government-owned factories and railway workshops the conditions are distinctly better. We may say that as a rule large industrial establishments with hundreds of men on their pay roll have adjusted their hours of work according to the requirements of the Act. On the other hand, we have plenty of evidence to show that small employers, especially those working in out-of-the-way localities, have often succeeded in evading the law. It is not because constant supervision is impossible: it is because the location of factories and a more "manageable" number of workmen employed therein offer endless opportunities for corruption—and after all factory inspectors alone cannot be expected to rise above the rest of the nation in the matter of "graft".

**Factory legislation.**—The Act of 1922, on which the hours of work at the present time are based, marks the climax of a series of legislative measures designed to improve the conditions of work in factories during the past fifty years. Up to the seventies of the last century the industrialist in India was allowed to ride roughshod in much the same manner as the pioneers of the factory system were allowed to do in the early days of the Industrial Revolution in England. The result was that labour, more particularly child labour, was exploited with inhuman callousness, and the conditions of work in most of the industrial establishments in the country were a

constant menace to the health and safety of the workers. And this state of affairs was all the more dangerous as the workers themselves were too weak and unorganized to raise a voice of protest. The foreigner once again came to the rescue; during the early seventies Major Moore and Mr. Ballard brought the question of female and child labour to the notice of the Government. Lancashire had already been on the alert, and in 1874 the Manchester Chamber of Commerce urged, in its own as well as in humanitarian interests, the necessity of checking the evil, and with that end in view made representations to the Secretary of State for India.

This early agitation from such unexpected quarters resulted in the appointment of a Commission in 1875 whose recommendations formed the basis of the first Factory Act which came into operation in 1881. But beyond prohibiting the employment of children below seven, and limiting the hours of work to nine per day with an hour's rest in the case of children between seven and twelve, the Act did not affect the factory labourer. The Indian manufacturer had evidently scored a victory in the teeth of a formidable opposition from all quarters. There was more agitation both in India and England, of which the Factory Act of 1891 was the outcome. This Act raised the upper and lower age-limits of children to fourteen and nine respectively, and reduced their hours of work to seven per day with a rest interval of half an hour. The new Act also benefited women inasmuch as it limited their hours of work to eleven with an hour-and-a-half's rest interval when the hours of work reached the statutory limit. No limit was placed on the hours of work for men, but half-an-hour's rest at midday (between 12 noon

and 2 p.m.) and a weekly day of rest were prescribed. And finally the Act laid down certain rules to ensure cleanliness and better ventilation in mills and factories.

The Act of 1891 while bringing relief to women and children did not affect the lot of male adults. Both in the cotton mills of Bombay and jute mills of Calcutta the average worked out at well over thirteen hours a day, while cases of fourteen and fifteen hours a day were by no means uncommon. Naturally there was more agitation in Lancashire and Dundee as well as in certain quarters in India itself, which resulted in the appointment of a Factory Labour Commission. The Factory Act of 1911 was the outcome of the recommendations of this Commission whose report was published in 1908. By this Act the hours of work for children were reduced to six per day in the case of textile factories while they remained unchanged in other industries. Women workers fared rather badly, for their rest interval was shortened while their hours of work remained at the old statutory level. Taken as a whole it seems the Act of 1911 was designed principally to bring relief to the much exploited male workers whose hours of work were, in accordance with the minority recommendations of Dr. T. N. Nair, fixed at twelve per working day. Sanitation, safety and other matters relating to factories also received due attention, and a system of regular and effective factory inspection was prescribed.

The Act of 1922, to which reference has already been made in a preceding paragraph, was the result of a series of changes and developments consequent upon the Great War. The League of Nations having taken the labouring classes under its wing had found it necessary to frame a code of rules for guiding the conduct of various

countries in the matter of hours and conditions of work, and India as a member of that organization had to accept its conventions and recommendations.<sup>1</sup> After the requirements of her infant industries and her climatic conditions had been given due consideration, India was required to limit the working hours in factories and mines to sixty per week, to raise the minimum age of employment in factories to twelve, to prohibit the employment of women after sunset, and to explore the possibilities of establishing a system of maternity benefits for women employed in factories and mines. The result was the Factories Act of 1922, whose provisions relating to the hours of work in industrial establishments have already been discussed.

The administrative provisions of the Factories Act of 1922 soon revealed some flaws for which remedies were provided in the Amending Act of 1926.<sup>2</sup> The rest interval prescribed by the Act of 1922 was found to be highly inconvenient to certain types of industrial establishments working shorter hours; this difficulty was removed by the Act of 1926 which provided for the reduction of the rest interval to one-half hour for men working  $8\frac{1}{2}$  hours or less per day. The Amended Act made it an offence, punishable with fine or imprisonment, for a parent or guardian to make a child work in more than one factory on the same day. Other clauses in the Act referred to the more accurate reporting of accidents, and placed restrictions on the cleaning of machinery while in motion.

Somehow, the various mining industries have

<sup>1</sup> These conventions were passed under the auspices of the League by the International Labour Conference held at Washington in 1919.

<sup>2</sup> The first Amending Act of no great practical importance was passed in 1923 in order to set down more definite rules with regard to weekly holidays.

not received the same amount of care and attention as factories. It was not till 1901 that the first Mines Act was passed and Mining Inspectors were appointed to ensure the health and safety of underground workers. The conditions of employment and hours of work, however, remained subject to private understanding between the employer and employed till 1923 when, more in obedience to the Washington Conventions than with any economic or humanitarian motive, an Act was passed whereby the hours of work were limited to 54 per week in the case of underground workers and to 60 per week in the case of workers employed above ground. A weekly holiday was prescribed, and children below 13 were forbidden to work inside a mine. Nothing, however, was done to prohibit or even to discourage by law the employment of women underground.

**Scale and methods of remuneration in industry.—**

It is clearly beyond the scope of the present enquiry to examine all the various details relating to wages and to determine exactly how far the labourer is compensated for his long hours of work in the midst of those incredibly dreary surroundings which are peculiar to factories in India. As the scale of remuneration differs from place to place in every industry, we cannot but confine our attention to a few representative cases in order to enable us to see how the output per man, and therefore per unit of money given in wages, in various industries in India compares with that in foreign countries with whom India has to compete in her own and foreign markets.

Let us begin with the unskilled labour which is employed in varying proportions to skilled and semi-skilled labour in different industries. As

the wages of this class of labour are governed by the scale of remuneration in agriculture, we must expect to find wide variations not only from place to place but also from time to time according to the condition of crops, etc. In normal times, however, eight annas per day is the upper limit for the wages of this class of workmen in India, while in many parts of the country (such as the United Provinces, Berar and the Central Provinces) four annas per day is the usual rate. Even if we accept eight annas per day as the universal rate throughout the country, the earnings of an unskilled Indian labourer must be taken as averaging less than one-eighth of those of the same class of workmen in Britain.

The same sordid tale is told by the wages of skilled and semi-skilled workmen. To take the cotton mill industry first, it is rather difficult to compare the wages of operatives in India and Lancashire on account of the fact that wages in the former country show a tendency to vary not only from place to place but also from mill to mill. However, the latest statistics issued by the Department of Commercial Intelligence and Statistics show that, to take a few prominent cases, the mule-side piecers in the cotton mills of Bombay city are being paid on an average nearly 20 annas per day, ring-side piecers 16 annas per day and ring followers 14 annas per day. At Ahmadabad, on the other hand, the wages of workmen belonging to these classes average 17 annas, 15 annas and 11 annas respectively. The scale of wages in the cotton mills of Madras, Sholapur, Nagpur, Delhi and other places is even lower than that in Ahmadabad. These are only a few representative cases, but they give us an excellent idea of the condition of the



skilled labourer in the cotton mill industry. Knowing that the average earnings of a Lancashire operative are seldom less than 40s. per week even in the present depressed state of the industry, wages in India must be reckoned as substantially less than a fifth of those in Lancashire.

In the jute mills of Bengal the condition of the labourer is decidedly worse. Here the wages of spinners average less than 8 annas per day, of weavers nearly 12 annas per day and of winders 10 annas per day.<sup>1</sup> Compare with this miserable pittance the minimum of £2 (nearly Rs. 27) per week in the jute mills of Dundee—a very significant contrast.

Still more astonishing is the contrast presented by the wages of skilled workmen known as *mistries*. In the jute mills of Calcutta their average monthly income does not amount to more than Rs. 30, at Jamshedpur it is nearly Rs. 40, and in the city of Bombay it is Rs. 45. In the engineering workshops we have again the same state of affairs. Here the wages of an ordinary operative, may be a machine shop worker, a moulder, a pattern maker or a fitter, do not average more than 16 annas per day, while in Britain the average works out at well above £3 per week even in the present depressed state of industry.

As the level of wages in any particular industry follows more or less closely the level of wages in other industries, we can easily form an idea

<sup>1</sup> These figures are based on the information privately collected in 1923. The figures issued by the Department of Commercial Intelligence are ambiguous, and yet far from flattering. But seeing that the jute mill industry has recently suffered a severe set back, the wage level must have come down accordingly. The unsuccessful strikes during the second half of 1929 may be taken as showing the direction in which the wind is blowing.

of the earnings of ordinary skilled workmen in various industries.<sup>1</sup> However, the representative cases cited above prove conclusively that, in spite of his longer hours of work, the skilled worker in India does not earn on an average more than one-fifth of what is earned by the same class of workmen in Britain.

**Fines and delays in the payment of wages.**—But it must not be supposed that workmen in India actually receive all what they earn or work for. A most wicked and pernicious system of fines has been developed and practised by some of the manufacturers, more particularly the cotton mill and jute mill owners, with the result that workmen often find large slices being taken off their wages for such offences as irregular attendance, bad workmanship and others. The law of the land gives no protection to the worker: it leaves the manufacturer free to exercise his powers in a manner most convenient and advantageous to himself.

Still more offensive and annoying is the system of withholding wages for varying lengths of time—a system that brings untold miseries and hardships upon the factory worker. The cotton mills of Bombay are the worst offenders in this respect. In this case wages are paid monthly, but a fortnight's wages are always held back, which in actual practice means that sometimes a newcomer is not paid anything at all for six weeks.

<sup>1</sup> No official data are available for recent years, but from what we have been able to get from private and semi-official sources it appears that the wages of an adult male miner in Bengal and Orissa amount to 8 annas per day, of an ordinary skilled workman in the tanneries of Cawnpore to 10 annas per day, of the weavers in the woollen mills of Dharival and Cawnpore to 12 annas per day, and of the skilled operative in the harness and boot and shoe factories of Cawnpore, Agra and Calcutta to less than 14 annas per day. These figures are for the year 1929.

In the jute mills and engineering workshops of Calcutta the wages are paid sometimes weekly and sometimes fortnightly, with generally a week's wages in arrears. In other centres of industry it is only in exceptional cases that the wages are paid weekly. However, they all seem to have one thing in common, and that is the abominable practice of withholding payments for varying lengths of time.

**Welfare work.**—Apart from the conditions and hours of work and wages various kinds of activities referred to under the generic term "welfare work" play an important part in moulding the character and promoting the happiness of the industrial worker. Under this head may be noted an endless variety of subjects affecting labour directly or indirectly, but the most important of these are the provision of facilities in connection with housing, education, sanitation, medical aid, maternity and sick benefits, compensation for accidents, recreation and amusements, provident and pension funds, unemployment insurance and others. It is obviously beyond the scope of the present inquiry to describe the part played by each one of these items in promoting the welfare of the industrial worker, or even to examine in detail the achievements in all these various fields in India. All we are concerned with is the attitude which the employers and the Government have so far adopted: and a fairly accurate idea of this attitude can be had by a swift survey of the black spaces of inactivity and by a comparison of its magnitude with that of the stray luminous spots of effort and achievement.

Let us begin by examining the situation with regard to the first fundamental necessity of the

factory worker—medical aid<sup>1</sup> in cases of accidents and sudden illness. Almost every large and up-to-date factory in India has a dispensary of its own, but in a majority of cases these dispensaries are mere show-things and are not in charge of a whole-time medical attendant.<sup>2</sup> The women workers are the greatest sufferers, as (excepting a few factories in Madras, Cawnpore and Calcutta) even the most up-to-date industrial establishments have failed to secure the services of qualified lady medical attendants. All things considered it seems that not more than 20 per cent. of industrial workers in India are in a position to avail themselves of medical aid of any description on the spot in cases of illness and accidents—in fact our own observations point to a much smaller proportion.

Far more deplorable is the state of affairs in regard to maternity and sick benefits. In accordance with the Draft Convention adopted by the Washington Conference (1919) the Government of India instituted enquiries through the various provincial Governments, which revealed that in a very few mills and factories had any kind of maternity benefit scheme been put into operation; but in spite of these revelations practically nothing has been done in this field. Of course sick benefit is almost unknown in India<sup>3</sup>:

<sup>1</sup> It would have been more logical to begin with sanitation, housing, and education (both general and technical), but as we have already discussed these topics in the preceding pages, it would serve no useful purpose to refer to them again at this stage.

<sup>2</sup> Anyone who has made personal investigations into this aspect of the question must have come across scores of cases in which for days at a stretch the doors of the dispensary are never opened. In cases of accidents the injured person is removed to the general hospital in a leisurely fashion, while in cases of sudden illness the sufferer is just allowed to go home.

<sup>3</sup> As far as our information goes, the Empress Mills of Nagpur, the Carnatic and Buckingham Mills of Madras and the mills and factories owned or managed by Messrs. Tata Sons & Co. are the only

all that a few enlightened employers have been able to do is to provide free medicine and treatment to their employees ; and one can easily count employers offering even these meagre facilities on the fingers of one hand.

Compensation for injury or loss of life now stands on a different footing. Up till 1923, an employer could be sued for compensation only in the case of a fatal accident (under the Fatal Accidents Act of 1885), but even in this extremity the employer was seldom forced to compensate the dependents of the deceased. Meanwhile, the number of accidents increased with alarming rapidity with every step forward in industrial development,<sup>1</sup> and this combined with the edicts of the Washington Conference and the clamour of labour itself compelled the Government to take action.<sup>2</sup> Accordingly in 1923 the first Workmen's Compensation Act was passed and the liability of the employer in the matter of compensation for injuries received by workmen while on duty was recognized. A definite scale for compensations of various kinds was provided, and machinery for dealing with claims was set up. The working of the Act during the past six years has revealed a number of defects in its provisions : among others, compensation comes tardily, and while disputes with

establishments in India in which sick benefit schemes have so far been introduced.

<sup>1</sup> In 1928, the latest year for which official statistics are available, there were 16,348 accidents in Indian factories, of which 264 were fatal (see *Statistics of Factories, 1930*). In addition to these the coal-mining industry records the annual average of no fewer than 200 fatal accidents.

<sup>2</sup> Compensation for injuries was not entirely unknown in India before the Act of 1923 came into operation. Even during the war some enlightened manufacturers like the British India Corporation, Messrs. Tata, the owners of the Buckingham and Carnatic Mills of Madras and one or two others had actually gone farther than what is required by the Act of 1923.

regard to the scale of payment are common, there is no authority (except the expensive law courts) to arbitrate and to expedite payments. This Act, however, is said to be an experimental measure; but the record of its working somehow gives the nasty impression that the experiment has been conceived and is being conducted very half-heartedly.

The subject of unemployment insurance may be dismissed with the remark that nobody knows anything about it in India. The provision of provident and pensions funds would have also been included in the category of non-existent things had it not been for the activities of the British India Corporation of Cawnpore, the Carnatic and Buckingham Mills of Madras and the Empress Mills of Nagpur in this field. All these undertakings provide pensions or provident fund facilities for their employees with the necessary safeguards with respect to the record and length of service. Their conditions are rather hard, but they cannot be otherwise under the prevailing circumstances, especially when the labourer has no idea of his duty and responsibility towards his employers: indeed, these firms have achieved in such trying circumstances what others in foreign countries have not been able to do in vastly more favourable conditions. It goes without saying that the rest of the crowd of Indian employers are content to watch in gloom and idleness the progress of events in Nagpur, Madras and Cawnpore.

As regards the provision of facilities for amusements and recreation, the less said the better. The importance of amusements and recreation as character-building forces has been recognized the world over at all times and stages of human development; but even in this respect India is

woefully backward. No concerted and organized effort has been made to interest the factory labourer in these aspects and activities of life. The result is that to a vast majority of industrial workers gossip is the only amusement and, to those who are inclined that way, "boozing" the only recreation. For achievements in this field we have once again to look towards Jamshedpur, Madras, Cawnpore and Nagpur, where games, libraries, cinemas and workmen's clubs have been provided. Some activity is also being shown in other centres of industry, but the sum total of achievements in these centres is almost nil as compared with the magnitude of their requirements.

**The trade union movement.**—The absence of the various facilities noticed in the preceding paragraphs is not entirely due to the apathy of the employer or the State: the labourer himself is to a certain extent responsible for these deficiencies. It is the labourer who must take the initiative in the matter of reform; and in order to make his demands effective he must appreciate the necessity of combination and united action.

In almost every country in the world the introduction of the factory system has been followed by the organization of workmen, often against the laws of the land, into societies to enable them to protect their rights and to improve their condition by acting collectively in cases of emergency. But different has been the course of developments in India where trade unions did not make an appearance for nearly three quarters of a century after the introduction of the factory system of manufacture into the country.<sup>1</sup> It

<sup>1</sup> The most important cause of this lack of initiative is to our mind the mentality of the people and the absence of tradition. Docility

was in April, 1918, that the first trade union of industrial workers was formed in Madras. "Except in the very early beginning, it has been a Union consisting exclusively of the workers in the three textile mills in Madras . . . It owes its origin to the fact that the workers began to feel the pressure of high prices during the latter part of the war and the frequency with which assaults took place inside the mills."<sup>1</sup>

Somewhat similar circumstances were responsible for the spread of this movement to Bombay immediately after its advantages had been demonstrated in Madras. Other industrial centres followed suit, and by the end of 1921, almost every industrial centre in the country had a number of labour organizations. Simultaneously the "federation movement" came into existence, with the result that apart from the central organization known as the All-India Trade Union Congress (which was established in 1920) there are now many labour federations or central unions in various parts of the country.

But the organization of these trade unions and their federations is not so sound and extensive as their high-sounding names or their geographical extent would signify. Their coffers are empty; their paying members are few; ameliorative action is almost unknown to them; their executive bodies exercise little control over their members. Again their membership is unstable and volatile, being liable to violent changes according to prevailing economic conditions. Their chief function seems to be to rally the

and contentment, even in the face of the fiercest odds, have always been the chief characteristics of the people of India, with the result that militant combination for the assertion of political or economic rights has been unknown at all times in the history of the country.

<sup>1</sup> See the Memorandum submitted by the Madras Labour Union to the Whitley Commission.



workers for strikes in cases of emergency, and this function they perform with admirable efficiency. Their authority and influence over the workers belonging to any particular industry is manifested only in times of strikes when the non-members participating in the struggle easily outnumber the members of the trade unions concerned. And, conscious as they are of their power in this direction, the unions do not use these weapons sparingly: the fact that strikes have now become a regular feature of industrial life in India and that millions of working days are now annually lost<sup>1</sup> is suggestive, and shows that the existing trade unions have a much wider sphere of influence than that indicated by the number of paying members. No official data are available, but the claims put forward by the All-India Trade Union Congress tend to show that in 1926 it controlled 167 Trade Unions representing nearly 100,000 workmen. But as many non-industrial unions are also affiliated to the Congress, the number of trade unionists engaged in industry must be very small. The figures for subsequent years are not available, but in July, 1928, the Bombay Labour Gazette reported that the number of trade unions in the Presidency stood at 87 in that year with 111,320

<sup>1</sup> Let us illustrate our point by means of recent statistics. In 1925 not less than 134 industrial disputes were recorded, involving 270,423 workers and a loss of 12,578,129 working days. The average number of days lost through strikes during the five years 1921-25 amounted to nearly 7,400,000 a year. From the strikers' point of view the year 1927 was singularly barren and uninteresting. Only 131,655 workmen were involved in 129 disputes and a little over 2 million working days were lost during that year. But the difference must have been more than made up during the following year, for which no all-India statistics are available, but during which some of the greatest battles in their short history were fought out by various trade unions. In Bombay city the general strike in the cotton mill industry during that year involved 147,644 workmen and a loss of nearly 22 million working days. During the same year departmental strikes at Jamshedpur culminated in a general lockout which lasted from May 1 to September 13, involving a loss of more than 2 million working days.

members on their rolls. Although this sudden increase can be explained away by reference to abnormal conditions prevailing in the industry at the time (when labour was fighting with its back to the wall against some of the new tendencies in the industry), nevertheless it is full of significance inasmuch as it denotes a change in the labourer's mentality.

But considering that the labour movement in India is barely ten years old, and that the conditions governing the growth of trade unionism are by no means favourable, the results so far achieved must be considered as highly encouraging. Of the adverse circumstances the most important are the ignorance of the workers themselves and the united opposition of the employers of labour. The ignorance of the labourer has necessitated the intervention of men who are not themselves labourers: indeed, it is on account of the activities of these men that the trade union movement has been introduced and developed to its present extent in India. And as the work carries no remuneration, very few educated and influential men willing to devote their time to the organization and uplift of the labouring classes are available at present. As regards the opposition of the employers, some interesting sidelights were thrown on the aims and ideals of these little Napoleons during the tour of the Royal Commission on Labour. The evidence given before the Commission at various industrial centres had one thing in common: it tended to confirm the suspicion that the whole body of employers in the country were desirous of destroying the trade union movement.<sup>1</sup> Their chief grievance appears to be that

<sup>1</sup> In the memorandum submitted by the Madras Labour Union, it was alleged that the attitude of the employers was consistently un-

the movement is organized and guided by men who are not directly connected with industry, and the evidence given before the Whitley Commission tends to show that even the Government treats these grievances with sympathy. And yet they must be aware of the fact that trade unionism is the inevitable outcome of the development of factory system, and that so long as the workers are illiterate, the movement can be organized and guided only by sympathisers from outside the ranks of the working class community.

**Efficiency of labour.**—As we have pointed out before, a good deal of work has been done on Indian labour problems by Indian as well as foreign writers; but unfortunately they have confined their attention to the description of the superficial aspects of the labourer's life—much in the fashion of a naturalist's description of a newly-

friendly towards the movement which found expression in intimidation and victimization. The result was that the men were afraid to join the union and "did not come to the meetings until it was dark. . . . Their (the employers') objection to the union was that, in the first place, there was no need for it. . . . and secondly, they could not recognise an institution in which there were outsiders."

At Cawnpore the Commission was boycotted by the leading labour organization; but those who, in spite of the ban, came forward to give evidence made strong allegations against their employers' conduct towards them and offered proofs in support of their contentions. Asked what was the attitude of the officials towards the union, they stated that "the attitude could be known by the threats they received when they came to give evidence before the Commission. . . ." If there is any truth in the statement that the employers can go the length of intimidating witnesses—and there is no reason why we should disbelieve these statements—the necessity of offering further evidence for the sake of illustrating our point at once disappears. And, be it remembered, these things are alleged to have happened in an otherwise progressive industrial centre.

In Bombay, Ahmadabad, Calcutta and Jamshedpur, the employers are even more hostile towards the unions; during recent strikes they have done all they could to crush these organizations by refusing to negotiate with them for the simple reason that they were being guided by outsiders—well knowing that without the help and guidance of these outsiders they would never have come into existence, and that in the present stage of development they could never hope to carry on for long.

discovered species of animals. As far as our information goes, no attempt has been made to measure the efficiency of Indian labour with arithmetical precision and to compare it with that of foreign workmen; and yet from the scientific point of view this aspect of the question must always be the climax of all investigations on the problems of industrial labour. Obviously it is not enough to proclaim the self-evident fact that, in so far as production per head is concerned, the labourer in India is vastly inefficient in comparison with foreign labourers. What is needed is a comparative study and an exact statement of facts not only in connection with output per head but also regarding the cost per unit of work done and the quality of the article produced. It would be a very difficult and highly specialized study; but in the absence of data we must rely on crude, commonplace facts which have already been recorded with meticulous care by every writer on the subject.

It is impossible to challenge the statement that from the point of view of output the Indian industrial worker is not nearly as efficient as the worker in any of the western countries. The very fact that a larger number of hands have to be employed in mills and factories in India than in other manufacturing countries proves that. In the absence of independent investigations by any writer we might as well see what the Indian employer has got to say about the productive capacity of his workmen. Let us take the notorious case of the cotton mill industry first. On the one extreme we have the famous estimate of Sir Clement Simpson (of Binny & Co., of Madras) putting one hand in Lancashire as equal to 2.67 hands in an Indian cotton mill; while on the other extreme stand

the estimates repeated with monotonous regularity by the mill-owners of Bombay and Ahmadabad who believe that they require four operatives as against one in England. Again, the evidence given before the Whitley Commission tended to show that the jute mill-owners of Calcutta regard the Dundee workers as three times as efficient as their own operatives. As regards other industries, the Tatas try to make the world believe that they have to employ five workmen at Jamshedpur for one employed in Europe, while the late Sir Alexander McRobert of Cawnpore in his evidence before the Industrial Commission expressed the opinion that on an average 3·5 workmen in India were equal to one in England. And lastly, we know that in so far as productive capacity, as indicated by output per head, goes the Indian miner (under-ground worker) stands at par with the British and German miners in spite of the various disadvantages (with regard to machinery, etc.) under which he works.

Now what are we to make of this rigmorale of statistics and estimates? That Indian labour is not nearly as efficient as British labour is evident; but how can these estimates be utilized in forming even a rough idea of "comparative efficiency"? Why, if we must believe the mill-owners in the two cases, should the efficiency of the cotton mill operative in Bombay compare so unfavourably with that of the Madras worker, more particularly when the industry in the former Presidency has had a start of more than half a century over the latter? And why should the Tatas employ five hands at Jamshedpur for one hand in Britain, while the coal industry can show just as good results by employing the same number? In order to get at the root of the problem we must stop quarrelling with

figures, and try to analyse the mentality of their authors. It is a very strange coincidence that the employers who are responsible for tall figures are the people who have woefully mismanaged their affairs: in fact the greater the mismanagement the louder are the complaints with regard to the inefficiency of workmen, and therefore the longer are the odds against the latter. Someone must be lying, and more likely than not it is the "dud" employer: indeed, he is proving himself as incompetent to tell lies as to manage his business affairs. Furthermore, the tendency even among the more efficient employers to keep the cost of labour down by constantly complaining of the inefficiency of their workmen cannot be entirely disregarded.

To return to the cotton mill industry, we must admit that the estimate offered by Sir Clement Simpson (2·67 Indian operatives equal to 1 British operative) is not far off the mark. But even these scrupulously honest figures have been challenged by Dr. Gilbert Slater who asserts that the looms in the Buckingham and Carnatic Mills (on which Sir Clement Simpson's estimates are based) "were working at a greater speed than is customary in Lancashire". Anyone who is acquainted with the system of work both in India and Lancashire would readily agree with Dr. Slater's statement and subscribe to his conclusion that "the real difference between the efficiency of a Lancashire and of a Madras operative is much overstated by the ratio of two and two-thirds".<sup>1</sup> And these arguments are also applicable to Bombay where, even before the Tariff Board started its investigations, more than

<sup>1</sup> See the paper read before the Royal Asiatic Society: *Asiatic Review*, January, 1923.

95 per cent. of the weavers in the Presidency attended to two looms, while nearly 2 per cent. attended to three or more than three looms.<sup>1</sup> These figures after being readjusted in the light of Dr. Slater's assertions would mark a great improvement even upon the estimate offered by Sir Clement Simpson, especially when it is remembered that the average British weaver attends to only four looms, and that the weavers attending to five and six looms are rare exceptions. And when to these facts we add the results of the longer hours of work in India, it becomes obvious that the daily output per head in Bombay is not less than half the output per head in Lancashire.

In the steel industry, whose details of labour cost will be examined in a later volume, the conditions are probably not quite so favourable; but at the same time it is impossible to believe that they have to employ five men at Jamshedpur as against one in England. The steel industry in India has always been in a very precarious condition; it deserves our sympathy, but the clumsiness of its masters' tactics in garnishing their tales of woe with such obvious exaggerations is enough to make a crocodile weep, or a cat laugh. The five to one ratio has been invented with the object of misleading fools and exploiting their sympathies; if not, it could never have been invented by men in their senses. As no two steel works are alike, it is difficult to refute the statement by facts and figures; but a visit to Jamshedpur and to an iron and steel works in the Midlands of England or in the western districts of Germany would convince even an untrained observer that in submitting

<sup>1</sup> See the Bombay Government's Report of an Enquiry into the Wages and Hours of Labour in the Cotton Mill Industry, p. 12.

the ratio of five to one Jamshedpur has violently exaggerated its misfortunes.

When all the various circumstances are taken into account, it becomes obvious that the last person whose estimates can be accepted at their face value is that most inhuman of all slave-drivers—the Indian employer. European managers and skilled workmen employed in Indian mills and factories are the people really competent to offer the right estimates, but we have yet to come across one who, when taken into confidence, would support the wildly extravagant assertions of his employer and say that it is necessary to employ more than 2·5 hands in an Indian factory as against one in England. The textile and leather workers in Delhi, Agra and Cawnpore are decidedly less efficient than the workers in Bengal, Bombay, Nagpur and Madras, and yet even in these North-Indian centres the European managers and technicians freely express the opinion that, when working under identical conditions as regards mechanical equipment, three Indian workmen can always show substantially larger output than one worker in England, and that in certain cases (such as machine-tending, carpentry, repairs and various highly-skilled jobs) an ordinary British worker has not much to give by way of a start to a really competent Indian workman. Taken as a whole, however, the trend of opinion among these foreign observers, who are directly connected with industry, appears to be that on an average less than 2·50 workmen are required in India<sup>1</sup> as against one man in England; and this

<sup>1</sup> Many foreign industrialists and employers have spoken of Indian workmen in terms which, if not quite flattering, at least do them justice. Only last year (January 15, 1929) Mr. R. G. Jones, Regional Production Manager, General Motors Limited, in the East, publicly bore testimony to the capacity of Indian labour. Speaking of 800



estimate corresponds to that arrived at by Sir Clement Simpson, after making due allowance for the higher speed at which machine units are worked in certain types of industrial establishments in India.

We have now to see how on an average the cost of labour in India per unit of article produced (which must, from the competitive point of view, be the final object of measuring efficiency) compares with that in other countries. Let us believe the Bombay mill-owners for once and assume that they actually employ four times as many operatives as their rivals in Lancashire. Let us even ignore Dr. Gilbert Slater's contention that machine units in Indian textile mills work at a higher speed than is customary in Lancashire; we may even forget all about the longer hours of work in India. In order to prove that from the cost point of view his labour is inefficient, the Bombay mill-owner must prove that he gives away more in wages to his four workmen than what one Lancashire operative usually earns. But we have seen that the earnings of a cotton mill operative in Bombay are on an

odd workmen in the Bombay branch of his undertaking, Mr. Jones declared: "The average ability of workmen in India is as good as in other countries. We have had no difficulty in getting men able to handle our most important positions. We have a sufficient number of men who are exceptionally good." He further declared that most of the workers showed a degree of keenness in learning unsurpassed by men in any other country, and that the efficiency of a well-trained Indian workman compared quite favourably with that of an average European or American worker. It may, however, be added that the factory of the General Motors in Bombay, on whose working Mr. Jones' verdict is based, is organized on the most up-to-date American lines, and that, as pointed out by Mr. Jones himself, "everything is done to create, both physically and mentally, a pleasant atmosphere" both inside and outside the factory. All these things are only too often neglected in the textile and other factories in Bombay. But although the mill-owners are themselves responsible for these adverse circumstances, even this utter contempt for better conditions could not have demoralized their workers to the extent shown by the ratio of four to one.

average less than a fifth of those of the Lancashire operative. The inference is obvious: the operative in Bombay is being cheated, even in respect of the work actually done, to the extent of at least 20 per cent. (and probably much more) by his incompetent employer who, not content with that, has the impudence to complain that he gives away a lot more in wages per unit of work than does the employer in Lancashire. When subjected to this kind of "X-ray examination," even Jamshedpur with its five to one ratio comes out shorn of all its ugly pretensions. And if this test is applied to other industries, it would prove to be equally devastating to their claims of higher labour cost.

For concrete evidence in support of the above contentions we might profitably refer to the record of Indian labourers in foreign countries. During the past forty years Indian labourers have found their way to such highly advanced countries as the United States, Canada, South Africa and Australia, and it is a well-known fact that they have always been able to hold their own in competition with the highly efficient and disciplined labourers of those countries. In fact their ultimate expulsion from those countries had for its root-cause the grievance that, being in no way inferior to white workmen in the matter of efficiency, they introduced a tendency to degrade the standard of wages and living among the working classes in those countries by accepting a lower scale of wages. Now if Indian workmen can be about as efficient as white workmen when working in foreign countries, why cannot they be equally efficient in India? And again, if an European agricultural labourer can become a most efficient factory worker in the United States, why cannot an Indian labourer

do the same? Certain factors, which we are about to examine, are responsible for creating a real difference in the efficiency of Indian and foreign factory workers, but, as proved by Mr. Jones' testimony and by the statistics of production relating to labour in the coal mines of Bengal and Bihar, the difference is not so great as indicated by the five to one or even the three to one ratio.

## CHAPTER VII

### LABOUR (continued)

#### CAUSES AND EFFECTS

**Existing conditions : a recapitulation.**—In the preceding chapter we have confined our attention strictly to the statement of facts without in any way trying to explain their implications and inter-connection. Before, however, we proceed with the latter task, it seems desirable to recapitulate as briefly as possible some of the more important conclusions arrived at different stages of our enquiry in the preceding pages. Once again stated in a narrative form they are as follows.

There are very few permanent industrial workers in India: the great majority of those engaged in industries are really agriculturists who return to the village for varying lengths of time. They are employed through the agency of a recruiting agent who is not slow to exploit the needs of those who return from the village to seek work in an industrial establishment. These factory workers are, with few exceptions, completely illiterate, so that their intellectual capacities are comparatively poor. But very little is being done to make up this deficiency by general education. Their standard of living is low, their housing arrangements are deplorable both as regards accommodation and sanitation—in fact they are in many respects distinctly inferior to those in the village. The atmosphere in mills and factories is extremely depressing both physically and mentally, while the hours

of work are generally much longer than in Europe and America. In spite of these longer hours of work, the average earnings of an Indian industrial labourer are less than a fifth of the average earnings of an English factory worker. The wages are not paid promptly as in Europe: there are annoying delays in payment, and sometimes the worker has to wait for six weeks before his first and subsequent weeks' wages are forthcoming. And on top of all this, substantial amounts are often taken away in fines. Very little is done by way of improving the physical, moral and intellectual standards: it is only in a few exceptional cases that hospitals, play-grounds, libraries, schools and various facilities for amusements have been provided. Even sick allowances are practically unknown. These deficiencies are due more to the absence of strong, well-organized trade unions than to the apathy of the employer or the State. The standard of productive efficiency is also very low: on an average a little less than 2·50 Indian workmen are equal to one British worker. And to this we may add at this stage the two well-known facts which have not been explicitly stated hitherto: that physically the Indian factory labourer is probably the poorest specimen of humanity, and that climatic conditions in India are too unfavourable for sustained physical and mental efforts.

**Causes, effects and counter-effects.**—All these various features of industrial life in India are by no means isolated phenomena: they are the most intricately connected parts of a complex whole, acting and reacting upon one another in a most baffling manner, so that none of them can be studied without direct or indirect reference

to the rest. But as each one of them has to be studied with all its connections and inter-connections, it would be impossible to avoid frequent repetitions, especially if a clear exposition of the whole problem is to be the final aim—such are the difficulties of disentangling a tangled mass.

Let us, for the sake of convenience, begin at the source. The fact that only a small proportion of workmen have so far been permanently industrialized and that industries in India are to an overwhelming extent dependent on the village for the supply of labour is at once the cause and effect of many important problems directly connected with industry. The migratory character of Indian factory labour is due to many causes, of which the inherent love of the worker for old familiar surroundings, the difficulties of getting suitable housing accommodation, and consequently the lack of social facilities, are the most important. Large centres of industry must have their own typically depressing atmosphere and surroundings, but the difficulties connected with housing often compel a factory worker to leave his family behind in his village and to pay them visits as frequently as possible. Again, overcrowding and disregard for sanitation combined with the depressing atmosphere of the factory tend to make him a physical wreck and so, often against his will, necessitates his departure. The consequences of this practice are that the supply of labour, though far from being inadequate at any time of the year, is not constant, and that long breaks and consequent lack of concentration tend to make the labourer inefficient.

The recruiting system in vogue at the present time is not without its consequences: it brings

about discontentment and economic distress, and therefore indirectly affects the efficiency of labour. It is also to some extent responsible for the so-called scarcity of labour at certain times of the year, because the labourer cannot always get in touch with the recruiting agent of the mill or factory in need of hands.

The intellectual backwardness of the worker (which is the direct outcome of illiteracy) has a long trail of direct and indirect consequences; but to take a few, it stands as an obstacle in the way of the development of skill; it is responsible for the lack of ambition; it tends to lower the standard of living; it prevents workmen from realizing their obligations and responsibilities; it deprives labour of the various social and economic advantages of combination; and all these are in varying degrees responsible for the inefficiency of labour.

The difficulties connected with the housing of labour are the most fruitful cause of various evils associated with industrial life in India. They are to a very large extent responsible for the uncertainty of labour supply; but the evil does not stop there: lack of sanitation and overcrowding bring disease and death, so that they affect not only the supply of labour but are also instrumental in lowering its efficiency. Furthermore, they act as a deterrent to those who have a desire to become permanently industrialized. And, finally, they are to no mean extent responsible for that phenomenon, the stagnation of will and effort to improve the standard of living.

And the low standard of living itself is the father of many an evil: it destroys ambition, it gives rise to unclean and insanitary habits, it brings disease and loss of stamina, and all these combined result in the loss of efficiency.

The long hours of work in vogue in India have a longer trail of consequences than is generally supposed. In the first place, as the atmosphere in Indian industrial establishments is decidedly uncongenial (partly for climatic reasons and partly on account of faulty layout of factories and lack of cleanliness) and as the Indian labourer has a very poor physique, there is always a tendency on the part of the worker to seek relaxation either by loitering or by altogether absenting himself from work. But in spite of these wiles and crafts his vitality generally deteriorates under the pressure of long hours of work in uncongenial surroundings, so that not only his working capacity and efficiency suffer, but he is also compelled to go to his country home for varying lengths of time to recuperate his health. It also tends to lower his standard of living inasmuch as he has no time and leisure to devote to the finer sides of life: on his return from the factory he finds himself too exhausted, both physically and mentally, to think of indulging in even those enjoyments of life which are within his reach.

All these three tendencies, viz. deterioration of physique and vitality, inefficiency and low standard of living, are also caused by the low scale of wages, though, contrary to what is generally supposed, not to the same extent as by the long hours of work. We say "not to the same extent as the long hours of work," as we feel that so long as the factory labourer has to spend nearly half his time in the factory, he will never have leisure to enjoy his increased earnings, so that a rise in wages will, far from improving his standard of living, bring a desire for obtaining what the labourer needs more than the ordinary material comforts of life—leisure and rest. And the Indian



mill-owners are for once probably honest in their statement that an increase in wages results in an increase in absenteeism. In absenting himself from his work the labourer merely obeys nature's law of compensation. Nevertheless, it cannot be regarded as a permanent feature; higher wages must *in course of time* improve the standard of living, as it is more likely than not that the worker will begin to appreciate the necessity of better food, if nothing else, and to maintain that standard he will find himself prepared to work more regularly.

But from the point of view of efficiency and standard of living the system of payment of wages in vogue in many parts of India is as degrading and harmful as the low scale of wages itself. The Indian factory worker is primarily an agriculturist and he migrates to the factory often because he finds himself at the end of his resources. And when he has to work for a month or (as is the case in Bombay) six weeks without seeing his wages, he is naturally compelled to borrow money from the money-lender—and the gift of an Indian money-lender is like the cursed diamond of the Arabian Nights. The rate of interest on the loans advanced by these money-lenders varies from 50 per cent. upwards, so that the debtor can manage but with difficulty to pay bare interest. And when wages are small, the regular payment of interest alone breaks the back of the wage-earner. The result is a fall in the standard of comfort and so, via the loss of vitality and staying power, it leads to inefficiency and sometimes migration.<sup>1</sup>

<sup>1</sup> The Government of Bombay made an enquiry in 1920 into the working class budgets in the city and suburbs of Bombay, and revealed that nearly 47 per cent. of the families were in debt to money-lenders. The average indebtedness was reckoned to be nearly two and a half months' earnings, and the usual rate of interest was 75 per cent.

It is very doubtful if the absence of facilities for play and amusement is as full of immediate consequences as it is generally supposed to be. The reason is obvious: the factory worker has no means and little leisure to indulge himself in these "luxuries". But then there are children and youngsters who grow up to detest life in the city because it has given them nothing in their youth whose memory they could cherish in later years of life, and because they have always seen a contrast between life in the city and in the village. Life in the factory has no redeeming feature for them; and so every new generation of workmen regards the city not as a permanent home but only as a caravan post.

The inadequacy of arrangements for the treatment of the sick and ailing has more immediate and direct results: many workmen die because of inattention during the initial stages of illness, while others who come back are too weak and exhausted to work efficiently. And the absence of sick allowance aggravates their misfortunes even more than the sickness itself, as the sufferer has either to borrow money at high rates of interest, which, as we have seen, has far-reaching consequences, or suffers quietly in want and poverty in his native village. In each case the result is the same: labour becomes inefficient and scarce. And the same is true of maternity benefits, because child-birth puts the woman in exactly the same position as a serious illness does to an ordinary worker, male or female—only

which, however, was frequently exceeded. But even these eye-opening official statistics cannot be accepted as final, particularly as we know that many people dislike the idea of revealing the secrets of their indebtedness to strangers, or indeed to anybody who is not intimately connected with them. The number of workmen in debt and the extent of their indebtedness must, therefore, be greater than is shown in the Bombay Government's Report.

it is more important, because in this case two generations of workmen are concerned at the same time.

The absence of strong, well-organized trade unions is at once due to, and to a certain extent is the cause of, the backward mentality of the worker with all its wide and far-reaching consequences. If the factory worker in India lacks discipline, it is as much due to his inborn inclinations as to the absence of the guiding influence of trade unionism; if he neglects his duties it is partly because he has not the moral force of a trade union to control his actions; if his mental faculties are not given a chance to develop, if he is resourceless in times of poverty or illness, it is partly because he has himself failed to take the initiative through the collective agency of trade unionism.

It is hardly necessary to state any of the obvious and well-known facts concerning the climate in India, beyond the fact that in a sub-tropical country the atmosphere is never very congenial for long, intensive physical effort. The heat exhausts the worker quickly and so adversely affects his physique and efficiency. The "period of maximum efficiency" is therefore much shorter in tropical and sub-tropical countries than in temperate regions.

The physical inferiority of the worker produces exactly the same results as an unfavourable climate. Some idea of the physical inferiority of Indian workers may be had from the fact that, as brought out in evidence before the Whitley Commission, the weight of Indian workers averages only 104 pounds as against the average weight of 124 pounds in European countries.<sup>1</sup>

<sup>1</sup> We have no means of checking these estimates, but from what we know of the people south of the Vindhya and in Europe, we must

This inferiority is due to a variety of causes, of which racial affinities and characteristics, social and religious customs (particularly early marriage), unwholesome climate, unbalanced food and low standard of living are the most important. Naturally enough it is reflected in the staying power of the worker: it seems that, climatic effects apart, it is more or less in exactly the same proportion as the physique of the worker in each case.

#### REMEDIES

**The crucial problem.**—Two facts of outstanding importance to the development and general welfare of industry emerge from the brief discussion of the various problems relating to Indian factory labour in the preceding section, and these are the intermittent character of labour supply and the comparative inefficiency of Indian workmen. But as even in the worst times the shortage of labour is never so acute as to compel the mills and factories in any part of the country to work appreciably below their normal capacity, and as new men are always available to take the place of those who fail to turn up for one reason or another, the problem ultimately resolves itself into the necessity of improving the efficiency of labour: for after all it is not the inconvenience involved in finding the requisite number of men to run an industrial establishment that we ought to deplore, but the adverse effects of the rapid turnover of labour on its efficiency.

But even in the matter of efficiency it is its qualitative and not its quantitative side that suffers through the migration of labour, and therefore needs an effective remedy. We have

regard the estimated difference of 20 per cent. in the weights of the two peoples as somewhat conservative.

seen that the employer in India is getting more out of his labour than is justified by the scale of payment. Moreover, under the existing conditions the return of the factory labourer to his village does not diminish his working capacity but actually improves it, so that even from the employer's point of view the migration of labour is not without its advantages. The qualitative efficiency of labour, however, suffers, and suffers seriously, through these frequent excursions. A prolonged and voluntary absence from work tends to destroy the power of concentration; it diminishes interest in work. It is not of any great consequence in the case of industries turning out rough and crude products; but almost every industry has its highly-developed branches which require of workmen engaged therein sometimes a faultless judgment and sometimes a delicate touch of hand.<sup>1</sup> In these cases the loss of practice and the absence of concentration adversely affect the efficiency of the worker. Constant employment and the retention of judgment and interest are in these cases more essential than the retention or development of muscular energy.<sup>2</sup> It is,

<sup>1</sup> The value of constant practice is best illustrated in the art of glass blowing. The manufacture of the finer varieties of cotton and silk textiles requires a delicate touch which can be acquired only after a very long practice. For the value of judgment, the finest illustration is provided by the engineering and leather tanning industries. In the former case the accuracy of size and in the latter the uniformity of colour, thickness, pliability and other qualities of the product manufactured from raw materials of varying qualities are indispensable; and it is impossible to impart these qualities unless workmen possess a high degree of judgment. In all the above-mentioned industries it is not the select few but the rank and file who must possess the various qualifications, and which cannot be acquired without prolonged concentration.

<sup>2</sup> It is a common practice in Europe and America to keep certain types of industrial establishments going even in times of acute depression without the least prospect of earning a profit, and sometimes with the certainty of incurring a loss. There is, of course, no other object in view except to keep the efficiency of workmen unimpaired, and incidentally to keep the undertaking in touch with the world of commerce.

therefore, when the requirements of these industries are taken into account that it becomes necessary to create a permanent labour force.

But it would be not only difficult but also highly undesirable under the prevailing conditions to check the tendency to migrate. As we have seen, the factory labourer is by no means living and working in ideal surroundings, and so long as no improvement is made in these directions, it would be desirable for workmen to migrate to the village periodically in order to be able to recuperate their health. But so long as a permanent labour force is not created, it would not only be difficult to develop some of the highly technical branches of industry but also to improve the economic condition of the workmen engaged in some of the existing industries by improving their productive efficiency. The conclusion is obvious: while the migratory character of labour, in so far as it affects its supply, is a problem by itself, it is from the point of view of efficiency a mere detail. The improvement of efficiency both in connection with the existing industries and the highly-developed branches of various industries which have yet to be established is the crucial point, so that scientifically the problem of migration must be merged into the wider problem of efficiency. It would have been necessary to proceed on somewhat different lines had there been an actual scarcity of human raw material in India. But as it is, the problem before us is not of supply but of retention; and we want to retain the crude village products because we aim at creating an army of really efficient workmen, and because we realize that efficiency and migration cannot go together.

**Conditions of work in relation to migration.**—As far as our knowledge of labour conditions in the industrial centres of India goes, we find that it is not so much his work the Indian factory labourer flies from as the conditions in which he has to do that work. The congested atmosphere of most of the Indian factories would soon kill the energy and spirits of a hardy European worker, and the effects of this combined with those of the long hours of work upon the comparatively frail Indian workman can be easily imagined. It is chiefly on account of these adverse conditions that he is compelled to take those long “pleasure trips” to the village, and if the frequency or the length of those trips is to be shortened, a clean sweep of all the causes and sources of depression and ill-health within the factory will have to be made, and the hours of work will have to be shortened according to the requirements of the occasion. Improvements in these directions will, while eliminating the baneful effects of factory atmosphere upon the worker and affording him longer periods of rest and leisure, improve his health and physique, and so render it possible for him to make his trips to the village short and less frequent.

**Housing in relation to migration.**—We have seen that the lack or insufficiency of accommodation and consequent overcrowding in the factory areas not only ruin the health of the worker but also compel him frequently to leave his family behind in the village. The result is that either ill-health or family affections or both compel him to leave the factory at frequent intervals. Taken all round it seems that the housing problem is, more than anything else, responsible for the migratory habits of industrial

workers in India, and the experience of the Tatas at Jamshedpur speaks a great deal in support of this contention. In these circumstances we must not look forward to the creation of a permanent labour force without the provision of adequate and suitable accommodation for the factory worker. Moreover, it is a home, a real home, that the worker requires, and not, as is the case now in most of the centres of industry, a make-shift sort of arrangement.

Taken in the light of "providing homes" for workmen, such activities as are being shown at Bombay and other centres of industry are worse than useless—in fact they may be regarded as wasted money and effort. Those who are responsible for these "benevolent gifts" to the worker seem to possess a very limited amount of intelligence and imagination, or at any rate they are completely out of touch with the problems of industry. The least we should expect them to know is that an improvement in the standard of living is one of the greatest needs of labour and industry in India (as without this improvement we cannot expect a rise in the efficiency of labour) and that an one-roomed tenement hardly offers any scope and material for a comfortable living. These are not the sort of homes which are likely to bind the worker to the industrial centre. They have in a sense done more harm than good to the worker and industry: they have delayed the solution of the problem. But when the realities of the situation are grasped, and a real and lasting solution of the whole problem of industrial labour is found (which will come immediately after a definite policy of industrial development has been adopted), the additional cost of dynamite will not stand in the way of



clearing the ground for the erection of real homes for the industrial population of the country.

But on whose shoulders is to lie the responsibility of building these "ideal homes"? The employer turns his empty pockets inside out; local authorities show their annual deficits, their heavy liabilities, and the long list of their pawned resources; and the State has no fixed policy, little sympathy and hardly any interest. And yet we know that all the three parties are responsible in varying degrees. So long as the Government does not realize its own responsibility in the matter and compel other parties to realize theirs, we must not expect any improvement in the situation. All three must co-operate, but the Government itself must take the initiative. Housing subsidy on the English model would not offer an adequate inducement to private enterprise; moreover, it would not be advisable to let this field become the hunting ground of the capitalist. There are many ways in which the State might co-operate with the employers and local authorities in providing homes; but in devising a scheme of co-operation the possibility as well as the desirability of inducing the tenant to become an owner should never be lost sight of.

In this connection it should always be remembered that there is nothing that binds a primitive man to a place more securely than real property—and an Indian peasant is essentially a primitive being in many respects. By interesting the labourer in the question of ownership, it would be possible to destroy the last traces of desire for returning to the village which might linger in spite of other improvements.

In a scheme that aims at the ultimate transference of ownership rights to the worker himself,

the only way in which the three parties can co-operate is by dividing the burden of interest charges on the capital outlay. The State might raise a loan (which it can do on more favourable terms than other partners in the scheme), and demand of the employers and local authorities to contribute their quota towards the interest charges. The worker on his part may be required to pay for his home by monthly instalments which may form the basis of a sinking fund. He may even be required to contribute something towards the interest charges, but only on the condition that his total contribution does not exceed a certain percentage of his usual earnings. In this way the burden of interest can be distributed among the various parties directly or indirectly interested in the development of industries. Unless something is done on these or similar lines, the problem of industrial housing and therefore the whole riddle of industrial labour will remain unsolved for an immeasurable length of time.

**Amusements, games, education and unemployment insurance in relation to labour settlement.**— Side by side with the provision of housing facilities, it would be necessary to provide games and amusements, more particularly for the younger generation of workmen. The children of the existing generation must grow to like their environments in the factory town, which they can do only if in their impressionable days of youth life in the town offers them something more than life in the village. And there is nothing that captures the heart and imagination of youth more readily than games and amusements. Apart from that the advantages of these facilities will be reflected directly in the efficiency

of these workmen of to-morrow when they take up employment in the factory.

Sound education, both literary and technical, will also go a long way towards creating a permanent labour force. It is a common grievance among the village folk in India that even a short course of study in modern schools "spoils" their children, as they begin to find conditions in the village intolerable, especially if that education has been accompanied by occasional visits to a large neighbouring town. If there is even a grain of truth in these complaints, we must welcome them heartily: for they show that in education itself is likely to be found a force sufficiently strong to bind a large number of men to the centre of industry.

As regards unemployment insurance, it is often asserted that a system of State insurance against unemployment is not needed in India, as a factory worker can always return to his village when he is thrown out of employment. And yet this assertion is made by those very people who deplore the migratory character of factory labour in India. As it would be necessary to induce the labourer to sever his connection with the village, it would be the height of stupidity to depend any more upon the benefits of that connection. Moreover, it must be remembered that all industrial employment is more or less temporary in character, and in the absence of insurance against unemployment the worker cannot light-heartedly sever his connection with the village—his last refuge in times of unemployment under the prevailing conditions. But although the institution of unemployment relief is likely to go a long way towards solving the problem of migration, it must be admitted that it is not quite practicable at the present moment.

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It would prove to be too heavy a burden on the National Exchequer as well as industry, while its benefits are not likely to be so great as to justify that heavy financial burden.

**Settlement of labour in relation to its efficiency.**—As the migratory habits of Indian factory workers are chiefly due to the various undesirable features of life both inside and outside the factory, the improvements suggested in the preceding paragraphs should go a long way towards bringing about a permanent attachment of labour to the factory. In the process of settlement will also come a change in the outlook of the worker on life. In the prevailing circumstances, the labourer, so to speak, refuses to develop responsibility: loss of work and unemployment lose half their terrors to him when he can always fall back upon agriculture. He can therefore afford to be easy-going in his habits. But the moment he realizes (and education will bring about that realization the more quickly) that his life and happiness are dependent on industry, he will, being after all human, become more amenable to discipline. Better housing and education, which are the two essential factors in bringing about the permanent divorce of factory labour from the land, are bound to improve the standard of living and so make the labourer more ambitious. All these changes are bound to bring about an all-round improvement in the efficiency of labour.

**Efficiency demands shorter hours of work.**—If it is intended to exploit to the full the various improvements which are calculated to bring into existence a permanent labour force, it would be found desirable, perhaps necessary, to reduce the working hours substantially below their pres-

ent level. There are a good many sound reasons for this suggestion. To begin with, the hours of work (eleven per day) are so long that the worker has hardly any time left for other pursuits in life. Unless, therefore, he is in a position to enjoy more leisure, we should not expect much improvement in the standard of living which the provision of "ideal homes" is predicted to bring. In these circumstances it would be idle to expect an improvement in the standard of efficiency. Economic considerations apart, there is no justice in demanding of the Indian labourer to work for longer hours in an unfriendly climate than the physically superior European worker is expected to do in that congenial atmosphere. By compelling the Indian labourer to work longer hours we are perpetuating his physical inferiority, which no amount of improvement in housing conditions or an increase in wages can fully compensate. We should under no circumstances and at no time expect Indian labour as a whole to show the same degree of productive efficiency or even to work for as many hours as foreign labourers without showing distinct signs of deterioration, and by expecting him to work longer we would be deliberately inviting what we are anxious to avoid at all cost.

At the present time the Indian labourer is compelled to work so long and the work itself is so exacting for his poor physique that the end of the day finds him completely exhausted both in body and mind. Is it a wonder that he hates the factory and his work and is always anxious to avail himself of the first opportunity that comes in his way to loiter about or to absent himself altogether from his work? Not only will the shortening of hours lead to a decrease in loitering and absenteeism, but in the long

run will actually lead to an improvement in the productive capacity of labour. The labourer must get time and leisure to recuperate his lost energy.

It may be contended that a reduction of hours would lead to a corresponding reduction in output, and that the hours of work cannot be reduced without also reducing wages, which is far from desirable. This objection would be valid and a reduction in wages would be justified only if it could be proved that the Indian factory worker is incapable of maintaining his output when the hours of work are reduced. For instance, will an Indian weaver be unable to look after three looms for seven hours instead of two for ten hours? We have no doubt that more than 90 per cent. workers would welcome this kind of arrangement, for it would bring them the much-desired leisure. It is true that the worker, on account of the high pressure of work, would probably leave the factory at the end of seven hours as much exhausted as he does under the 10-hour system, but then he will have more time to recuperate his energy. These extra hours of leisure may be spent in more elevating pursuits that not only make life really worth while, but also create a desire for mental and moral development and give birth to new wants and ambitions.

It is perfectly obvious that something has got to be done in order to rescue the labourer as well as his employer from their present plight. A new and sympathetic light on the whole problem is urgently needed; but India has no one with Henry Ford's imagination and resourcefulness to demonstrate the possibilities of this new line of action as a solvent of labour difficulties. The employers in India are obsessed with the idea that their salvation lies in longer

hours. And why? Because, they say, their men are inefficient. But they do not tell us how the efficiency of the labourer is to be improved when he is not given a chance. Indeed, it seems that the Indian employer is the most unimaginative and unenterprising animal in all creation, and if in spite of his efforts he does not prosper, it is because of his sins against humanity: in all his misfortunes one can easily see the hand of Nemesis.

**Higher wages as an aid to improved efficiency.—** So long as the mentality of the employer does not undergo a complete change, it would not be prudent for the worker to expect anything by way of increase in remuneration without being able to show a distinct improvement in his efficiency. But as it is possible to increase the efficiency of labour to a certain extent (by first tackling the problems of housing, sanitation and education) even without an actual increase in wages, it should not be difficult to find means to maintain a higher standard of living and so pave the way for further improvements in efficiency. But even if in these changed circumstances the employer can manage to defy the labourer (as he would be tempted to do if labour is not strong enough to enforce its demand) and so let his misguided ideas of self-interest triumph over his better judgment, it would be the end of all hopes to improve the efficiency of labour beyond what improved housing and sanitation and shorter hours of work might bring.

But these eventualities will arise only when the employer is in a position to dictate his own terms to his workmen, and, well-organized as he is, it would not be altogether impossible for him to do so. To deal with such emergencies as

these, it would be necessary to prescribe by law the minimum rate of wages. It would also be advantageous to set up machinery to deal with disputes between the employer and his workmen. Attempts have been made during recent years to obtain recognition of the principle of minimum wage, but the manufacturer, influential as he is, has always succeeded in jockeying the Government and its economic and legal advisers into situations of his own liking. The result is that wages have often shown a tendency to fall below the subsistence level. Moreover, the present system tends to create a disparity in the scale of wages not only from place to place but even from factory to factory, and, as has been demonstrated during recent years in the case of the cotton mills of Bombay, is a fruitful cause of prolonged strikes and lockouts. Again, although the Act of 1929 provides machinery for the settlement of trade disputes, it cannot prove to be of any material advantage to the labouring classes, especially as it leaves the employer free to ignore—as he no doubt often finds it advantageous to ignore—the findings of the Courts of Enquiry when they fail to please him.

**Prompt and full payment of wages necessary in the interests of efficiency.**—It may be difficult for the Government and the employers to accept the principle of minimum wage, but there is no moral and economic justification in their refusal to abandon the system of levying heavy fines on flimsy pretexts and of withholding wages for varying lengths of time. We have already examined the extent to which these pernicious practices degrade and demoralize labour. The least that the Government might do in the in-



terests of labour and efficiency is to compel the employers to mend their ways; the law in its present state gives them too much liberty, and they are abusing this liberty in reckless disregard of the interests of their workmen. The question of fines and delays has certainly a strong humanitarian appeal, but it is not this aspect of the question that prompts us to demand an immediate reform: it is the economic side, as we are convinced that the prevailing abuses tend to make labour inefficient.

**Trade unionism as a bulwark against capitalistic aggression.**—When we study the present organization of industry in India and examine the black and disappointing record of the industrialist, it becomes difficult for us to escape the conclusion that the tendency to exploit labour will never be absent from the mind of the Indian employer even in times of prosperity (as was amply proved in the case of the cotton mill and jute mill industries during the war), and that he will always try to compel his workmen to share with him the fruits of his own incompetence in times of distress. When such is the state of affairs, there will be no other course open to the labourer than to compel the employer to yield his due and legitimate share, and this course of action will be possible only when workmen organize themselves into trade unions. By organizing themselves on these lines they will simply be taking a leaf out of their opponents' book, who have already mobilized their forces and seem to be well-prepared for all eventualities. No one should welcome the prospects of an industrial war; but if the employer is not willing to change his attitude towards labour, and if instead of arguing he must always brandish his sword in the face of his "adver-

saries", the latter will have no alternative but to take up the challenge sooner or later. Nor would the struggle be without its benefits to industry in the long run; the greatest need of industry in India at the present moment is efficient labour, and sweated labour, as we have already explained, can never attain a high degree of efficiency.

**Trade unionism in relation to efficiency.**—Apart from the militant side of their activities, trade unions will have a wide sphere of activities all of which will directly or indirectly improve the standard of efficiency. In the first place the development of trade unions will in course of time result in the development of the sense of responsibility among the workers which they so sadly lack at the present time; they will not only be responsible to the employer for their omissions and commissions but also to their own organizations. This tendency will be all the more noticeable when the labourer has become educated. Indirectly, too, the trade union movement will play an important part in improving and maintaining the standard of efficiency. Libraries, reading rooms, playing fields, and amusement facilities, to mention a few, may be provided by enlisting the support of the local authorities, employers and the public at large, and these institutions, as we have seen, will play an important part in improving the efficiency of labour. And as others would refuse to help until labour first learns to help itself, and as labour can help itself only by organizing itself into trade unions, the existence of the latter may logically be taken as one of the essential conditions of improving and maintaining the efficiency of labour.

But if the employers are really anxious to improve the quality of labour, they will have to change their attitude of hostility towards trade unions for one of friendliness. They will have to recognize that, in the present state of his mental development, the labourer cannot but look to the outsider for the management of his affairs. Moreover, he must give up his typically Oriental conceptions of the duties of a servant towards his master; he must learn (which he has not so far learnt) to treat and negotiate with his men as his equals, and not as his slaves. It no doubt means a somersault, but nothing short of a complete somersault will lead him and the country at large to the desired goal.

**Education as a factor in efficiency.**—From the point of view of efficiency the intellectual development of the worker is of even greater importance than an improvement in his surroundings, material equipment and organization, as without education the labourer will never be able to organize himself, far less use that organization to his highest benefit, or use improved tenements to the best of his advantage, or draw the maximum amount of benefit from the longer hours of leisure, or even to use his increased earnings in a manner most beneficial to himself. Moreover, the quality (as distinguished from quantity) of work depends entirely upon the intelligence and training of the worker. In order, therefore, to bring about an all-round improvement in the efficiency of labour it would be desirable to make a beginning by tackling the problem of education.

But the difficulty is that while under the prevailing conditions the young labourer is often brought up in the village, it is not practicable

to catch him in his nursery by extending the system of compulsory education to rural areas. But as this system has already been introduced among the urban population, it would be necessary to begin by providing opportunities to the labourer to transfer himself and his family permanently to the factory area.

It would not, however, be possible to expect even an educated labourer to give his best to industry without giving him the right kind of education. We have seen that, from the industrial point of view, the present system of education is altogether inadequate, and that not only must the school-leaving age be increased, but also it is necessary to introduce technical and vocational training. A complete and thorough overhaul of the whole system of primary education is needed; and so long as the worker is not trained and educated on up-to-date lines, we must not expect a great and revolutionary change in his outlook on life or a very great improvement in his efficiency.

**Employment bureaus and co-operative societies.**—The system of labour recruitment in vogue at the present time also tends to make the labourer inefficient inasmuch as it deprives him of a certain proportion of his earnings or compels him to give presents in cash to the employer's agent. Clearly in the interests of peace and efficiency this barbaric system of recruitment will have to be abolished, and abolished promptly. It would be a great improvement to establish employment bureaus in all the chief centres of industry in the country; but even under this arrangement it would not be wise to give a long rope to the officials in charge of these establishments. The labourer himself is likely

to be the corrupter in his race for employment under certain conditions, so that a very close vigilance will be necessary if these employment bureaus are to serve their purpose.

It will also be necessary in the interests of efficiency to rescue the labourer from the clutches of the money-lender. The prompt payment of wages and the institution of sick-allowances are likely to starve the money-lender a good deal; but to enable the labourer to obtain his supplies of food and clothing more cheaply for cash or on credit, it would be necessary to organize co-operative societies. As at the present moment the labourer himself is too ignorant and unorganized to embark on schemes of this nature, we must not expect any progress in this field without the intervention of the so-called "outside agencies".

**Physical fitness in relation to efficiency.**—It has already been explained that one of the most important causes of the inefficiency of Indian workmen is their physical inferiority, and that this inferiority is due to racial, climatic, cultural, economic and social causes. It is possible to eradicate completely the various cultural, social and economic anomalies; but the racial and climatic factors will always be there, although even in these cases it is possible to counteract their effects to a certain extent by sustained effort in the direction of physical culture and by means of economic weapons.

When we come to analyse the whole problem, the conclusion which is forced upon us is that the Indian labourer has a poor physique because he is born a weakling and because he does not live well. By catching him in his youth and by educating him and providing him with

better housing accommodation and so helping him generally to live well, we cannot but improve his vitality and physique and so improve his working capacity; but in order to make the best of the material at our disposal we must also try to remove, no matter how slowly, the various social and cultural anomalies. It will be a very long process, and probably no tangible results will be forthcoming for several generations, but the prospect of slow progress should not prevent us from making a beginning immediately.

It is difficult to say exactly how the problem ought to be tackled. As, however, we are expecting a lean time in the matter of results, perhaps it would be better to organize an attack on all fronts simultaneously. But in executing even this scheme it would be necessary to give special attention to the social and cultural sides of the question. The labourer must be made acquainted with some of the fundamental laws of clean living which he has been accustomed to disregard either in response to religious injunctions or as a result of ignorance and superstition. Superstitions and habits, especially those which are based on religious perversions, die hard among a backward people, but education and constant propaganda are bound to tell in the end.

It will also be necessary to give special attention to the diet of the working classes. The trouble with the lower classes in certain parts of India is not that their food is insufficient but that it is too ill-balanced to maintain health and physical efficiency. As a rule starchy foods are consumed in much larger quantities than it is necessary, while nitrogenous foods and foods containing "vitamin D" (such as vegetables and fruits) are neglected. This lack of balance results in general debility and in various kinds of

ailments which diminish vitality and staying-power. We cannot expect a people, more particularly a backward people, to change their dietary in a day; but education and constant propaganda may once again come to the rescue, and yield some good results in course of time.

Unbalanced food and unhygienic living lower the vitality of the worker and make him the victim of various wasting diseases. Prevention is always better than cure, but when prevention cannot be effected readily, more attention must be paid to the curative side of the question. For instance, under the existing conditions we cannot make the ignorant labourer immune from malaria, but all the same we can effect a cure by proper treatment and, moreover, we can minimise the after-effects of the disease and so prevent a deterioration in the physical efficiency of the victim. Again, we cannot look forward to a sudden change in the dietary of the labourer, but when the disproportionate consumption of starchy foods gives rise to hookworm infection (which not only diminishes his efficiency but also lowers his vitality and so exposes him to other devastating diseases) we can easily prevent further mischief by effecting a cure for this disease. Major Norman White's memorandum on the subject of removable pathological causes of the inefficiency of Indian labour is instructive<sup>1</sup> and the claim that the productive capacity of the man who has been treated for ankylostomiasis or hookworm increases by as much as 25 per cent. brings home to us the consequences of neglect, and demonstrates the necessity of a well-organized campaign against disease and ignorance throughout the length and breadth of the country.

<sup>1</sup> Report of the Indian Industrial Commission, Appendix I.

Here is at last an opportunity for the Government to help both labour and industry by legislative and executive action. It is not difficult to see that the case for the introduction of a system of medical supervision and control has been established. Workmen may be required to undergo a medical examination at frequent intervals, and arrangements may be made for the treatment of those who are suspected of being below the mark as regards health. The worker himself being ignorant and therefore unable to appreciate the consequences of his various ailments, it would be necessary to introduce compulsion in the matter of examination and treatment. The scheme is likely to be expensive, and more likely than not the employer will find it beyond his means; but as it is as much the duty of the employer to look after the health of his workmen as that of the State and local authorities to ensure the welfare of their citizens, it may be necessary to evolve a scheme of medical supervision financed, if not also controlled, by all the three interested parties. Whatever the ultimate arrangement as regards finance and control, the responsibility of taking the initiative rests upon the Government—in fact it would not be far wrong to suggest that if and when it is decided to take up the question of labour seriously, the problem of medical supervision must be one of the first to be tackled by the Government.

The campaign against ill-health and physical inefficiency of the worker would lose half its usefulness if due attention is not paid to the eradication of the evil of drink. The ill-effects of alcohol on human system are now universally recognized, but nowhere are they more devastating in character than in hot countries, especially when the vitality and physique of



the consumer in those hot regions are poor. We have no official data to rely upon, but anyone who has examined the conditions at close quarters must have come to the conclusion that, as in Europe, only a small percentage of industrial workers can be described as complete abstainers. Now, when the wages are low, the worker can indulge in this pastime only by depriving himself of the necessaries of life. The alcohol habit, therefore, affects the worker in India in twofold manner: directly by deteriorating his vitality and physique, and indirectly by depriving him of the necessaries of life.<sup>1</sup>

It is obviously undesirable for the State to leave the whole thing entirely to the discretion of the individual, especially when the individual is totally incapable of judging things for himself. Complete prohibition may at first sight appear to be the only effective remedy to meet the requirements of the situation, but in advocating this drastic measure for checking the evil in India we must not shut our eyes to the complete failure of the experiment in the United States and some of the Scandinavian countries. Our dipsomaniacs will always be with us, and there is no reason to suppose that Indians as a race are altogether devoid of "bootlegging" propensities. As far as we can see, we will ultimately have to fall back upon the restraining influence of social opinion for a lasting solution of the problem. The social conscience of the community and the individual must be aroused; but that does not relieve the Government of all responsibility in the matter. The Government might play its part by making the course of the "sin", which

<sup>1</sup> According to the Bombay Labour Office, between 8 and 10 per cent. of the income of the workers who drink is spent on this account. See the Bombay Labour Gazette, September, 1921.

is so easy now, more difficult by progressively increasing the duty on liquor and by gradually withdrawing the retailing facilities from the industrial areas—regardless of the effects of this policy on its finances.

### CONCLUSION

**Suggested remedies and their bearing on the efficiency of labour.**—Our enquiries on the condition of Indian factory labour and the causes of its inefficiency leave no room for doubt that the situation urgently demands remedies, and that until something is done to improve the situation, the labourer will never be contented, and the industrialist will never be free from the anxiety and inconvenience of finding suitable men to carry on the manufacturing operations. Again, so long as nothing is done to remove the various anomalies, the labourer will never become so skilful as to answer the requirements of the various highly-developed branches of industry which have yet to be introduced into India.

The effects of the various suggested remedies may, thus, be studied from three different points of view: the efficiency and welfare of labour, the requirements of the existing industries and the needs of some of the highly-developed industries or branches of industries which have yet to be introduced into India. The labourer demands improvements in the conditions in which he lives and works; the employer needs less flighty and more reliable labour; the industries of the future demand skill. The requirements of the present-day employer can be met to a very large extent by bringing about the settlement of labour in the factory area; by education (both literary and technical) and settlement we can gradually

produce an army of skilled workmen for the higher branches of industry ; and we can produce loyal and contented workmen by improving their economic conditions and by giving them leisure to enjoy life, which can be done only by improving their productive capacity. And the various remedies which we have suggested are calculated to remove the existing evils that affect the skill and productive capacity of the labourer in an adverse manner.

It has been shown that all the various existing anomalies act and react upon one another. In these circumstances it would be wrong to regard any one of the suggested remedies as superfluous. We have the raw material in its natural state, and we should not expect to get the finished article (highly skilled and efficient labour) while neglecting some of the finishing processes. Of course it is always possible to improve the quality of the material by partially subjecting it to some of the finishing processes, but we should always aim at producing a finished, and not a semi-finished, product. But, to continue the analogy, just' as every finishing process adds to the value and quality of a manufactured article, so the gradual application of the various remedies will bring about an improvement in the quality of Indian labour. In this case, however, it would be desirable to subject the crude product of the village to all the finishing processes at once ; but at the same time it would not be impossible to achieve the goal by stages, although, naturally enough, this method will take much longer time to produce the desired results. One thing is certain : so long as all or most of the remedies are not applied, it would be impossible to secure suitable workmen for the higher branches of industry which have yet to be introduced into India.

The remedies which we have suggested merely indicate the objectives, and not the lines on which action may be taken. It will be necessary to study and analyse each and every evil which directly or indirectly affects labour and through labour the industries of the country, and a definite and clear-cut programme of action will have to be drawn up. The various important details of that programme can be provided only by men who have had a first-hand experience of labour conditions not only in India but also in the more advanced Western countries. From this standpoint the Whitley Commission has an excellent opportunity of giving the necessary guidance to the country. And as the Commission's terms of reference include the examination of the various problems concerning the efficiency and welfare of industrial labour, their report is likely to serve as the Magna Charta of progress to the factory worker in India. But it can play that venerable rôle only on the condition that all the four parties in the game, viz. the Government, the employer, the labourer, and the community at large, are willing to play the parts assigned to them by the Commission.

**Responsibility of the Government.**—There is no doubt whatever that the Commission will assign the leading part to the Government; but the question is, will the Government be willing to play that part? The country has not yet forgotten the miserable failure of this star actor in the heroic rôle of the "saviour" of women and children nearly a quarter of a century ago when its genius and enthusiasm were eclipsed by the evil genius of that villain of the piece, the employer. There is no evidence to show that the leopard has changed its spots, and that the employer

is no longer anxious to play the part of the villain.

It is evident that no scheme of reform can be carried out in its entirety without the direct or indirect co-operation of the employer. The reforms in connection with housing, sanitation, medical inspection, hours of work, wages, sick allowance and maternity benefits, to mention but a few, cannot be carried out without the active assistance of the employer at one stage or the other; and without these reforms the problems of factory labour cannot be solved. The employer would like to get all the benefits of reform without making any sacrifices, so that it may be taken as a foregone conclusion that any serious attempt on the part of the Government to solve the various problems of industrial labour would bring it into conflict with the employer. In fact there are reasons to believe that so unreasonable will be the demands of the employer in the name of "liberty of action" that any determined effort on the part of the Government to introduce reforms would actually involve the coercion of the factory owner. Has the Government of India, constituted as it is at the present time, got the strength of character to fight against the well-organized and powerful class of industrialists just for the sake of its principles, or to protect the interests of that nonentity, the factory worker, or even to prepare the ground for the development of industries?

It is to be remembered that the mentality which was responsible for that storm of indignation against factory legislation (designed to protect the interests of women and children engaged in industry) about a quarter of a century ago is still there. If in those days the actions of the Government could be misrepresented as aiming

at helping the British industry by damaging its Indian rival, those arguments are, in the present sensitive mood of the country, likely to make a much wider appeal: for the Government is every whit as alien to-day as it was a quarter of a century ago; while in addition it is believed that British industries are now more desperately in need of foreign markets. If such is the attitude of the employer in India, the Government, in enforcing any measure of reform, will have to take courage in both hands and decide to act without fear or favour. And so long as the Government is not in a position to show these desirable qualities, the various problems concerning the welfare of labour and the development of industries will remain unsolved.

**A glance into the future.**—It is interesting to speculate on the probable trend of events in the future, and to try to visualize the results of the various reforms. In the social and economic spheres perfection can never be achieved, but in so far as Indian labour is concerned, a beginning will have to be made with some sort of an ideal capable of immediate realization.

But even on the day when illiteracy is completely banished from among the factory workers in India, when the worker is not compelled to live in dingy, insanitary hovels, when labour is so well organized as to be in a position to compel the employer to do justice in the matter of wages and hours of work, and when workmen have become healthier in body and mind as well as enlightened and ambitious—even the dawn of that golden age will not find the Indian worker as efficient in the matter of output (as distinguished from skill in the manipulation of machinery and materials) as the European and

American labourer. His physique will always compare unfavourably with that of the Western labourer, and the unfriendly climate will always be there to keep his output down. But, then, the employer would not suffer in consequence of smaller output, as the wages of labour would be correspondingly small; nor would the labourer suffer in want and poverty as, owing to climatic reasons, his requirements in the matter of food and clothing would be small as compared with those of his Western comrade.

## CHAPTER VIII

### STATE ACTION

#### INTRODUCTORY

**Methods of State aid to industries : a historical study.**—One of the most interesting topics in history is the connection between the evolution of political institutions and the development of industrial arts. Of course the manufacturing industries began to be developed thousands of years before the birth of the State in the modern sense of the term, but there is evidence to show that the political evolution of a people has always been accompanied by cultural and industrial progress. The Memphis of the Pharaohs, the Ur of the Chaldeans, the Pataliputra of the Guptas, the Baghdad and Damascus of the Caliphs, the Tehran of the Shiites, the Delhi and Agra of the Moghals and the Eternal City of Rome were as great seats of political power as centres of culture and material progress. And why? Because of imperial patronage.

In those early days imperial patronage attracted artisans to the seat of political power, and so encouraged industry. But in Europe even during the Middle Ages royal patronage had ceased to be the personal affair of kings and princes: it had, unlike what we find in the East, given place to national patronage. In England, indeed as in some other European countries, the grant of special facilities to foreign craftsmen, by Royal Charters and otherwise, remained for a long time the chief instrument of industrial development.<sup>1</sup>

<sup>1</sup> Cf. W. Cunningham: *The Growth of English Industry and Commerce, Early and Middle Ages*, pp. 188, 304, 641. Also E. Lipson: *The English Woollen and Worsted Industries*, pp. 10-26.



But political and economic changes soon rendered the adoption of more vigorous measures necessary. In England restrictions were put on the export of raw materials (such as wool) and the import of finished articles during the thirteenth century, and in the fourteenth century a Navigation Act requiring the export and import of merchandise in English bottoms came into operation.<sup>1</sup> In the time of Elizabeth, the grant of bounties was resorted to in order to encourage certain industries, including shipbuilding.<sup>2</sup> Then came the realization that industrial expansion demanded the capture and development of foreign markets: so harbours were improved to facilitate shipping and trade.<sup>3</sup> Special privileges were granted to the individuals and organizations engaged in trade with foreign countries; meanwhile, new industries at home were encouraged by the grant of Royal Charters conferring monopolies of trade. It was on these lines that the State encouraged the development of industries in England up to about the middle of the eighteenth century.

The rulers of France appear to have been more enterprising than their English contemporaries. As early as the middle of the fifteenth century, a system of State control of industries was introduced in France, which, according to the late Dr. Cunningham, was used as a sort of model in England. The French, however, went further than the English in many directions: apart from restrictions on imports and direct and indirect encouragement to exports (as in England) the State embarked upon a programme

<sup>1</sup> *Op. cit.*, 394.

<sup>2</sup> Cf. W. Cunningham: *The Growth of English Industry and Commerce in Modern Times*, pp. 324, 484, 485, 486, 516, 519.

<sup>3</sup> *Op. cit.*, pp. 66, 488.

of road construction in the sixteenth century—a thing which was never seriously attempted in England until about the middle of the eighteenth century—and less than a century later was itself setting up factories for the manufacture of cloth, lace, carpets, soap, glass and other articles.

A new era of State interference began in England with the Industrial Revolution. The new revolutionized industries needed a more effective protection; foreign markets were more necessary than ever; the interests of the country and industry had to be safeguarded by imposing restrictions on the export of operatives and machines; roads had to be constructed to facilitate the development of local markets. However, in the second quarter of the nineteenth century England was in a position to adopt the free trade policy. But the adoption of this policy did not impose any restrictions on governmental interference in the affairs of industry, except in the domain of tariffs. The State continued to interfere sometimes to protect the worker, and sometimes to assist industry indirectly. During recent years, however, the State has shown a tendency to extend the sphere of its activities in relation to industry. Scientific research and technical and industrial education are receiving heavy subsidies; export credit schemes have been put into operation; some of the key industries have been actually financed and protected; various struggling industries have been "safeguarded" against foreign competition; more elaborate arrangements have been made to bring the manufacturer in touch with foreign markets.

In Prussia there had been a great economic revival during the reign of Frederick the Great (1740–1786) when the imports of foreign manufactured articles were discouraged by prohibitive

duties, while bounties were granted on the export of Prussian manufactures. Again, special privileges were offered to foreign artisans; new industries were encouraged by subsidies and protective duties; the exports of raw materials were discouraged; loans were arranged for the purchase of raw materials and tools; grants were given in aid of technical education; various isolated parts of the country were opened up and connected by means of roads and canals.<sup>1</sup> On these foundations was destined to be built one of the greatest industrial structures of modern times.

Both France and Prussia would have probably revolutionized their industries on the English model before the end of the first quarter of the nineteenth century had not the Napoleonic Wars put back the clock of progress. The wars on the Continent did not materially affect the progress of industries in England; but both France and Prussia were completely crushed by these wars. It was thus that the revolutionized industries in England came to have a long start—indeed so long a start that no nation in the world could hope to overtake her without considerable effort and struggle. And this struggle found expression in such extraordinary measures as bounties and protective duties, indirect financing of industries (through banks), cheap railway freights on raw materials and finished products, and above all, as in Germany, the deliberate development of a system of education which was calculated to be most beneficial to industry.<sup>2</sup>

The United States, Japan, Italy, Belgium, Austria-Hungary and various self-governing members of the British Empire were, for a variety

<sup>1</sup> Cf. W. H. Dawson: *Protection in Germany*, pp. 2 *et seq.*

<sup>2</sup> Cf. J. H. Clapham: *The Economic Development of France and Germany*, pp. 303 *et seq.*

of reasons, left behind in the race of industrial development, and as they, like Germany and France, could not hope to compete with Britain on equal terms, special measures had to be taken in each case to introduce and protect new industries. The United States,<sup>1</sup> Japan,<sup>2</sup> Canada,<sup>3</sup> Australia<sup>4</sup> and South Africa<sup>5</sup> solved, and are still trying to solve, all their difficulties mainly with the help of protective tariffs. But other measures likely to benefit industry were not neglected. The United States had to subsidize industry, shipping and technical education. In Japan model factories were set up by the State, and foreign experts were invited to run those factories and to instruct young Japanese in the arts of manufacture; national laboratories for scientific and industrial research were established, and up-to-date arrangements were made for technical education and industrial training; private agencies were provided with machinery and plant on advantageous terms; financial assistance was given to various industries in the form of bounties and subsidies; industrial banks were set up to expedite the development of industries; in many cases the Government went to the length of providing a part of capital for industrial undertakings. In Canada, bounties have been offered to various industries, facilities for technical and industrial education have been provided, and roads, railways

<sup>1</sup> For the United States reference may be made to the Economic History of the United States by E. L. Bogart, and the Cambridge Modern History.

<sup>2</sup> See Cambridge Modern History and Financial and Economic Annals of Japan.

<sup>3</sup> See Canada Year Books and W. L. Griffith's *The Dominion of Canada*.

<sup>4</sup> See B. R. Wise: *The Commonwealth of Australia*; and H. D. Baker: *Australia*.

<sup>5</sup> See W. B. Worsfold: *The Union of South Africa*.

and canals have been constructed by the Government. In various States of the Commonwealth of Australia and in New Zealand, protective tariffs have been adopted, various industries (including shipping and shipbuilding) have been subsidized, and roads, railways and harbours have been constructed. In New Zealand coal-mines and hydro-electric installations are owned and worked by the State, while the Government of the Union of South Africa helps industries by imposing high tariffs, and by the provision of facilities for research and technical education.

**The main lines of State action.**—The above description of governmental activities in various countries is short and sketchy, but it gives us an excellent idea of the lines on which a government may proceed in order to develop the industries of its country. We are not concerned with the ultimate economic effects of the development of industries in any of the above-mentioned countries: all we have to remember is that in almost every case the measures taken by the State did actually succeed, though in varying degrees, in establishing the manufacturing industries for which conditions in the country were favourable.

One of the most important and highly significant conclusions forced upon us by the industrial history of various nations is that the measures taken by a State to stimulate the development of industries have differed not only according to the economic condition of the nation at a given time, but also according to the circumstances prevailing in the world beyond its own frontiers. Our attention is also drawn towards the fact that the methods and devices adopted by some of the old industrial nations have not only been fully exploited by new-comers in the field of industry,

but it has sometimes been found necessary to apply new and more effective devices and measures according to the requirements of the time. Each nation and each generation of men have thus made their own contribution towards solving the problems of industry.

A new field for State action was opened up by the circumstances arising out of the Industrial Revolution in England. Britain was enjoying a long start, so that when Germany, France, America and other countries came into the field, they had to devise brand new measures to meet the requirements of the situation. The leeway could be made up only by adopting such extraordinary measures as those relating to technical and scientific education, research, financial organization and assistance, and others. But at the same time, none of the older methods of State assistance to industries was entirely neglected: import duties on foreign manufactures, bounties and subsidies on native products, and restrictions on the exports of raw materials were revived; foreign artisans were welcomed with open arms; even that old method of encouraging local industries, the royal patronage, was not allowed to fall into disuse—only the place of the ruling head was now taken by the whole governmental machinery. New weapons were forged and put into use one after another; at the same time all the old tools were gradually reshaped and used more unsparingly than ever before. And the late-comers, like the Japanese, could not afford to discriminate in choosing their weapons from the armoury of European industrial nations: as we have seen, not only had they to arm themselves with all their opponents' old and new weapons, but they had actually to go a step further. Hence those model factories and

State partnerships in banks and industrial establishments which were at one time so unique a feature of the Japanese industrial organization.

It is remarkable how industrial history has been repeating itself in every country; but it would be more remarkable if it now ceases to repeat itself in the case of new-comers in the field of industry. The lesson is obvious: those new-comers must carefully examine the possibilities of every weapon which other nations have used and are still using so effectively. It may be possible to neglect or modify some of those weapons without any serious disadvantage, but it would be impossible to achieve the goal while neglecting all or most of them: they must not disregard the lessons of history, and the history of every nation (including, as will be shown later on, England) tells us that when a nation has to overtake a rival which had a long start in the field of industry, it can do that only by adopting such measures as the imposition of protective duties, grant of bounties and subsidies, provision of transport facilities, discriminating transport charges in favour of local industries, grant of financial assistance to industries, provision of facilities for scientific research and technical and industrial education, establishment of model and demonstration factories, and grant of facilities for expert technical advice and commercial information.

**Indirect State assistance.**—The various activities referred to in the preceding paragraph do not completely exhaust the field of State action. As far as we can see, there are very few governmental activities which do not directly or indirectly affect the manufacturing industries of a country. As we have seen in connection with

industrial labour, the policy of a government relating to sanitation, medical relief, housing and general education exercises an important influence on industrial development. Again, the currency policy of the government, the general management of revenues, and laws relating to land tenure, banking practice, joint-stock and private companies, trade marks, patents and even those concerning the social life of the people, such as marriage and vagrancy, are not without their effects on industries. And finally, as we have already explained, legislation relating to such matters as hours of work, wages, trade unionism, compensation, factory management, unemployment, health insurance and others, is from the industrial point of view a factor of first-rate importance. Although the activities of the State in these fields have no direct influence on the development of industries, some of them are so far-reaching in their effects that the slightest bungling on the part of the government may nullify the benefits of the various measures designed to bring relief to industry directly.

**Scope of the present enquiry.**—The above is by no means an exhaustive survey of governmental activities affecting the industries of a country directly or indirectly: while many others will be described in the course of the ensuing discussion, it has to be remembered that the field is being gradually widened—in their anxiety to help industries governments have long since given up the habit of limiting their actions according to the dictates of convention and precedent. But while new fields are being opened up, all the old and ancient ones are being all the more vigorously exploited.

These facts are not without significance for



India where efforts are being made to develop industries on modern lines. As no country in the world has developed a system of national industries without at first smoothing the way for that development and subsequently applying at least some of the remedies previously exploited by the more advanced industrial nations, we must determine the exact place of all these various remedies in India's programme of industrial development. Moreover, as no country has been able to develop its industries without applying these remedies at one time or another in its history, they may serve as a sort of measuring rod to determine the depths of our Government's anxiety to develop manufacturing industries in India. But we must go farther than that: we must try to examine the real attitude (whether hostile or friendly) of the Government towards industries at various times, and this cannot be done merely by taking the record of activities into consideration. In psycho-analysing the Government, the outer manifestations of its mind will be a useful guide; but in order to determine the causes of inborn tendencies, if any, we will have to direct our enquiries to other fields. However, it will be our first duty to examine the record of their achievements.

#### THE INDUSTRIAL POLICY OF THE EAST INDIA COMPANY

**Motives and ideals of the East India Company.—**In tracing the causes of the decline of India's ancient industries it has been shown that the gradual disappearance of all those crafts was inevitable, and that even the presence of an all-powerful national government would not have materially affected the course of events. In

these circumstances it would be clearly unjust to accuse the East India Company of complicity in the demise of Indian industries. On the other hand, the Company being primarily a commercial body, it would have found the prosperity and not the ruin of Indian industries to its advantage: the fact that the Company tried to improve the condition of the cotton and silk piecegoods industries suggests that, far from harbouring any hostile intentions, it was, up to the closing decades of the eighteenth century, actually friendly and sympathetic towards industries in India. Indeed, it would not have been in its interests to act otherwise.

It was during the closing years of the eighteenth century that the Company withdrew its patronage; it was forced to do so by the powerful industrial interests in England, to whom the annihilation of all textile industries in India was more welcome than their prosperity or even their existence.

During the nineteenth century the East India Company had been reduced more or less to the position of an automatic machine to execute the decrees of its masters at home; its motives and ideals with regard to industries in India could easily be identified with the motives and ideals of the English manufacturing classes who had now become the dominant political force in England. It is obvious that the growth of a rival system of industries in India would have never been welcomed by the English manufacturer: in fact it would have been in the interests of British industries had the East India Company actively discouraged the introduction of the modern methods of manufacture. But the position becomes very complicated when we find the Company actually encouraging the development

of that basic industry—iron and steel manufacture. It will be shown in connection with industries of the basic order that the Company helped various individuals in every possible manner—by mineral and forest concessions, by advancing loans, and by placing contracts on favourable terms—to establish the iron smelting industry in India. In its anxiety to establish the industry, the Company went to the length of setting up factories at its own expense.

We thus find the East India Company pursuing two different ideals; but these contradictions are too simple to bring about a serious confusion. In order to find an explanation for this anomalous state of affairs and to understand the policy of the Company we must try to analyse the motives responsible for those contradictions. The Company, it seems, was anxious to help India, but not at the expense of Britain. A cotton mill in India would have injured Britain, but the iron works could not, at any rate in those days. Nature had cleared the way for Lancashire goods in India, and it would have been traitorous on Company's part to put obstacles in the way of its country's prosperity. But helping India in the matter of iron implied no such conduct. The Company's attitude towards Indian industries was friendly—so long as that friendliness did not injure British industries. But the moment the interests of its country were involved, it assumed not indeed a hostile attitude but complete neutrality. Just as it had refused to place obstacles in the way of Lancashire goods, so it would have declined to play an active part in removing those obstacles had they come into existence in spite of its indifference. It was by all means an honourable attitude, but it cannot be described as progressive. The country, it is

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true, was not quite ready for the introduction of Western industrialism, but it is equally true that the Company made no great effort to prepare the ground with a view to expedite the development of industries.

### INDUSTRIAL POLICY DURING THE PRE-WAR PERIOD

**Laissez-faire policy under the Crown.**—If anyone in 1858 had expected that with the passing away of the East India Company and with the establishment of the direct rule of the Crown would dawn a new era for Indian industries, he must have been sadly disillusioned. But there was no occasion to feel surprised, seeing that the direct rule of the Crown meant only a change in name, and that the ultimate source of authority, the British Parliament, had not changed its views in the matter of industrial policy. As a matter of fact the change was followed by an actual setback inasmuch as it resulted in the suspension of the activities of the Government in non-competitive fields. From this point of view the direct rule of the Crown had all the defects of the Company's rule, but none of its redeeming features.

By the time the Crown assumed control of government, conditions in India had become more favourable for industrial development. Western education had been broadening the views and outlook of men; the knowledge of chemical and physical sciences—the real basis of modern industrial methods and technique—was spreading; peace, security and the expansion of foreign trade were gradually bringing about the accumulation of capital. All these developments, as we have seen, were helping to create the

spirit of enterprise among the people, which was finding expression, among other things, in the introduction and development of the factory system of manufacture. This movement was further stimulated by the construction of railways: they facilitated the collection and transport of raw materials and the distribution of finished products, although they also increased the intensity of foreign competition. Again, the Department of Geological Survey was set up on a permanent basis during the 'seventies, which subsequently led to the discovery of some new coalfields, and so indirectly helped industry by bringing down the cost of fuel.

As far as indirect assistance to industries goes, the Crown Government had many achievements to its credit. Apart from the establishment of peace and security, and the provision of education and transport facilities, the Government was not slow to introduce laws relating to banks and joint-stock companies. But by no stretch of imagination can any of the above-mentioned activities be described as designed to help and to stimulate the growth of industries directly. The ideal of the new rulers of India was to create a well-ordered State, and if the measures directed primarily towards that end helped industries, we cannot but regard industrial development as a by-product. In order to achieve those great ideals—the establishment of the rule of law and the development of the foreign trade of the country—everything that indirectly helped industries in India would have been done just the same: peace and security were not bestowed with a view to help industries; universities were not set up to create a race of industrialists; railways were not constructed even with the remotest intention of helping industries; even the Geologi-

cal Survey of India cannot be claimed to have been created solely for the benefit of Indian factories.

Had the Government of India even the least intention of helping the industries of the country, it would not have insisted on a purely literary type of education in the universities: it would have also introduced some sort of technical education as well. Again, if the newly-constructed railways were at all intended to benefit industry, the Government would not have allowed the railways to pursue a policy of discrimination in favour of imported goods—on the contrary, as was the case in various foreign countries, special privileges in the matter of rates would have been granted to the infant industries of the country.

In the face of this indifference it would have been foolish to expect the Government to regulate its fiscal policy according to the needs of the various newly-established industries. As a matter of fact that policy was not regulated even according to the financial requirements of the Government itself: it was dictated by the British manufacturer, and the history of duties on cotton goods provides plenty of material in support of this contention. It would be a pity to miss this story which is at once interesting and instructive. It happened like this. In the early 'sixties, when the task of re-conquest and pacification after the great rebellion of 1857 had been completed, the cotton mill industry began to be developed with great rapidity. So rapid was the progress that in the early 'seventies the mill-owners had to turn their attention to foreign markets. With the setting up of more mills the exports of Indian yarn and cloth increased all the more rapidly during the second

half of the 'seventies. Now since the 'sixties the Government had been compelled to impose import duties on cotton goods (which ranged between 5 and 20 per cent. at different times) in order to stabilize its finances. Lancashire attributed the rapid development of the cotton industry in India to the protective effects of these import duties. Completely shutting their eyes to the fact that the coarse products of Indian mills could not compete with the finer products of Lancashire, and as such the development of the cotton mill industry in India was not a menace to their own prosperity, the English cotton mill-owners compelled Parliament to pass a series of Resolutions demanding the repeal of import duties on cotton goods. The result was that in 1879 Lancashire "greys" were exempted from duty, and three years later all import duties on cotton goods were abolished. And who was the sufferer? Not by any means the Indian manufacturer, as, in the absence of direct competition, the repeal of duties did not materially affect the industry.<sup>1</sup> Although singularly barren in its consequences, the incident provides food for thought. In the first place it plainly shows that the fiscal and industrial policy of the Government of India was being dictated by British manufacturers, and, secondly, that these dictators could not tolerate the existence of a rival in India.

If further evidence of selfishness is at all needed, we have only to turn some more pages of the history of the Indian cotton mill industry. It is recorded that in 1894 the Government once

<sup>1</sup> That the rapid development of the cotton industry in India was not due to import duties on foreign goods, and that the repeal of these duties did not adversely affect the fortunes of the industry is shown by the fact that between 1882 and 1895 the number of spindles in India increased from nearly 1,550,000 to over 3,500,000.

again found itself desperately in need of funds, and once again it looked towards cotton goods for relief. As there was no other way out of the difficulty, the Secretary of State sanctioned a paltry 5 per cent. duty on imported cotton goods, but on the condition that a countervailing excise duty was also imposed on the products of Indian mills so as to deprive the tax of any protective sting it might possess. The protective effects of a duty of 5 per cent. ad valorem ! What a chance for a worry ! In so far as the fortunes of the industry in India were concerned, the new measure had little significance, or, at any rate, it did not hurt the industry to the extent shown by the magnitude of the burden. It is true that this measure provoked the Indian mill-owner to shed more crocodile tears than any other in history, but those tears were in part genuine. And those genuine tears were not inspired by any great financial loss, but by the knowledge that the State instead of helping him, or even standing aloof as a disinterested spectator, was actually putting obstacles in his way. And this sentiment was shared by every Indian who had the sense to grasp the deep-rooted significance of this new measure. Dr. Gilbert Slater's verdict that the birth of this sentiment was "an imperial disaster of the first magnitude" beautifully explains all its implications.

These facts give us an idea of the industrial policy of the Government up to the closing years of the nineteenth century. They show that India's rulers were utterly indifferent towards the fate of industries in the country ; and if industries were able to make some progress, it was in spite of this cold indifference. We cannot say for certain what the attitude of the Government would have been had Indians taken full advan-



tage of the favourable conditions created (not with the object of helping industries) by their rulers themselves ; but their conduct towards the cotton industry (which was the only national industry of any importance at the time) suggests that they would not have been inconsolable had India remained as innocent of modern industrial methods as she was in the days of the East India Company.<sup>1</sup>

**Crossing the Rubicon.**—The first direct attempt under the Crown to help industries was made in Madras in the year 1898 when Mr. (now Sir Alfred) Chatterton, who was Superintendent of the Madras School of Arts at the time, obtained a small grant from the Madras Government to demonstrate the possibility of manufacturing aluminium vessels. The story of this new departure, however, began to be written in the early 'nineties of the last century when "proposals that the water power, which would become available on the completion of the Periyar irriga-

<sup>1</sup> As a result of the recommendations of the Famine Commission of 1880, an exhibition was organized in Calcutta during 1884-85, which, according to the Holland Commission, led to the institution of the Calcutta Commercial Museum. At the same time the Reporter on Indian Economic Products was instructed to examine the Indian industrial resources. It is also claimed that along with these measures some provision was made for technical and industrial education. As these governmental measures have been boomed a great deal by the Industrial Commission and various writers, it appears necessary to explain that the Calcutta Commercial Museum was by no means designed for the products of organized industries: it was meant for handicraft products and as such could not have helped the factories in existence at the time. Similarly, by some very strange coincidence, the Reporter's attention was confined mainly to the handicraft industries, so much so that he quite forgot even to examine the possibilities of various organized industries. As regards technical education, the less said the better. The arrangements were totally inadequate even to meet the requirements of handicrafts, while organized industries were once again completely neglected. This neglect of organized industries all round cannot be a mere coincidence: everything points to the conclusion that it was an expression of the industrial policy of the Government.

tion project, should be utilized in the manufacture of aluminium by the then new electrolytic methods, had awakened interest in the Madras Presidency. Nothing has come of these proposals, and to this day the water power remains undeveloped; but . . . the Government sanctioned experiments . . . in working up sheet and ingot metal procured from the British Aluminium Company to determine whether the metal would prove useful to the people of India, and, if so, to build up a market for it in the country, which would justify the establishment of hydro-electric works for its production from Indian ores".<sup>1</sup> The experiment was a success, and in 1900 the Secretary of State sanctioned the appointment of Mr. Chatterton for a period of three years in order to organize and develop the various technical trades and industries in the Presidency. It may be mentioned here that although a large demand for aluminium has been created in the country, the original object of the Madras Government's experiment, which represented a truly noble ideal, has been lost in the dust of applause and self-satisfaction. However, the achievements of the Madras Government, though small and insignificant, show that at last the Rubicon had been crossed.

**Industrial policy of the Central Government.**—The Madras Government was by no means alone to boast of its progressive ideals: it had to share the laurels with the Government of India without whose consent and guidance it could not have taken the initiative. In 1905 the Central Government went a step farther by creating a separate Imperial Department of Commerce and Industry.

<sup>1</sup> See Report of the Indian Industrial Commission, par. 107.

But "it is believed that this Department by no means took the form originally contemplated by Lord Curzon", whose lofty ideals of assisting the industries of the country through this new channel were not shared by his underlings and his successors. The new Department rapidly degenerated to the position of an observation post to watch the activities of the existing industries, but with no power or desire to help them, far less to explore the possibilities of helping new ventures. However, the ultimate character and policy of this Department were to be decided by the happenings in the provinces; it was in Madras, and to a certain extent in the United Provinces, that the battle between the forces of progress and reaction was fought. Let us, therefore, go back to the scene of that fateful struggle.

**Developments in Madras.**—The success that attended the efforts of the Madras Government to develop the aluminium industry in the Presidency led to an expansion of the activities of the Government in the field of industry. Under the direction of Mr. Chatterton, hand-loom weaving was developed, irrigation by pumping was undertaken, and, which is very important from the point of view of the present inquiry, the chrome process of tanning leather was introduced and developed for the first time in India. Moreover, arrangements were made to enable small manufacturers to instal power-driven machinery and plant. These numerous activities, according to the Industrial Commission, "aroused the opposition of the local European commercial community, who interpreted them as a serious menace to private enterprise and an unwarrantable intervention on the part of the State in matters beyond the sphere of Government; on

the other hand, the Indian public approved of the policy which had been pursued”.

Now in 1908, an industrial conference was held at Ootacamund, which passed resolutions calling upon the Government to take a greater share in the development of industries. The recommendations of the conference were reviewed in the Madras Government Order No. 2894 of October 17, 1908, wherein the appointment of a Director of Industries “to control pioneer enterprises and practical industrial education, and to establish a bureau of industrial information and an industrial museum” was announced. But when the scheme came before the Secretary of State (Lord Morley), his lordship failed to see the utility of State action in the matter of demonstration and experiment on a commercial scale—which were the pivotal points on which the whole scheme rested. In his famous despatch of July 29, 1910, he politely ordered the Madras Government to suspend their activities in those undesirable directions, and to confine their attention strictly to industrial instruction. The Secretary of State was careful to explain that the State funds might be expended upon bringing the people in touch with the various scientific and technical developments which were taking place in Europe, and that it must be left to private enterprise to demonstrate the commercial possibilities of these improved methods in India. This brought all the industrial schemes of the Madras Government to an end—at any rate for the time being.

**Developments in the United Provinces.**—The initial successes of the Madras Government had their reverberations felt in the United Provinces. Being fired by his progressive ideals, Sir John Hewett,

Lieutenant-Governor of the Province (who had been the first member in charge of the new Imperial Department of Industry and Commerce), summoned an industrial conference at Naini Tal in the year 1907. "The proposals accepted at this conference included the appointment of a provincial Director of Industries advised by a board of officials and businessmen, whose main functions were to be the acquisition and dissemination of industrial information, the introduction of new and the stimulation of existing industries. For these purposes the Director was to be provided with an expert staff, and to have the control of industrial and technical education and, in particular, of a technological institute to be established at Cawnpore, the professors attached to which were to assist by investigation and advice in the solution of industrial problems. With the help of the staff of the technological institute, the Director was to pioneer new industries and to experiment in improved methods and demonstrate their application to certain existing industries on a commercial scale".<sup>1</sup>

These recommendations of the Naini Tal Conference were accepted by the United Provinces Government, and the development of industries was, so it seems, started with a vengeance. Loans and grants were distributed right and left without any regard of consequences or of the requirements of the occasion. New sugar factories were set up and most of the existing ones were remodelled.<sup>2</sup>

<sup>1</sup> *Op. cit.*, par. 108.

<sup>2</sup> How mercilessly funds were squandered, is shown by the history of the loan given for starting a sugar factory in the Gorakhpur district. A loan of Rs. 7,00,000 was granted to the sugar factory with a view to demonstrate the possibilities of the industry, but the terms of the loan did not bind the Company to accept advice from, or even to permit inspection by, any Government officer. The machinery and the processes adopted were not in all respects suited to Indian conditions. See Report of the Industrial Commission, Chap. VIII.

A pioneer oil mill was also started at Cawnpore in order to investigate the possibility of manufacturing cotton-seed oil on a commercial scale. They would have gone farther still had not Lord Morley's despatch compelled them to call a halt. This sudden outburst of pioneering effort cost the provincial exchequer several million rupees, and it is a tribute to the incapacity of those who were responsible for devising and executing the scheme that the experiment yielded no results of any importance or value. Indeed, as far as experiments in the United Provinces are concerned, the Morley despatch came as a blessing in disguise—and it came none too soon.

**Effect of Lord Morley's despatch on Government of India's policy.**—While Lord Morley's despatch brought to a standstill the activities in Madras and the United Provinces, it had a paralysing effect upon the senses of the Government of India. They now became so cautious and timid that their attitude suggested a relapse to the policy of mid-Victorian days. But the worst part of this unfortunate affair was that the despatch deprived them of the last rudiments of independent judgment, self-confidence and self-respect. They were in this plight when Lord Crewe sent his despatch dated March 12, 1912, in which he tried to explain the real meaning of his predecessor's rebuke. To put it concisely, Lord Crewe began by telling them that "the Madras Government had placed too limited a construction" upon the orders given in his predecessor's despatch, and ended up by sanctioning small experimental plants for the purpose of demonstrating the advantages of improved machinery or new processes. He also sanctioned the creation of Provincial Departments of Industries, subject

to the condition that the activities of the Directors of Industries were kept within well-defined limits.

But this new communication failed to neutralize the demoralizing effects of the Morley despatch. It did not restore to the Government of India their judgment or self-confidence. As remarked by the Industrial Commission, even now they "seemed to be in doubt as to how far they would be justified in sanctioning proposals for demonstration plants, financial assistance and other forms of direct aid to industries. Their desire to move in these matters, which had not so far reached the stage of active fulfilment, had received a decided set back". However, one tangible result of Lord Crewe's despatch was that Directors of Industries were appointed in almost all the major provinces.<sup>1</sup>

**Pre-war industrial policy reviewed.**—The various activities of the Central and Provincial Governments during the first decade of the present century cannot fail to create the impression that the rulers of India (we use the term advisedly) had now become alive to the desirability of developing the manufacturing industries of the country. They also show that there was a divergence of opinion between the real rulers and their agents in India as to the part which the State was to play in developing industries. On the one hand we have the "men on the spot" who understood the situation, and who were anxious to do all that Nature had made

<sup>1</sup> The functions of the Directors of Industries as laid down in Lord Crewe's despatch of March 12, 1912, were to collect information and data regarding the industrial establishments already in existence, to carry out and direct experiments and to bring the results of these experiments to the notice of local manufacturers, to supervise the training of students in technical and industrial institutions, and to advise the provincial Governments in matters relating to industrial legislation.

them capable of to improve the situation. On the other side we have their masters in England who, apart from having their own orthodox views on the functions of the State, had their own interests to consider. In forming an idea of the pre-war policy of the Government, therefore, we have to take into account only what Parliament and Imperial Government were prepared to do, and not what their agents in India wanted : for, from the constitutional point of view, even in the days of Viceregal absolutism the Governor-General himself was merely a sort of glorified clerk executing the decrees of the Secretary of State. In matters affecting directly or indirectly the economic well-being of Britain, the heads of the Central and Provincial Governments in India were nonentities ; the history of duties on cotton goods and Lord Morley's despatch prove that.

In these circumstances it would be a mistake to look upon the activities in Madras and the United Provinces as indicating the industrial policy of the Government. What was done was in a sense illegal, and consequently had to be undone. For a clear-cut exposition of policy we must turn our eyes to the contents of the Morley and Crewe despatches, and, as we have seen, even the Crewe despatch (which was decidedly more liberal than his predecessor's) did not go beyond providing facilities for technical education, setting up small experimental plants as adjuncts to those educational institutions, and appointing Directors of Industries in the provinces. How far these facilities were likely to meet the requirements of the situation and to stimulate the growth of industries will become obvious after we have minutely examined the record of achievements up-to-date ; at this stage



we can only say that, before Lord Morley's intervention, the mere introduction of two promising industries—aluminium hollow-ware manufacture and chrome tanning—had amply justified governmental action in the matter. But these valuable results may, having regard to various circumstances, be described as accidental finds or flukes. There was no definite and clear-cut policy behind these activities: it was realized by individual officers of the Government that something had to be done, and the Government blindly plunged into various schemes at their bidding without stopping to think out a definite plan. The whole business was pure and simple gamble: it brought a rich harvest of results in Madras and disaster in the United Provinces.

It is very difficult to say what the consequences would have been had Lord Morley given a free hand to his subordinates in India. But one thing is certain: industries in India would have never made any progress without a definite policy of industrial development, and as the formulation of that policy would have necessitated a thorough overhauling of the whole fiscal system—which the Imperial Government and Parliament would never have countenanced in those days—the freedom of the Government of India to assist industries by other means at its disposal would not have enabled India to make the best, of her opportunities and resources. From this point of view the Morley despatch did not do a great deal of harm to industries in India—unless, of course, it can be proved either that the wheel of chance was going to continue its run in favour of Indian industries (as it had at one time been doing in Madras) or that the Government were going to attack the problem from all sides. Demonstration factories and technical education

are undoubtedly important items in the programme of industrial development, but, as we have seen, there are other items of even greater importance without which it is not possible to make any real and lasting progress. Of course there is no evidence to show that the Government had the will or power to introduce those items in their programme. All those demonstration factories and industrial schools would therefore have led the country nowhere. Lord Morley, it seems, was unduly apprehensive.

**Industrial policy during the war.**—As might have been expected, India found herself unprepared to face the situation created by the Great War. It was then that the people and the Government realized the real significance and consequences of dependence on foreign countries for the supply of manufactured articles. On the one hand the economic life of the country was paralysed, while on the other the Government was feeling the pinch of scarcity in connection with various articles of military importance. Naturally, it set the Government thinking very seriously, it seems, for the first time in history. Equally naturally, their first thought was to overhaul their whole industrial policy which was the root-cause of their misfortunes. With this end in view, Lord Hardinge, the Viceroy, sent a despatch in November, 1915, to the Secretary of State, pointing out that “a definite and self-conscious policy of improving the industrial capabilities of India will have to be pursued after the war, unless she is to become more and more a dumping ground for the manufactures of foreign nations”, and suggesting that “after the war India will consider herself entitled to demand the utmost help which her Government can afford to enable

her to take her place, so far as circumstances permit, as a manufacturing country”.

As a first step towards the goal, the Government announced, in 1917, the appointment of the Indian Industrial Commission to inquire—

(a) Whether new openings for the profitable employment of Indian capital in commerce and industry can be indicated.

(b) Whether and, if so, in what manner, Government can usefully give direct encouragement to industrial development,

(i) by rendering technical advice more freely available ;

(ii) by the demonstration of the practical possibility on the commercial scale of particular industries ;

(iii) by affording, directly or indirectly, financial assistance to industrial enterprises ; or

(iv) by any other means which are not incompatible with the existing fiscal policy of the Government of India.<sup>1</sup>

The appointment of the Industrial Commission marked the beginning of the third stage in the development of Indian Government's industrial policy.

Meanwhile, changes of far-reaching importance were taking place in the economic life of the country. The war-time restrictions on production and exports combined with the difficulties of procuring freights brought about an acute scarcity of various manufactured articles for the supply of which India was completely dependent on foreign countries. This scarcity was full of possibilities for mischief in the case of various

<sup>1</sup> See Government of India's Resolution No. 3403, Commerce and Industry, of 19th. May, 1916.

basic articles which were used in the existing industrial establishments and of those which were required for military purposes. In these unusual circumstances it became necessary, among other things, to develop the resources of the country and to bring under control as far as possible the demand for various articles which could not be procured in desired quantities. With this object in view, the Indian Munitions Board was organized in April, 1917, and was very wisely armed with extensive powers to deal with the situation. The Board at once proceeded to apply some very drastic, but original, remedies with a view to encourage Indian industries. With the object of developing the industrial resources of the country, the Board provided expert advice, facilitated the import of plant and machinery, and engaged suitable skilled workmen for new industrial establishments. Again, it introduced a system of local purchase of manufactured articles needed in India for the army and various Government departments, including the railways. Furthermore, it introduced a system of diversion (by introducing the so-called priority system and control over indents on all foreign countries) of orders for manufactured articles from foreign countries to the manufacturers in India.

The results of these activities were, for the moment, far-reaching. A hot-house for industries was built up, and all kinds of facilities (including all sorts of wild and extravagant promises regarding the Government's behaviour after the war) were provided to induce people to sow the seeds of new industries. The effect was almost magical: many new industries came into existence in the twinkling of an eye. These hot-house plants represented the monumental

war-time achievements of the Government and its Board, but, like all hot-house growths, they were not destined to live long : on the restoration of normal conditions after the war they perished even more rapidly than they had grown. Such was the tragic ending of the first part of the drama of war-time efforts.

Although the second part was destined to be played after the war, there is no reason to suppose that it was completely disconnected from the first. The Government was still pledged to help Indian industries ; there had been no departure from the policy adopted during the war. However, in order to be able to follow the second part, we must turn our attention once again to the Industrial Commission whose recommendations were destined to provide the basic material for the story of that part.

**Recommendations of the Industrial Commission.—**The Industrial Commission made a sifting enquiry into the industrial requirements and resources of India, and in their Report outlined a plan of action which was based on the fundamental assumption that without State intervention the development of industries cannot, in the circumstances peculiar to India, proceed at the pace necessitated by the requirements and warranted by the resources of the country. Their Report, as the terms of reference would show, covered every field of State activity in relation to industry, except the most important of all—the fiscal policy of the Government. But in spite of these serious limitations, they produced a plan which, though far from being scientific or even logical in its constructive efforts, should have provided an excellent ground for laying the foundations of industrial policy.

Beginning with the raw materials for industries, the Commission stressed the necessity of research work in connection with agricultural and forest products. In connection with agricultural products, attention was specially directed to the cultivation of cotton and sugar, while in the case of forest products valuable suggestions regarding the use of timber and the establishment of plantations to secure a concentrated and cheap supply of wood for various timber-using industries were made. Suggestions were also made to ensure the development and scientific exploitation of the mineral resources of the country.

The Commission next proceeded to examine the bearing of various material deficiencies on the development of industries as a whole; and having arrived at the inevitable conclusion that these deficiencies were a great obstacle in the way of industrial development, they recommended that steps should be taken immediately to establish various "key" or basic industries. Having realized the importance of power as the basis of modern industrialism, and being convinced that the future of industries in Southern and Western India was bound up with the development of water power resources, they urged the desirability of introducing the more up-to-date methods of coal extraction in Bengal and Bihar, and recommended a systematic survey of the hydro-electric resources of the country.

The Commission, having realized that it was impossible to develop industries on modern lines without providing up-to-date facilities for scientific research and industrial and technical education, proposed that institutions for research work on scientific subjects in connection with industries should be established, and that provision should be made for industrial and technical education.

By these means the various technical problems arising from time to time in connection with industrial processes were to be promptly and scientifically tackled, and the requirements of industries in the matter of engineers, technologists and skilled workmen (for which the country is now dependent on foreign countries) were to be met. With these ends in view, the Commission proposed that the Government should establish Imperial Services to which scientific and technical experts may be recruited. These officers were to be "placed under Local Governments or Departments of the Government of India for administrative control". It was also proposed that the services of Government research officers should be available to "private industrialists who may desire to employ them on specific problems". It was further recommended that research institutes may be established at some of the chief centres of industry so as to bring them in direct touch with the technical problems facing an industry or industrial establishment. Less elaborate, but equally efficient, arrangements were prescribed in connection with industrial and technical education. Local Governments were required to provide facilities for primary and industrial education for the artisan and labouring population, and the establishment of up-to-date industrial schools was urged. Furthermore, it was suggested that arrangements for training in manipulative industries (such as weaving, mechanical engineering, etc.) should be made in connection with the existing industrial establishments, to which theoretical classes were to be attached. Special teaching institutions were to be established to provide training in non-manipulative industries, such as chemical manufacture. As regards higher technical education, the Com-

mission suggested schemes for the establishment of institutions specializing in engineering, metallurgy, mining technology and others. These higher institutions were to be affiliated to various universities, while those for the training of skilled workmen and others were to be controlled and administered by the Provincial Departments of Industries.

Some very important suggestions designed to improve the system of commercial and industrial intelligence were made by the Commission. They also stressed the importance of establishing trade agencies in some of the neighbouring countries which were likely to provide an outlet for Indian manufactured articles.

The Commission attached special importance to the purchase of Government stores in India itself as a method of helping indigenous industries. From their inquiries and from the information they had received privately the Commission had come "to the conclusion that the manufacturing capacity of the country had been far from sufficiently utilized by Government Departments",<sup>1</sup> and therefore recommended that the railways and Government Departments should, as far as possible, obtain their supplies from Indian manufacturers.

In the course of their inquiries, the Commission had heard numerous complaints regarding the difficulties of acquiring suitable land for industrial purposes. They, therefore, proposed that the

<sup>1</sup> See Report, par. 192. How far the Government was anxious to help Indian industries by direct patronage is shown by the following remark: "Those of our members who had the opportunity, when working with the Indian Munitions Board, of scrutinising the indents of the India Office, found numerous instances in which articles were ordered from England, which could have been supplied by Indian manufacturers equally well both in respect of price and quality, if the latter could have relied on an established Government practice of local purchase".



Government should introduce the necessary changes in local laws so as to facilitate the transference of land.

The Indian investor's reluctance to finance new industries, the lack of industrial organization, and the absence of expert knowledge regarding the technique of new industries prompted the Commission to recommend that the Government should help to introduce and develop these new industries by setting up pioneering and demonstration factories.

The recommendations of the Commission in connection with transport facilities, though confined to the railways and inland waterways, were calculated to bring the products of Indian factories and imported manufactured articles on the same level. It was proposed that internal traffic, especially in the case of raw materials conveyed to, or manufactured articles conveyed from, the various centres of industry, "should be rated as nearly as possible on an equality with traffic of the same class and over similar distances to and from the ports", and various guiding principles were laid down to enable the Government to give effect to this proposal. In addition to that, the Commission recommended that the question of improving the existing waterways should be immediately taken up by the Government.

Some interesting proposals in connection with the financing of industry were put forward by the Commission. Among other things, it was recommended that industrial banks may be set up to finance industry; that in the case of loans from the banks for current finance the Government may, in the absence of industrial banks, stand as security; and that in certain cases the Government should provide direct financial aid

in the form of guarantee of dividends, loans of funds for initial and current finance, or direct contributions to the share capital, and by undertaking to purchase a definite amount of output.

These proposals and recommendations of the Commission were designed to be either provincial or imperial (all-India) in scope. In dealing with those which belonged to the provincial sphere, the Commission recommended the creation of specialized Departments of Industries, and made some suggestions regarding the qualification and duties of the various members of the staff. For the "direction and co-ordination of the general industrial policy of the country and the proper performance of certain functions of high national importance", the Commission recommended the creation of a separate Imperial Department of Industries. And, finally, in connection with the nation-wide activities of the Imperial Department, the Commission suggested the creation of an Imperial Industrial Service.

**Some deficiencies and drawbacks.**—The brief outline of the chief recommendations of the Industrial Commission as given above cannot fail to produce a very favourable impression at first sight: indeed as far as the Report goes, and considering the circumstances in which it was written, the Commission succeeded in producing a scheme of outstanding merits and importance. But, unfortunately, it neither goes far enough, nor takes account of the circumstances of the time when it was going to be acted upon. In a word, it is too seriously inelastic and incomplete. And yet it must be conceded that most of the recommendations when taken separately are sound, in fact flawless, and the machinery devised by the Commission to work those recommenda-

tions cannot, having regard to the circumstances in which it was expected to operate, be improved upon in many directions.

The most obvious and serious deficiency for which the Government, and not the Commission, is responsible, is the complete exclusion of all questions relating to the fiscal policy of the Government. Even assuming that the acceptance of the recommendations of the Commission had given the necessary impetus to the development of industries in India, it would have been impossible for some of the newly established industries to stand foreign competition. We cannot separate the fiscal policy of the Government from a scheme of industrial development: the fiscal history of every industrial country in the world provides plenty of evidence to prove that while, taken as a whole, it is possible to introduce new industries in a country by adopting various non-fiscal measures, it is not practicable to maintain and develop them without adjusting the fiscal policy of the country according to the requirements of the occasion. Again, as the fiscal policy itself is one of the most powerful stimulants, it profoundly affects the character of various direct and indirect measures that may be adopted to stimulate the development of industries. In these circumstances we cannot accept the scheme put forward by the Industrial Commission as a final basis of the industrial policy of the Government.

Another serious deficiency, for which the Commissioners themselves are responsible, is that their scheme takes no account of the relative importance of various drawbacks from which industries in India suffer at the present time. They tell us all about the absence of various basic industries, but they do not themselves seem

to realize the consequences of this deficiency, and have therefore failed to make it clear to the Government and the country at large that so long as these material deficiencies are allowed to exist, all efforts at developing the industries of the country are doomed to end in failure. They knew, or ought to have known, that some of these basic industries are the starting points on the road to industrial development, and yet they just skipped over them as if they were of no greater importance than various other deficiencies in India's industrial organization. Just as it is the first duty of the Government to see that these basic deficiencies no longer exist, it was the duty of the Commission not only to explain the consequences of these deficiencies but also to suggest practical and effective remedies. Again, they knew that the rate of industrial development in a country ultimately depends on the amount of capital available for that purpose, and that in spite of the fact that there is no great scarcity of capital in India, the Indian investor is reluctant to lend his support to new industrial enterprises, the Commission never stopped to make a sifting enquiry into the problem. They depended too much on the hypnotic influence of their pioneer and demonstration factories and industrial and scientific services: they misread Indian character and history. They forgot that there were many industries (leather tanning, glass and paper manufacture and others) whose possibilities had been more amply proved than all the pioneer and demonstration factories could ever hope to do, and yet there was no one in the country to take them up. When all these things are taken into account, it becomes abundantly clear that it was the superstructure with which the minds of the Commissioners were

occupied, and that they were content to let the foundations take care of themselves.

It must have been noticed that although the Commission tried, in so far as the object of their various recommendations goes, to follow in the footsteps of various foreign nations, they were not quite so fortunate in their choice of machinery through which those recommendations were to be acted upon. There was to be too much spoon-feeding by Government, which though useful during the initial stages would have nevertheless tended to destroy all private initiative. In this respect their recommendations in connection with technical assistance to industries deserve special attention. It is all very well in theory to have an Imperial Industrial or Chemical Service, but we cannot visualize the circumstances in which the officers belonging to these services would have inspired the industries in the country with progressive ideals. On the other hand these services would have in the long run tended to arrest the progress of industries: scientific research is the life-blood of progress, and, as is the case in all foreign countries, industries do not depend entirely on outsiders for research work. And in India the presence of Government experts would have for all time prevented the industrialist from learning to help himself. Never before have such arrangements been made in any part of the world, and although there is no reason why India should follow in every detail the example of other nations, she cannot be allowed to commit suicide just for the sake of variety.

Even more disastrous than bureaucratic intervention is the suggested division of functions between the Provincial and Imperial Governments and Departments of Industries. This dual control and responsibility, combined with the

part assigned to all-India Scientific and Industrial Services, rendered the whole scheme inelastic, if not unworkable. It had been built up in relation to a certain type of political constitution, and that relationship was so well-defined and rigid that a change on either side could not but render it impossible for the scheme to work smoothly.

**The Reform Act of 1919 in relation to industrial development.**—The Report of the Industrial Commission was given a warm reception both by the Government and the public at large. Now it so happened that the constitution of the country was in the melting pot at the time the Report was issued, and the resulting Reform Act of 1919 brought about changes of far-reaching importance. The provinces were granted a certain measure of autonomy, and it was into this constitution that the scheme of industrial development had to be fitted. The problem that needed a solution was whether the development of industries should remain an Imperial subject, or whether it should be decentralized and allowed to come under the so-called popular control. There were two main considerations: sentiment and efficiency; and clearly it was impossible to blend them together. On the one hand public opinion demanded that the task of developing the industries of the country should be entrusted to Indians themselves, while on the other the interests of efficiency required that the development of industries should remain an Imperial or all-India subject. According to the provisions of the Reform Act of 1919, the former would have necessitated the complete decentralization of executive control and functions, which was clearly most undesirable, while the latter course, though

depriving the people of the luxury of self-government in the domain of industry, would have ensured the much-desired unity of control, efficiency and therefore progress. The case for centralization was admirably stated by the Government of India in their despatch to the Secretary of State in which the following highly instructive paragraph occurs :—

“In the first place we hold that the Central Government cannot possibly divest itself of responsibility for the industrial progress of the country, which is necessary to secure its military safety, its freedom from outside economic aggression, and its social and political stability. The Government of India’s control of railways, tariffs, foreign trade relations and intelligence . . . and such services as the Geological Survey, further emphasises their responsibility in respect of industries. That responsibility should, we think, be discharged by furnishing advice and help to local Governments, by co-ordinating their efforts and by working concurrently with them, rather than by direct control. Secondly, the expenditure on many of the measures necessary for industrial progress is very high. Research and industrial experiment are exceedingly costly in proportion to their results in any one part of the country; without a large and highly specialized technical and scientific staff, mere administrative effort will be barren; nor are either the finances or the requirements of local Governments extensive enough to enable them to give appreciable assistance to large enterprises by loans, guarantees or undertakings to purchase products . . . Thirdly, experiments, often on a commercial scale, will have to be undertaken, if dangerous gaps in our economic armour are to be closed, and essential links in the industrial

chain are to be forged, while there is yet time. There must be a central authority responsible for seeing that this is done, and such authority must command finances sufficiently large and sufficiently elastic to enable them to do the work themselves, if necessary. Finally, a central agency, equipped with a full scientific and industrial staff, is needed to help and advise local Governments, to co-ordinate their efforts, to pool their experience, and to set the pace of the advance".<sup>1</sup>

It was with these irrefutable arguments that the Government of India tried to prove the case for the centralization of State action. They also put forward equally powerful arguments against the scheme of decentralization. But in vain. Everybody, like certain members of the Functions Committee which was set up in connection with the Reform Bill, now appeared to be "impressed by the strength of the desire that industrial development, on which the future of India so much depends, should rest in the hands of the representatives of the people". Political expediency, and not sound economic considerations, won the day; for when the rules were finally promulgated, it was found that the subject of industrial development had been to a very large extent provincialized. In so far as the activities of the Central Government were concerned, a central subject dealing with the "Development of Industries, in cases where such development by central authority is declared by order of the Governor-General in Council, made after consultation with the Local Government or Local Governments concerned, expedient in the public interests" was introduced. The "control

<sup>1</sup> Fourth Despatch on Constitutional Reforms, dated April 16, 1919.



of mineral development, in so far as such control is reserved to the Governor-General in Council under rules made or sanctioned by the Secretary of State and regulation of mines" was also reserved for the Central Government. To the Provincial Governments were allotted the general development of industries, industrial research and technical education, and these functions of Government were to be discharged by Ministers.

It is evident that there was no guiding principle behind this "division of spoils," as effected by the Reform Act of 1919, between the Central and Provincial Governments. The whole affair was arbitrary from beginning to end: it was inspired by political exigencies and not by economic considerations. If half the contentions of the Government of India contained in their despatch to the Secretary of State, which has been quoted above, are true—and we maintain that there is more truth in them than their authors intended to convey—the new arrangement, to say the least, could not be depended upon to create a situation in which all the resources of the country would be mobilized and used so as to yield the maximum they were capable of. But although the new arrangement was far from satisfactory, it gave endless opportunities to the Central Government to develop the industries of the country by indirect action and by its advisory functions. The Governor-General in Council was given vast powers to bring important industries under the control of the Central Government; the railways of the country were still under the Central Government's control; forest and mineral concessions were still a preserve of the Government of India; above all, the fiscal machinery was in the hands of the

Central Government. Activities in these fields combined with direct patronage (in the form of buying manufactured articles locally) could not be despised as of no consequence: they at least offered an opportunity to the Central Government to "do its bit" and to prove that only the co-ordination of activities in every industrial sphere could be expected to yield the best possible results. The Reform Act of 1919 put the Government of India on its trial: its intentions and ideals were henceforth to be judged from the record of its achievements in the fields which were assigned to it by the new constitution.

It must have been noticed that in so far as opportunities for direct action were concerned, the Provincial Governments had the lion's share. But, then, they could not be expected to discharge their duties according to the requirements of the occasion, as their financial resources were too meagre for such costly activities as the direct or indirect financing of industrial undertakings, the installation of model and demonstration factories, the provision of facilities for scientific research, or even the appointment of specialists and experts who, in the scheme proposed by the Industrial Commission, were expected to play a part of outstanding importance. Again, the Provincial Governments, which were independent of each other and even of the Central Government in the field of transferred subjects, could not have the requisite foresight and opportunities to frame their policy according to the requirements of the whole country. There has been, thus, no national policy behind the activities of the State during the years that have elapsed since the Reform Act of 1919 came into operation. And the consequences of this lack of policy and co-ordinated effort will become apparent when

we examine the record of achievements during the period under consideration.

**The appointment of the Fiscal Commission.**—The division of functions, as outlined in the preceding paragraphs, between the Central and Provincial Governments, which aimed at helping and expediting the development of industries, was made without any reference to the fiscal policy of the Government. As a matter of fact the Government of India did not possess, indeed it does not possess up to the present day, the authority to shape its fiscal policy or to adopt a fiscal measure to help industry quite independently of the wishes of the Secretary of State. However, in 1919, when India's new constitution was in the making, the Joint Select Committee on the Government of India Bill recommended that as "a satisfactory solution of the question (of fiscal policy) can only be guaranteed by the grant of liberty to the Government of India to devise those tariff arrangements which seem best fitted to India's needs," and as "it cannot be guaranteed by Statute without limiting the ultimate power of Parliament to control the administration of India, and without limiting the power of veto which rests in the Crown . . . it can only therefore be assured by an acknowledgment of a convention . . . . In the opinion of the Committee, therefore, the Secretary of State should as far as possible avoid interference on this subject when the Government of India and its Legislature are in agreement, and they think that his intervention, when it does take place, should be limited to safeguarding the international obligations of the Empire or any fiscal arrangements within the Empire to which His Majesty's Government is a party." Nothing

came out of these recommendations at the time ; but nearly two years later the Secretary of State, in his despatch of June 30, 1921, intimated to the Government of India that he had " on behalf of His Majesty's Government, accepted the principle recommended by the Joint Committee in their Report on Clause 33 of the Government of India Bill ".

For the first time in history, the Government of India could now in theory shape its fiscal policy according to the requirements of the country. But, then, they did not know exactly what the requirements of the country were, and therefore had no idea of the principles by which the Government was to be guided in shaping its fiscal policy. As a preliminary step towards getting over these initial difficulties, a Resolution was issued on October 7, 1921, stating that the Government of India with the approval of His Majesty's Secretary of State had decided to appoint a Fiscal Commission " to examine with reference to all the interests concerned the Tariff Policy of the Government of India, including the question of the desirability of adopting the principle of Imperial Preference, and to make recommendations ".

**Recommendations of the Fiscal Commission.**— The Commission made an exhaustive examination of the fiscal measures best suited to the requirements of industries in India, and laid down definite rules to guide the policy and actions of the Government. The preliminary conclusion to which the Commission came after examining the requirements and resources of the country was that the industrial development of India had " not been commensurate with the size of the country, its population, and its natural

resources, and that a considerable development of Indian industries would be very much to the advantage of the country as a whole".

After having established the case for industrial development, the Commission proceeded to examine the merits and drawbacks of free trade and protection, and, sheltering themselves under the well-known arguments of J. S. Mill and Frederick List, they did not experience much difficulty in proving (a) that in spite of various natural advantages new industries cannot be introduced and developed in an industrially young country when those industries have to compete against fully developed rivals, (b) that protective duties are necessary to neutralize the effects of an early start, and (c) that these protective duties should be resorted to only in the case of those industries which can eventually stand foreign competition without protective tariffs, or which are necessary for the safety of the nation. These classical arguments inevitably, and very properly, resulted in the recommendation that "a policy of protection to be applied with discrimination" should be adopted by the Government in order to stimulate the development of industries in India.<sup>1</sup> According to this recommendation, only those industries were to be considered entitled to receive protection which could prove their ability eventually to face world competition without the assistance of protective tariffs, and the amount and duration of protection were to be the minimum possible but consistent with the ideal

<sup>1</sup> In support of this recommendation, the Commission pointed out that wholesale or indiscriminate protection results in political corruption, brings about the combination of manufacturers to exploit the domestic consumer, and encourages inefficient methods of production. Discriminating protection, on the other hand, restricts the rise of prices, curtails the period of burden of high prices, and serves the best interests of industries themselves inasmuch as it ensures efficiency and rational and well-ordered progress.

of just enabling the industries to stand on their own legs.

The Commission took the view that, in a scheme of protection, it was necessary to distinguish between basic and non-basic industries, and recommended that, as a rule, non-basic industries may, subject to the conditions mentioned above, be assisted by means of import tariffs; but as it was desirable to keep the cost of the manufactured articles which were used in other manufacturing industries as low as possible, they recommended that basic industries may be assisted chiefly by means of bounties. Furthermore, in the opinion of the Commission export duties on raw or semi-manufactured materials were not to be resorted to as a means of assisting industries.

In order to enable the Government to carry out the policy outlined above, the Commission recommended the creation of a permanent Tariff Board to whom, among other things, the duties of examining the claims of various industries to protection and of watching the operations of tariffs and bounties were to be entrusted. It was suggested that the Tariff Board in dealing with claims for protection should satisfy itself (a) that the industry possessed natural advantages, (b) that without the help of protection it was not likely to develop at all, or not so rapidly as was desirable, and (c) that it will eventually be able to face world competition without protection.

As regards Imperial Preference the Commission recommended that it was inadvisable to introduce the system; but suggested that the question of adopting a policy of preferential duties on a limited number of commodities be referred to the Indian Legislature after preliminary examina-

tion of each case by the Tariff Board, and in case this policy was adopted, the preference given in any particular commodity should in no way diminish the protection required by the industry.<sup>1</sup>

**Fiscal Commission's recommendations in relation to fiscal policy.**—The recommendations of the Fiscal Commission were accepted by the Government, and now form the basis of its fiscal policy. The question naturally arises: are the principles underlying these main recommendations of the Fiscal Commission scientifically sound, and are these recommendations likely to meet the requirements of the country? The chief contention behind the scheme drawn up by the Commission is that, taken as a whole, only those industries are entitled to State assistance for which conditions in the country are favourable. As no

<sup>1</sup> Apart from the problems of fiscal policy and Imperial Preference, the Fiscal Commission discussed many other subsidiary questions relating to State assistance to industries, and so threw fresh light on some of the problems which had already been discussed by the Industrial Commission. To begin with, they emphasised the necessity of giving a more industrial bias to primary education and of providing better opportunities for the training of apprentices. They also pointed out the desirability of creating an organization for increasing the mobility of labour. They examined the bearing of various protective measures on the inflow of foreign capital, and, while maintaining that no obstacles should be placed in the way of foreign-controlled industrial enterprises, they recommended that Government monopolies or concessions should be granted only to companies registered in India with rupee capital and with a reasonable proportion of Indian directors. They also re-examined the whole question of transport facilities in relation to industries. Like the Industrial Commission, they examined the rates policy of the railways, and recommended that raw materials to and manufactured articles from Indian industrial centres should be subject to the same charges as the goods carried to or from the ports. More important, however, were their recommendations in connection with coastal shipping traffic. Having satisfied themselves that, as a result of monopoly which the shipping companies maintained by means of rebates, the freights paid on cargo were too high and therefore heavily handicapped indigenous industries, the Commission suggested that the Government should make a thorough enquiry into the desirability of initiating legislation against the system of shipping rebates in India.

one should be anxious to establish an industry which has not the least chance of surviving without some kind of protection, and as indiscriminate or general protection is likely to bring such perpetual invalids into existence, the Commission was perfectly justified in insisting upon discrimination. The methods prescribed by them for helping various kinds of industries are on the whole sound, though not altogether flawless.<sup>1</sup> And, finally, the machinery proposed by them in connection with their recommendations was probably the best under the circumstances: its merits had already been proved in the United States and other countries.

But, in spite of the excellence of their work in its own particular and limited field, the Commission's Report somehow leaves the impression that something vital is missing, that the Commission has approached the subject with a petty mind, and that it has not succeeded in justifying its existence. The first and foremost duty of the Commission was to indicate the lines on which the Government should shape its fiscal policy so as to expedite the development of industries, and the recommendations of the Commission clearly do not satisfy this fundamental requirement. The Commission took only the requirements of the existing industries into favourable consideration so much so that it actually recommended that no State assistance (by means of protective tariffs or bounties) should be given to industries which have not yet come into existence. But at the same time we know that in order to increase the manufacturing capacity of India many new

<sup>1</sup> That the Commission was not thinking far ahead is shown by their refusal to allow export duties on raw materials in any shape or form. They did not realize that, subject to certain well-defined conditions, export duties on raw materials may go a long way towards developing the leather tanning, oil milling and other industries.



industries, more particularly those belonging to the basic group, will have to be introduced, and that unless these basic industries are developed, it will be impossible to develop other industries according to the extent of the country's requirements and resources. Again, mass production being the rule at the present time, it would be impossible to introduce some of the basic and non-basic industries without investing enormous amounts of capital; and who would be willing to invest that capital with the certainty of suffering heavy losses during the initial stages (owing to the lack of experience on the one hand and the overwhelming superiority of the foreign product both in the matter of cost and prestige on the other) while awaiting the decision of the Tariff Board? One cannot expect to come across such recklessness even in highly advanced industrial countries (the case of the dye-industry in Britain provides an excellent illustration), and in a backward country like India it would be sheer madness to embark upon such slippery ventures.

It was on these worthless foundations that the Government was destined to build up its fiscal policy—the policy which was expected to expedite the development of industries. The plain fact is that the Commission did not at all attempt to suggest a really constructive policy: they merely suggested some emergency measures to stop the rot in the existing industrial system of the country. Their recommendations suited the existing system admirably, but they could not serve as the basis of a constructive policy: the record of industrial progress in India during the past eight years provides concrete proofs in support of this contention.

## CHAPTER IX

### STATE ACTION (continued)

#### PROGRESS UNDER THE REFORMED CONSTITUTION

**The basis of industrial policy.**—We have seen that, in so far as the Central Government was concerned, the Report of the Industrial Commission had ceased to exercise much influence on its industrial policy after the introduction of constitutional reforms. And for various reasons, which have been outlined in the preceding paragraph, the Report of the Fiscal Commission failed to bring the dawn of a new era for Indian industries. There was thus nothing to guide the Central Government except its own sense of fairness—for constitutionally it was no part of its duties to help industries *directly*. The basis of its policy was, therefore, the constitution of the country, and for all practical purposes the constitution deprived it of everything except the power to assist by fiscal action. It cannot be denied that the constitution had given power to the Governor-General in Council to assist in the development of any particular industry or industries in the public interest; but, then, it must not be forgotten that these measures could be taken only by the exercise of extraordinary powers vested in the Governor-General, and that he was not constitutionally bound to exercise those extraordinary powers. Once again the sympathies and inclinations of the Central Government are to be tested on the touchstone of achievement.

Theoretically, the Provincial Governments had unlimited opportunities under the new constitution. The entire Report of the Industrial Commission was at their disposal, and they had been given the powers (though not the means) to take action in respect of all its recommendations. In theory their policy and actions were based on these recommendations, which they had to remould according to their own requirements.

**Administrative developments under the Reformed Constitution.**—Although the Central Government was not constitutionally bound to do much by way of helping industries *directly*, it did not consider it advisable to cut itself off entirely from the provinces. In order to keep itself in touch with the provinces and to help them as far as possible under the new circumstances, it created, in February, 1921, a Central Department of Industries. As might have been expected, there was very little work for the new Department. The reformed constitution had deprived the Central Government of all activities in the direction of demonstration, research, technical education and finance, so that the new Department became a sort of information bureau. Indeed, there was no justification whatever for creating this Department.

Acting in accordance with the recommendations of the Industrial Commission, the Government of India also created the Indian Stores Department in January, 1922, to act as a purchasing and inspection agency for the Central Government, and also for such Local Governments and public and quasi-public bodies as may find it convenient to avail themselves of its services. It was intended to encourage Indian industries through the agency of this Department by preventing

as far as possible the purchase of manufactured articles of non-Indian origin when indigenous products of desired quality were available at competitive prices. Accordingly, an elaborate code of rules and regulations was drawn up for the guidance of the new Department.<sup>1</sup>

It will be remembered that the Fiscal Commission had recommended the appointment of a Tariff Board to examine the claims of applicants for protection. The Government of India having accepted the recommendations of the Commission, the Indian Tariff Board was appointed in July, 1923, for one year in the first instance. The life of the Board, however, has been extended from year to year, so that it may now be taken as a permanent feature of the industrial organization of the country.

The new constitution gave a much wider scope (without any guarantee as regards results) to the activities of Provincial Governments. The organization in the provinces was essentially on the model suggested by the Industrial Commission, but with the difference that the duties allotted to the Central Government by the Commission were to be performed by Local Governments themselves. The progress was extremely rapid: by 1921, a Department of Industries had been created in every province, and with the arrival of the newly-appointed Ministers the work of industrial development

<sup>1</sup> The Industrial Commission had also suggested an examination of the water power resources of the country, and urged the desirability of providing better transport facilities to local industries and of introducing the more scientific and economical methods of coal extraction. In accordance with these recommendations the Government of India appointed Committees to investigate the problems of coal mining and water power, and, in 1924, appointed the Railway Rates Advisory Committee to enquire into the complaints against the policy of the railways that came before the Government from time to time.

began, so it was pretended, in right earnest. Real experts being expensive and beyond the paltry means of the provinces, cheap imitations were taken as a substitute, and executive officers were appointed with a lavish hand. But one thing was lacking in every case—a definite and constructive programme. Nobody knew exactly what the goal of these activities was or what the requirements of the country at large were. They attempted to do everything they had heard of regardless of the needs of the occasion.

**Effects of financial stringency.**—Seeing how this “development business” was organized, it is not difficult to foretell how it would have affected the industries of the country. But luckily for the enthusiasts, financial stringency intervened to save their faces. In 1922, the necessity for economy resulted in the wholesale abolition of posts in every provincial Department of Industry, and in the abandonment of some of their schemes. The remark of the official chronicler that “retrenchment, while it prevented the development of many useful activities, was responsible for the abandonment of some projects which later experience has shown to be unsound,”<sup>1</sup> is full of significance, and explains the nature of provincial activities in the pre-retrenchment days.

The recommendations of the Retrenchment Committee destroyed the last traces of initiative in the Central Government. In 1923, the Department of Industries was amalgamated with the Commerce Department and its Industrial Intelligence Section was abolished. Thus, the “unconstitutional” efforts of the Central Govern-

<sup>1</sup> See A. G. Clow : *The State and Industry*, p. 33.

ment to assist industries came to an end. The Stores Department, however, survived the onslaught of the Inchcape Committee.

In so far as the Central Government is concerned, the changes introduced in 1923 have proved to be of a permanent character. In the provinces, on the other hand, the movement was destined to be short-lived: with gradual improvement in provincial finances the Departments of Industries were allowed to extend the sphere of their activities. But this new outburst of activities was rather due to the anxiety of the Directors to have something to direct in order to justify their existence than to the formulation of any clear-cut policy in the domain of industry.

**Achievements of the Central Government under the Reformed Constitution.**—The history of efforts, if not achievements, during the past ten years is thickly crowded, but as after all the ultimate aim of the present enquiry is to determine the lines on which the State must proceed in order to encourage and expedite the development of industries, we may shut our eyes to the long record of waste and failures, and confine our attention to the achievements which the Provincial and Central Governments have to their credit.

As far as the achievements of the Central Government are concerned, we would not be justified in looking for a long record in view of its various constitutional disabilities. Its activities were confined to tariffs, transport, mining, stores purchase and commercial intelligence, and in these fields its record has been on the whole fairly satisfactory. During the past seven years the Tariff Board has examined the claims of a number

of industries for protection, and, as a result of its recommendations, assistance by means of protective tariffs, bounties, or subsidies, has been given to steel, railway wagons and underframes, wire and wire nails, bolts and nuts, paper, printers' ink, plywood, safety matches, transmission belting, and other manufacturing industries. In the case of the cotton mill industry, protection was recently granted quite independently of the old recommendations of the Tariff Board. Again, duties on various raw materials (such as sulphur, spelter, etc.) have either been reduced or abolished to assist the various consuming industries. As regards transport, although railway freight charges on articles sent to or from the centres of industry have been considerably reduced during recent years, the discrimination in favour of through traffic to and from the ports is still in force. Something, however, has been done to improve the roads of the country : as a result of the recommendations of the Road Development Committee, a system of taxation on motor transport was introduced in 1929, and arrangements were made to divide the proceeds of the new taxes between various provinces according to their petrol-consuming capacity. No steps, however, have been taken by the Government to remove the various anomalies in coastal traffic<sup>1</sup>—even the deferred

<sup>1</sup> In February, 1923, the Indian Mercantile Marine Committee was appointed to consider and report what measures could be adopted by the Government to develop the shipping and shipbuilding industries in India. The Committee recommended, among other things, that facilities should be offered for the training of officers and marine engineers, that the coastal trade should be reserved for Indian-owned ships, and that the question of granting bounties to Indian ships engaged in foreign trade should be taken up by the Government later on. The reception these proposals received from the Government would have frozen the proverbial brass monkey : the only outcome of the labours of the Committee was that some arrangements were made to train officers for the ships that did not exist. In February,

rebates system has not been abolished—but a good deal has been done during recent years to improve the existing harbours and to build new ones at Cochin and Vizagapatam.<sup>1</sup> The stores purchase policy of the Central Government has been on the whole more progressive. As the rules promulgated at the time of the creation of the Stores Department could not enable the Government to give the desired amount of support to indigenous industries, new rules were issued in December, 1928, whereby in the purchasing of stores preference was to be given, first, to the articles produced in India from Indian materials, secondly, to the articles wholly or partially manufactured in India from imported materials, and, thirdly, to the articles held in stock in India. And, finally, as regards commercial intelligence, the Central Department of Commercial Intelligence and Statistics has been extended during recent years, and arrangements have been made for the appointment of trade agents in New York, Hamburg, Milan and in some African and Near Eastern countries.

**Developments in the provinces.**—The achievements of Provincial Governments in the field of industry during the period under consideration may be

1928, a Bill was introduced in the Legislative Assembly by Mr. S. N. Haji, which aimed at reserving the coastal traffic for Indian-owned ships; and some time later another Bill designed to abolish the rebates system was introduced by the same gentleman. The clauses of the Coastal Reservation Bill dealing with the measures designed to remove foreign ships from Indian waters are certainly defective; but the fact that the Government, while consistently opposing the Bill, has failed to produce a really constructive scheme is suggestive, and shows how far the Government is anxious to assist Indian shipping.

<sup>1</sup> A large area of fertile country and with extensive mineral resources had been lying undeveloped near the east coast without any convenient means of access to the outside world. The construction of a harbour at Vizagapatam is expected to remove this deficiency. The port is being developed under the direct control of the Government of India, and has been declared to be a major port.



studied under five main heads, viz. technical and industrial education, scientific research, technical assistance, pioneering and demonstration, and financial assistance.

**A. Technical and industrial education.**—As far as higher technical education is concerned, India is about as much dependent on foreign countries now as she was in the pre-reform days. Apart from the Faculty of Engineering in the Benares University, only two engineering institutions of collegiate rank have been established during the past ten years—the Maclagan College of Engineering at Lahore and the Bihar School of Engineering which is affiliated to the Patna University. Both these new institutions are designed to produce qualified mechanical and electrical engineers.

As regards opportunities for specialization in other industries, there is very little to record beyond what has been achieved at Cawnpore, Jamshedpur and Dhanbad. The Cawnpore Technological Institute, which was established in 1920 as a centre for industrial research, was converted into a teaching institution in the following year, and higher courses on the technology of leather, vegetable oils, sugar and chemical manufacture were introduced. The accommodation, however, is limited—only about a dozen students are admitted annually. Of infinitely greater importance from the educational point of view is the Indian School of Mines at Dhanbad, which was started in 1926 with the object of providing opportunities for specialized training in geology and mining engineering. In this case admission is limited to fifty annually, which, considering the requirements of the country, is more than adequate. The Jamshedpur Technical Institute is a semi-Government affair: it was

started in 1921 by the Tata Iron and Steel Company as a training ground for metallurgists, and has been subsidized both by the Central and Bihar and Orissa Governments. And to complete the list we may mention the Bengal Tanning Institute (originally Calcutta Research Tannery) which was established in 1919 on an experimental scale and, having proved its worth, was put on a permanent basis in 1925. A fairly up-to-date demonstration tannery is attached to the institute, and the chief courses of study are the technology and chemistry of leather manufacture. In this case too the accommodation is limited—in fact too limited in view of the great possibilities of the industry and the extensive requirements of the country.

It would not be out of place to point out at this stage that the standard of education in all these new institutions is very much inferior to what one is accustomed to find in Europe and America. It is not because they have been newly established and have yet to build up traditions: it is because their equipment is incredibly poor, and because their teaching staff is composed of men who, as compared with the great specialists of foreign institutions, are mere novices. No wonder the number of students going abroad for technical education is still increasing—even the number of State Technical Scholars sent out to foreign countries has increased by nearly 75 per cent. during the past eight years.

Contrary to what might have been expected, the reforms period has been singularly barren of achievements in the field of lower technical education. As far as our information goes, only six new technical schools have been added during the past ten years—two in Bengal and four in

Bihar and Orissa. Other provinces have shown a remarkable degree of stagnation : in fact Madras has actually shown some retrogression inasmuch as one of the two technical schools has been closed down. That there is a great demand for these technical institutions in the country is shown by the fact that in every province the number of pupils has increased by more than 100 per cent. during the past ten years, and that a large number of applicants are annually turned away for lack of accommodation.

As regards industrial schools for training ordinary skilled workmen, each provincial Ministry believes that it has a really brilliant record. Indeed, if numbers be the criterion, we should have no hesitation in declaring that the progress has been just wonderful : for in every province dozens of schools have come into existence in a comparatively short space of time. But unfortunately for the organized industries of the country, a very large number (probably more than 90 per cent.) of these schools confine their activities to such primary crafts as carpentry, metal working, and wood carving, while others combine with these crafts elementary training in such trades as dyeing, bookbinding, weaving, shoe-making, and sometimes leather tanning. In short, these schools have been set up avowedly with the object of helping the various handicrafts and not the organized industries of the country.

**B. Scientific and industrial research.**—At the present time there are only three or four important research institutes in India, but all of them, with the exception of one, were established under the old constitution. All these institutions, however, have been re-organized during recent years. Probably the most important of these

is the Forest Research Institute at Dehra Dun, which is an Imperial concern, and where a good deal of useful work is being done in connection with the industrial uses of forest products. Reference has already been made to the Cawnpore Technological Institute which was established in 1920, and which now combines teaching with research work. The Indian Institute of Science at Bangalore has recently grown into an extensive organization. From various accounts of its activities, which have been published from time to time, it appears that the Institute undertakes a very extensive variety of chemical researches, but although its equipment is most up-to-date, it has not so far produced any useful results to justify the enormous expenditure. This Institute is subsidized by the Central Government to the extent of Rs. 1,50,000 a year.

Some research work is also being done in connection with various industries in small Government-aided institutions. The Bengal Tanning Institute and the Madras Leather Trades Institute, which are purely provincial concerns, are doing some very useful work, but both these institutions were established under the old regime. Under the reformed constitution, however, the provincial Departments of Industries have been concerned mainly with investigations on industries of minor importance. The only important achievements in this field are those in connection with lac and indigo cultivation and in the direction of determining the spinning qualities of Indian cottons; but the credit for these achievements belongs to the Central Government which was responsible for taking the initiative in the matter as well as for the supply of funds.<sup>1</sup>

<sup>1</sup> The Pusa Agricultural Institute and the Lyallpore Agricultural College have done a good deal of research work on agriculture which

**C. Technical assistance.**—As far as technical assistance to industries in the form of expert advice goes, the record of most of the provincial Departments of Industries is almost blank. Only an expert can be in a position to give expert advice to an industrialist ; and while these experts are entirely out of the question, some of the provinces (as the Annual Reports of their Departments of Industries show) have not been able to employ even ordinary chemists and engineers. And yet these Annual Reports make a grand display of the services they have rendered to the manufacturer by giving him advice—which has often turned out to be all wrong ! But the tragic part of it is that although their incapacity has been proved times out of number, these jacks of all trades with whom the provincial departments are infested refuse to learn by experience and insist on misleading their “customers”. The leather tanning industry in Bengal, Madras and the United Provinces appears to be the only exception ; but it could not be otherwise, as the research tanneries in these provinces have got to employ experts, and it is these experts who are really responsible for technical assistance, although the local Departments of Industries claim the credit. The only redeeming feature of this sordid affair is that these provincial experts confine their “assistance” to cottage industries and small industrial establishments. It is partly because they know their own worth, and partly because the large industrialist is generally too shrewd not to profit by other people’s experience.

has indirectly benefited industry. Their most important contribution has been in the direction of evolving new varieties of sugar-cane and improving indigenous cottons. Both these institutions were established under the pre-reform administration.

**D. Pioneering and demonstration.**—It is widely believed in India that once the possibilities of an industry have been demonstrated, the rapid and extensive development of that industry becomes more or less an accomplished fact. In framing their recommendations the Industrial Commission exhibited a surprising amount of faith in this formula, and the provincial Ministries were not guilty of anything more serious than utter lack of imagination when they decided to follow the advice of the Commission without any regard of consequences. In view of this mentality we should not be surprised to find every provincial Ministry indulging in this expensive pastime. The Madras Government went in for the manufacture of writing and printers' inks, soap, glue and sugar; the Bombay Government embarked upon the manufacture of fish-oil and brown tea-pots and tiles; the Bihar and Orissa Government erected sugar, blanket and match factories; the Punjab Government set up a tannery; in the United Provinces the Government once again revived the old ideas of sugar and oil, with the manufacture of bobbins as a little side show. All these ventures failed, with the exception of inks and soap in Madras and matches in Bihar and Orissa. But the fact that even these successes have failed to interest anybody must have completely disillusioned the pioneers. No wonder the Madras Government announced in 1926 that in future the experimental work of their Department of Industries would not go beyond the laboratory stage, and that the pioneer work would be left to private enterprise. As no new schemes have been launched in any province during the past two or three years, it seems they have all decided to learn by experience and

to direct their energies to less expensive and more profitable channels.<sup>1</sup>

**E. Financial assistance.**—It will be remembered that the Industrial Commission had tried to solve the financial difficulties of the small industrialist by suggesting such measures as the grant of loans, contributions to share capital, guarantees of dividends and the provision of facilities for the hire-purchase of plant and machinery. The policy of various Provincial Governments was destined to be based on these recommendations. But while facilities for the hire-purchase of plant are not entirely unknown, the most common method of giving financial assistance to industries in vogue in various provinces is the grant of loans. In some of the provinces (such as Madras, Bihar and Orissa and the Punjab) Acts regulating the grant of financial assistance to industries are in force, while in others no limitations have been imposed upon the activities of the Government. From the Annual Reports of the various provincial Departments of Industries it appears that altogether not more than 5 million rupees have been given in loans, etc., during the past eight years. Only about 150 loans have been given during these years, and quite 80 per cent. of them were for sums amounting to less than Rs. 10,000. The United Provinces, Bihar and Orissa, Madras and Burma are the only provinces where attempts have been made to finance larger industrial

<sup>1</sup> As has been shown in connection with the sources of heat and power, the Punjab and Madras Governments have vast schemes of hydro-electric development in hand, while other Governments are seriously contemplating action. But hydro-electric works cannot be described as pioneer factories: they are, like canals and railways, public utility undertakings, although, under certain well-defined conditions, they are likely to be more beneficial to industry than to the general public. For full treatment of the subject, see Vol. II, Chap. IV.

undertakings. In the United Provinces a sum of Rs. 13,00,000 was given in loans to five undertakings (the Lucknow Sugar Works alone received Rs. 6,00,000), but unfortunately for the lenders four of the borrowing concerns ceased to exist, and the one (a glass works company) which survived was unable to account for the loan of Rs. 1,00,000 it had received. The Madras Government lent Rs. 4,00,000 to the Carnatic Paper Mills, and the mills had to draw the shutters shortly afterwards. The Bihar and Orissa Government helped the Indian Steel Wire Products Ltd., by purchasing Rs. 5,00,000 worth of its debenture stock, but it failed to put the undertaking on its feet. And finally, the Burma Government granted a loan of Rs. 15,00,000 to a spinning and weaving company; the mill went into liquidation shortly afterwards, and the Government suffered a net loss of Rs. 8,38,000. It is undoubtedly an all-black record.

No trustworthy information about the fate of various small loans is available, but from the meagre information contained in the Annual Reports of the various provincial Departments of Industries it appears that the experiment has been far from successful.

The Central Government has also been manœuvred once or twice in such a way as to advance loans in spite of its constitutional disabilities. The Calcutta Soap Works secured a loan of Rs. 25,000 for the manufacture of dynamite glycerine—an article of great military importance—but soon afterwards went into liquidation. Then came a paper mill with its tenders for the supply of paper to the Central Government. But the tender was subject to the condition that the Government should advance Rs. 8,00,000 to the company on the security of the paper already in



stock. This is the only instance in which a large loan has served a really useful purpose, and which has been paid back in full with interest.

OPPORTUNITIES AND ACHIEVEMENTS : A  
CRITICAL REVIEW.

**Opportunities in theory and practice.**—The above review of the activities of the Central and Provincial Governments in the field of industry shows that every weapon which was used at any time in the history of the world is being used in India to assist industries at the present time. Protective tariffs and subsidies are in operation ; the State is patronizing industries by offering them its custom ; technical and industrial education is being provided ; facilities for technical and scientific research are being offered ; technical assistance is being given to the industrialist ; pioneer and demonstration factories have been set up ; even direct and indirect financial assistance is being offered to the needy manufacturer. And yet we know that no important new industry has been introduced into India during the past ten years, and that, as shown by the annual returns relating to joint-stock companies and industrial establishments, the existing industries have not made any progress out of the ordinary during this period. This stagnation is full of meaning : it suggests that either the various remedies have not been properly applied, or there is something radically wrong with the whole system of State assistance which has been in operation during the past ten years. It would obviously be profitable to examine the extent to which the various remedies fall short of the actual requirements of the country, and to see how far the principles and motives underlying the policy of the Government are at fault.

**Opportunities for the Central Government.**—It has already been explained that the Reform Act of 1919 deprived the Central Government of various functions in connection with the development of industries. But, as has been pointed out before the Reform Act put the intentions and sympathies of the Government on their trial: for, in spite of the various limitations imposed upon the activities of the Central Government by the Act of 1919, the "Paramount Power" had still plenty of opportunities to make its existence felt in the domain of industrial development. To begin with, let us examine the opportunities offered by its newly-acquired control over fiscal policy. The Government must have known that very few new industries can be introduced and developed in the country when its attitude towards the matter is so uncertain. The Government would perhaps retort that it has all along been acting on the recommendations of the Fiscal Commission of 1913; but then the Fiscal Commission had not prescribed that the Central Government must take its recommendations as a Divine Commandment, nor was the Government quite unused to the practice of throwing the entire reports of Commissions and Committees into the waste-paper basket. It cannot be denied that the Government did not know for which industrial conditions in the country were favourable so that it was not in a position to announce its intentions with regard to those industries; but, then, it would not have been an unconstitutional or unprecedented procedure had it arranged an expert inquiry into the matter.

It is possible that, owing to various reasons which have been discussed in connection with industrial finance, an inquiry into the possibility of new industries and the announcement of

policy of the Government in relation to those industries would not have materially improved the situation; but an important question of principle is involved here. If that inquiry and the resulting announcement were not likely to meet the requirements of the situation, was it by any means a certainty that the various measures which had been adopted by the Central and Provincial Governments were going to expedite the development of industries? We know there has been no definite and clear-cut policy behind the various governmental activities under the reformed constitution, and that it has been a case of picking up remedies without any scrutiny as to their necessity and results; but why should the Government avoid picking up one particular remedy that came in its way? The fact that the Fiscal Commission had not suggested that remedy is no excuse: the Government should have relied upon a more trusty adviser than the Fiscal Commission—the industrial history of foreign nations.

It has been shown that under the new constitution the Governor-General in Council had the power to declare, with the consent of Local Governments, the development of any industry of national importance as an Imperial concern. We realize the difficulties of undertaking a measure by the exercise of extraordinary powers vested in the Governor-General in Council, especially when the consent of Local Governments is an essential factor and where inter-provincial jealousies have to be taken into account. But the Central Government as Paramount Power in these matters could certainly afford to take risks. The Central Government refused to exploit all extraordinary powers the constitution of the country had given them. They seemed to be

under the impression that those powers could be used only in a case of emergency. Had they summoned enough courage to use these extraordinary powers and taken only two basic industries, the engineering and heavy chemical industries, under their wing, nearly half the industrial problems of the country would have been solved.<sup>1</sup>

**Opportunities and achievements in the provinces.—** We have seen that under the new constitution the main task of developing industries had been entrusted to Provincial Governments. We have also seen that, taken all round, the provinces have been singularly unfortunate in their choice of remedial measures and that, judging by the results, they have utterly failed in creating a more favourable atmosphere for the development of industries. Before we begin to trace

<sup>1</sup> How some priceless opportunities for introducing and developing important new industries have been lost on account of what looks like utter insensibility to national requirements and lack of sympathy and foresight, is shown by the Government's handling of the Railways Reconstruction Programme. As a result of the recommendations of the Acworth Committee, the Government undertook to spend 1,500 million rupees during the five years 1922-27 on the rehabilitation of Indian railways. No official account showing how this enormous sum was spent is available, but the import statistics for the five years under consideration tend to show that quite half this grant had been spent on plant and materials imported from abroad. The Government was going to spend nearly 750 million rupees on imported materials, and yet it never explored the possibility of making the country self-sufficient for all time by spending merely a fraction of this amount on establishing the railway industries: for we maintain that by investing about 250 million rupees the Government would have been able to manufacture in the country anything from a tiny screw to a most up-to-date locomotive. In adopting this course the Government would not have been invading the field of private enterprise, for the Government itself is the largest railway owner in India. Besides, if the Government can run printing presses, armament factories and railway workshops in connection with its own requirements, there is no reason why its conscience should revolt against establishing for itself, or helping others to establish, the industry under consideration. There is no doubt whatever that the Government had already forgotten its own war-time experience and resolutions, and, sheltering itself behind the constitution, was now content to assume the rôle of a passive onlooker in reckless disregard of the requirements of the nation.

the causes of this failure, we must try to see how far conditions in the provinces and the country at large were favourable for the application of various remedies and what the requirements of the country actually were.

Perhaps the most important and valuable achievements of Provincial Governments are in the field of technical and industrial education. Although nobody appears to be satisfied with the existing arrangements in connection with higher technical education, and although the extension of facilities on a reasonable scale will not do any harm to the country, we believe that, quantitatively at any rate, enough has already been done, and that it would be more profitable to direct further effort towards improving the quality of education so as to turn out more efficient and better trained workmen of supervisory class. It is no use training workmen in excess of the requirements of the existing industrial establishments or for the industries that do not exist. Technical training must proceed just according to the rate of industrial development: it should not be allowed to proceed far in advance or to lag behind.

But in so far as industrial education is concerned, we fail to see how the existing system is going to help organized industries, except, possibly, in a very indirect manner. The existing arrangements are designed to help the various cottage industries; it does not concern us here how far they serve their original purpose, but we know that they do not help organized industries directly. Skilled factory workers are generally trained in the factory itself, and, as we have already seen, although the greatest need of organized industries in India is an educated apprentice with a "mechanical mind", nothing is being

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done to meet this urgent requirement, notwithstanding the fact that both education and industries have come under popular control. Even where Compulsory Education Acts have come into force, nothing has been done to give that "industrial bias" to primary education to which both the Industrial and Fiscal Commissions justly attached a great deal of importance. Well-trained foremen, mechanics and engineers are necessary in a scheme of industrial development, but more important still are intelligent and well-trained rank and file of ordinary skilled workmen; but notwithstanding this fact and in spite of all the opportunities, practically nothing has been done to make up this great deficiency.

A certain amount of success has also been achieved in connection with scientific and technical research, although, in the absence of highly technical industries in the country, we should not attach much importance to achievements in this field. The energies of most of the research workers have been directed towards helping the small industrialist who is too much of a burden upon the country and who, in view of modern tendencies in the direction of large-scale production, cannot be expected to survive for long. In these fields of lesser importance investigations have often been carried on at more than one centre without any co-operation, with the result that energies and funds have been wasted. Again, nothing has been done by any Provincial Government to mobilize all the resources at its command: in every Western country the universities play an important part in the field of research, but in India no effort has so far been made to harness these institutions in the service of industry.

It is also very unfortunate that the achievements of Provincial Governments in the field of

technical assistance, pioneering and demonstration, and financial assistance have all been on the wrong side. There is no redeeming feature about those miserable failures, and everything points to the conclusion that it would have been less injurious to their reputation had they decided to leave these three white elephants alone. In order to be able to give the right kind of technical assistance to industries, a staff of expert technologists was necessary—and the provinces had neither the means to employ these experts, nor was there sufficient demand for their services to justify their employment. The disaster that attended most of the attempts to give financial assistance to industries was also due to these causes: for in the absence of expert economic and technical staff the authorities were not in a position to conduct an inquiry into the technical equipment and financial condition of an applicant for relief, with the result that loans were granted to those undertakings which did not have the least chance of deriving any benefit from them. As regards pioneering and demonstration, it seems the activities of Provincial Governments were inspired more by sentiment than by sound economic considerations. They had been too closely following the advice of the Industrial Commission who had attached undue importance to this field of governmental action. The wholesale setting up of demonstration and pioneer factories can never be recommended for a country which is, so to say, already half-industrialized, and whose industrial backwardness is not due to the fact that people have yet to learn about the possibilities of various industries, but to various other causes some of which have already been discussed in connection with the financing of industry. It was in the 'seventies and 'eighties

of the last century that these demonstration and pioneer factories should have been set up on a grand scale and not after the first quarter of the twentieth century. In these days of large-scale and mass production, pioneer factories can never be large enough to serve their real purpose, and there are very few industries in which a demonstration is needed under the prevailing conditions. But these objections did not damp the enthusiasm of the newly-appointed Ministers, most of whom had never been anywhere near a factory all their lives. We have seen that most of this pioneering business was concerned with leather, matches, sugar, oil and (in Bombay) earthenware manufacture. It is a curious coincidence, but all these industries were chosen with a singular disregard of their economic and manufacturing technique: for the fact that any one of these articles can be manufactured at a profit in any particular locality does not either suggest that conditions for the establishment of the industry would be equally favourable in a locality only fifteen or twenty miles away, or (the supply of raw materials and the extent of the local market being sometimes limited as in the case of sugar and oil industries respectively) that another factory could be set up in the immediate neighbourhood of the pioneer factory itself. In these circumstances even if all the pioneer factories had proved to be successful undertakings, they would not have materially improved the industrial outlook; in fact when we take into account the various factors which are responsible for arresting the growth of industries in India, we cannot resist the conclusion that all those successes in the field of demonstration and pioneering would not have advanced the progress of Indian industries by an inch.



**The causes of stagnation and failure.**—As we have already explained, the failure of the Central Government to make the best of the opportunities that came in their way was due partly to their various constitutional disabilities and partly to their lack of foresight and sympathy: the war-time enthusiasm had waned, and the Government had now become an ardent believer in constitutionalism. As for the provinces, their efforts, as predicted in the Government of India despatch to the Secretary of State, were doomed to end in failure even if they had been directed on the right lines. But as it is, there was no policy behind their schemes, they had no goal in view, and, what is more important from the point of view of the present inquiry, they did not possess the means to carry out anything to perfection. Financial stringency has always been blamed, and yet financial stringency in a scheme of provincial responsibility was inevitable. The Ministers in charge of industries needed the entire revenues of the provinces and not their due share. Once again, the constitution that divides responsibility, that separates the activities of one province from those of another into watertight compartments, that makes the provinces completely independent of the Central Government's control, and that deprives the Central Government of opportunities and responsibility in many directions is at fault: for industries in one province cannot be developed without any reference to the requirements of other parts of the country, and the resources of the provinces are too meagre to meet the exacting requirements of modern industry. There must be unity of control, and there must be co-ordination of effort in various directions; and this unity and co-ordination could never have been achieved in

a scheme of provincial responsibility and independence in matters relating to industry.

**Policy an essential factor.**—Let us now assume for the sake of argument that under the reformed constitution the provinces had given up all their claims to independence and that the Central Government had retained full control in matters relating to industry. Would the situation have been any different from what it is to-day? There can be no doubt that the assumption of complete responsibility would have spurred the Central Government to greater activity, and the centralization of effort would have yielded more useful results than has been the case under the decentralized system. But at the same time there is no reason to suppose that the policy of the Government would have been so transformed as to produce an ideal atmosphere for the development of industries. There are indications that the Government would have never gone beyond the recommendations of the Industrial and Fiscal Commissions; it would have acted on the letter and not the spirit (if there was any) of those recommendations, and the mere application of various remedies by the Government would not have brought the country anywhere near the desired goal. A definite and clear-cut policy backed by sympathy and convictions was needed, and the actions of the Central Government during the past ten years leave no room for doubt that the Government is as far from having a policy as it was at any time in history. If the Government has at all any policy, that policy aims at merely removing some of the more formidable obstacles from the way of industrial development, and not at infusing the movement itself with extra power to accelerate its progress. Unfortunately,

although the Industrial Commission suggested all the ingredients of that extra power, it forgot to explain how and in what proportions those ingredients were to be used and how the ground was to be prepared for their application. In other words, they failed to indicate a clear-cut policy and programme of action with all their logical implications. As without such policy the development of industries can never be expedited, let us see on what lines the Government must proceed in order to create that favourable atmosphere in which every effort is made to exploit to the fullest possible extent the resources of the country with a view to develop the manufacturing industries. A good deal of what we have to say in the following section is based on the recommendations of the Industrial and Fiscal Commissions, with the essential difference that, in order to present a clear exposition of policy, facts and suggestions have been arranged in their logical sequence, their relative importance has been explained, and some of the more important gaps in the schemes presented by the two Commissions have been filled.

#### THE ESSENTIALS AND OUTLINES OF GOVERNMENT POLICY

**Sympathy and conviction as driving forces.**—The first fundamental condition which the Government must satisfy before embarking upon a programme of industrial development is the manifestation of a complete change in its attitude and convictions. The record of its activities during the past ten years shows that the Government regards industrial development as a desirable and not as a necessary end; and we repeat that so long as the Government is not completely

convinced of the absolute and urgent necessity of developing the industries of the country, its policy and actions will lack that driving force which is necessary for the achievements of a higher order. Every small thing counts in the creation of a favourable atmosphere; and in the absence of enthusiasm supported by guiding convictions not only small things but even more important items are apt to be overlooked, and their relative importance in the scheme of action is likely to be disregarded. And in the absence of an ideal, even the best scheme may degenerate into a soulless collection of ideas and so cease to inspire its own authors.

**Inquiry into the causes of industrial stagnation.**—As the Government will have to draw up its programme of action according to the requirements of the occasion, it must acquaint itself with the various factors which are responsible for checking the development of industries in general, and try to appreciate the relative importance of those factors. In its quest for the causes of stagnation that affect industry as a whole, the Government need not look far beyond the Reports of the Industrial and Fiscal Commissions—only it must approach the subject with an open mind and exert its common sense in arranging the various items in its programme according to their merits and importance. But whatever the procedure, the Government cannot fail to arrive at the conclusion that the unwillingness of the people to invest capital in industries, lack of technical knowledge, and the absence of some of the important basic industries are the root cause of industrial stagnation. As these deficiencies or drawbacks affect every industry more or less equally, their removal constitutes what we may

describe as "general remedies." The Government must start with the conviction that modern industry is based on capital, technical knowledge and certain primary industries, and that so long as anyone of those three corner-stones is allowed to remain absent no rapid progress can be made in the building up of an industrial edifice. The Government must, therefore, begin its programme of action by removing these primary deficiencies.

**Capital—the prime necessity.**—In determining the relative importance of the three above-mentioned factors in industrial stagnation, the Government cannot avoid giving the first place to the scarcity of capital: for without capital even technical skill cannot be provided and basic industries cannot be developed. And we have seen that capital is not available for industrial purposes in desired amounts, not so much because of an actual scarcity in the country but because the investor has no faith in the competence and integrity of the industrialist. The very first thing which the Government must do in order to pave the way for industrial development is to restore the confidence of the investor, and that, as we have already explained at length, can be done only by means of State-aided industrial banks. The industrial banks must, therefore, be the starting point on the road to industrial development. The practice of granting loans to all and sundry is pernicious in the extreme, and should be applied only in cases of exceptional importance, and even then after a thorough scrutiny into the affairs of the borrower. The principle that an industrialist has no business to come into the field unless he is thoroughly equipped and is in a position to raise the necessary funds from an industrial bank on the security of

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his assets should be strictly adhered to. However, as has been done in Japan, the Government may place sums of money at the disposal of industrial banks for the purpose of making loans to industrial undertakings.

**Technical assistance.**—If the scheme of financing industry through industrial banks is adopted by the Government—and we can see no other alternative if the capitalist is to be induced to give a more liberal support to industry—the problem of technical assistance will be automatically solved to a certain extent. But as the industrial banks will never be able to drive the individual and independent joint-stock concerns out of the industrial field, and as these independent concerns will neither be in a position to depend upon the services of the staff of expert technologists belonging to the industrial banks, nor, as is the case at the present time, be in a position to make their own arrangements for technical advice and assistance, the Government will have to make adequate arrangements to make up this deficiency. A staff of expert technologists in various industries will have to be engaged by the Government to examine new proposals and to advise the industrialist on technical matters. These experts may be given the power to certify the soundness of a new venture—a testimony which would be highly valuable in encouraging the investor—and entrusted with the task of watching the trend of developments in their respective industries. Had this scheme been introduced twenty years ago, hundreds of failures, which have involved the loss of at least as many million rupees, would have been averted, and some of the industries (like the cotton mill, steel and cement industries) would not have been

in that sorrowful plight in which they find themselves to-day. The expense of maintaining a large staff of experts on every important industry would be heavy (and that is why it would be beyond the means of any Provincial Government), but it would not only be indispensable in developing new industries on sound lines, but also in maintaining the old established undertakings in a state of technical and financial efficiency.

**Development of basic industries.**—The establishment of industrial banks and the provision of technical assistance will at once provide the necessary stimulus for the rapid development of industries, but if nothing is done to develop some of the basic industries simultaneously, the various new industries will come into existence with a handicap which will diminish their power to stand the competition of their old established rivals abroad, and so act as a powerful brake on the wheel of progress. Of these basic industries the manufacture of basic engineering products and heavy chemicals is of the greatest importance. Every modern organized industry must use machinery and chemicals, and the dependence of industries on foreign countries for the supply of these basic articles, quite apart from the uncertainties of supply in time of war, increases the cost of production to a considerable extent. This deficiency must be removed if industries are not to suffer a severe handicap from the start and if they are to be developed on a sound, natural basis. There is no doubt that these two basic industries can be developed in India without always asking for protection and subsidies. But as other countries have had a long start, it will be necessary to adopt special meas-

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ures to develop these industries in India. The Government must find out what special measures, or specific remedies, will be necessary in each case—for no two industries demand identical remedies—and proceed to apply those remedies with vigour and conviction.

If the Government is at all convinced that conditions in the country are favourable for the establishment of these industries and that unless these basic industries are established the pace of industrial development cannot be increased to the desired extent, it must make a beginning by announcing what special measures it is prepared to take in order to help these industries if steps are taken to establish them. These measures should come into force immediately after the first undertaking of its kind comes into existence. The removal of uncertainties regarding the attitude and policy of the Government is, apart from financial and technical assistance, the first condition for the establishment of these industries; and so long as the attitude of the Government is unfavourable or uncertain, these basic industries will never be developed and therefore the progress of industries as a whole will be retarded. What specific remedies are likely to be required in the case of each of these industries will be described after we have made a detailed examination of their requirements in the following parts of this work.

**Other general measures to help industry.**—Apart from the provision of facilities in connection with industrial banks, basic industries and technical assistance, which must serve as the foundations of industrial structure, there are other measures which, though far from being the life-blood of progress, are, as the history of other nations



proves, likely to help industry considerably, and these are the provision of facilities in regard to general and technical education, transport, power generation, industrial housing, and acquisition of land for industrial purposes. All these matters must be tackled if the development of industries is to be expedited.

**General and technical education.**—It has been shown in a preceding paragraph that, in spite of the recommendations of the Industrial and Fiscal Commissions, nothing has so far been done to give an “industrial bias” to primary education. The Government must take steps immediately to fill this gap which not only makes labour inefficient but also tends to make the educated classes averse to manual labour with all its adverse effects on the industries of the country. As regards technical education, it is very difficult to say whether it should precede, accompany or follow the development of an industry. There would be obviously no sense in providing facilities when there is no immediate prospect of an industry coming into existence; on the other hand a new type of industrial establishment cannot afford to waste its time and resources by trying to teach on its own premises the alphabet of manufacturing operations to its workmen. Perhaps it would be best to follow the middle course. Some sort of a training may be provided while the factory is being set up, and the Government may help the industrialist by providing various educational facilities. On the whole it may be said that, as in both the old and new industries the real practical training must take place in the factory itself, the Government can go no farther than merely providing facilities for preliminary training, and even that on the condition that the

demand for any particular kind of skilled labour in a centre or locality is large enough to justify expenditure in that direction. But the Government must immediately provide better facilities for the training of technologists for the industries which have already been established on an extensive scale, and widen the scope of teaching institutions as and when, but not until, various new industries are established.

**Industrial housing.**—We have already discussed at length the importance of the part which industrial housing plays in the general organization of industries in India, so that all we can do at this stage is to reiterate the fact that so long as the problem of housing is not solved by the application of the universally accepted principles, the supply of labour will remain uncertain and its quality poor, and these adverse factors will always retard the development of industries.

**Acquisition of land.**—The difficulties with regard to the acquisition of land, to which attention was drawn by the Industrial Commission, are more devastating in their effects on industry than is generally supposed. As raw materials and fuel have to be transported to and finished products taken out of a factory, it is only in certain localities that an industrial establishment can be set up, and if it is not possible to acquire a site for factory installation in a suitable locality, some less convenient site has to be taken up, and in that eventuality additional transport charges pile up the cost of production, and are often responsible for industrial disasters in India. As in spite of the recommendations of the Industrial Commission the Government has so far failed to amend the land alienation laws in a suitable

manner, it must immediately remove the existing anomalies if it really intends to expedite the development of industries.

**Power generation.**—We have already examined in a preceding chapter the bearing of power generation on the development of industries, and shown that the State must assist in the development of hydro-electric power and the installation of coal-fired central generating stations in India. Although, as we have seen, some activity is being shown in certain provinces in the direction of water power development, nothing whatever has so far been done to install central generating stations. As the coal-bearing districts of Bengal and Bihar and Orissa are the future home of those most important of all basic industries, iron and steel, engineering and chemical, and as the development of these industries cannot proceed satisfactorily when cheap electrical power is not available, it is imperative that the Government should include the installation of central generating stations among the first items in its programme of industrial development.

**Transport facilities.**—As the transport charges are an important item in the cost of production, the Government must help industries in India (as has been done in other parts of the world) with better and more efficient means of transport. Five different instruments of transport have to be taken into account, viz. railways, roads, inland waterways, coastal shipping and trans-oceanic shipping; and as all these five are used, or likely to be used, in varying degrees for the conveyance of raw materials and finished products, it is necessary that they should be kept

in a state of perfect efficiency, i.e. they should be capable of carrying goods cheaply, safely and quickly.

The railways are the most important instruments of transport on which industries in India must rely. In so far as the carriage of goods goes, they are, as compared with railways in Europe and America, neither cheap, nor safe, nor quick. They are not cheap in the sense that, as pointed out by the Industrial Commission, the charges for the transport of goods to and from the inland centres of industry are higher per ton-mile than the charges for the goods despatched to and from the ports, and this discrimination which is still in force (though not to the same extent as before the reforms) weakens the ability of Indian manufactured goods to compete with imported articles. The Indian railways are, moreover, less safe and quick than the railways in other industrial countries. While pilfering is very common on Indian railways, the inadequacy of rolling stock and a scientifically organized system of corruption and bribery sink both safety and despatch to an exceedingly low level. The seasonal character of demand for rolling stock is to a very large extent responsible for its shortage at certain times of the year; but when goods are left rotting under the sheds and often in the open (as godowns are not always very extensive) for days and sometimes weeks when the sender of those goods omits to give the usual commission to the railway staff, the effects of this pernicious system on industry can be better imagined than described. Therefore when the Government makes up its mind to develop industries, it will not only have to introduce a system of preferential railway rates on bulk transport in favour of local industries

(as has been done in France and Germany),<sup>1</sup> but, what seems to be more urgent, it will also have to take drastic measures to extirpate corruption and theft.

Some idea of the efficiency of road transport in India may be had from the fact that there are only 199,140 miles of roads in India, and of this total only about 59,000 miles or nearly 29 per cent. are "surfaced". Compare with this the 2,500,000 miles of unsurfaced and nearly 600,000 miles of surfaced roads in the United States. But the difficulties of road transport in India do not end here, as we find that motor and horse-drawn vehicles are almost a novelty and that most of the transportation work is done by primitive ox-driven carts. As road transport must always play a very important part in the economic organization of a preponderatingly agricultural country (for the conveyance of agricultural produce from and of manufactured articles to the village), it is necessary that more and better roads should be constructed, and attempts should be made to oust the primitive ox-driven vehicles and to popularize the cheaper, quicker and safer motor transport. But, as we have seen, the Government of India acting on the recommendations of the Road Development Committee is actually penalising motor transport by vehicle and petrol taxation, while the unwanted country cart (which uses and breaks the roads of the country many hundred times more than the power-driven vehicle) has not been subjected to any such burden. The Government must reverse its road transport policy and devise measures to modernize the whole road transport system

<sup>1</sup> See J. H. Clapham : *The Economic Development of France and Germany*, pp. 346-48, and *Times Trade Supplement*, December 24, 1921, p. 287.

of the country in the interests of industry and agriculture alike.

There are not many navigable rivers or canals in India, but it seems that the possibilities of using the Ganges, the Brahmaputra and the Indus have not been explored. As water transport is always much cheaper than railway and road transport, and as these three great streams pass through the most densely-populated tracts in northern and north-western India, the Government must give, as recommended by the Industrial Commission, due consideration to the question of developing these and other inland waterway for the transport of goods.

As regards coastal shipping, there is no doubt that the existing system of British monopoly provides safe and quick means of transport, but, in the absence of competition, it can never be cheap. The Government in devising measures to open this field for indigenous enterprise must not forget that during the past quarter of a century a number of Indian shipping companies have been compelled to go into liquidation on account of the ruthless rate-cutting wars of their old-established British rivals, and that so long as means are not found to restore free competition, there can be no hope of reducing the freight charges. If bounties are paid on shipbuilding, and a part of the coastal trade is reserved for Indian shipping, there would be nothing unusual in adopting this course; for many countries (including Britain) have adopted these measures at one time or another in their history to develop their shipping and shipbuilding industries.

State assistance in developing the coastal shipping and shipbuilding industries will be found all the more necessary when it is remembered that it is out of these small beginnings that

India can eventually develop trans-oceanic shipping.

It will also be necessary to pay more attention to the question of opening new harbours when the existing facilities are found to be inadequate. As far as we can see, the development of engineering, metallurgical, chemical and other industries in or around the coalfields of Bengal and Bihar and Orissa will gradually bring matters to a head: for the neighbouring port of Calcutta, apart from being more than 200 miles away from the centre of the existing coalfields, has its limitations as regards further development. In fact it is already so congested that the possibility of opening a new harbour should be seriously explored. Probably when the requirements of new centres of industry become too pressing, the solution will be found in re-opening and developing the ancient harbour of Balasore whose geographical position in relation to the coalfields of Bihar and Orissa is about the same as that of Liverpool in relation to Lancashire.

The development of foreign markets will also require a serious consideration; for apart from the necessity of keeping the manufacturer in touch with foreign countries for the sake of stability in production, certain industries, such as heavy chemicals, leather, etc., will probably need foreign connections from the start, because even in the beginning the output will be greater than the requirements of the country itself. Although, as a result of the recommendations of the Industrial Commission, some efforts have been made during recent years to establish trading connections with foreign countries, these efforts will have to be intensified according to the requirements of the occasion.

**Company law administration : some remedies.**— Our treatment of general remedies would be scarcely complete without a brief reference to the necessity of tightening up the laws governing the conduct of joint-stock enterprises. At the present time the law gives too long a rope to the managing agents, and if the management and organization of industrial undertakings are to be put on a sound, efficient basis, something will have to be done by the Government to cut down the unduly extensive rights and privileges of these agencies. In fact as the managing agency system has very few bright spots in its past record, and as it tends to starve the individual of all opportunities and initiative, it would not be unwise to check the growth of this system by legislation. Again, as the unwillingness of the investor to support new industrial ventures can be traced to the frequency of failures, the Government must immediately introduce the system of holding "inquests" on defunct organizations and give a wide publicity to the findings of the "coroner's jury" which may be composed of expert technicians on the advisory staff. This procedure will at least re-assure the investing public that there is nothing fundamentally wrong with the industry to which the bankrupt undertaking belonged. It will moreover help to expose the incompetence or villainy of those who are found responsible for the disaster, and so prevent them from doing further mischief. It must be admitted that an unusual course like this has never been adopted in any country, but that is no reason why it should not be given a trial in India where, as we have already seen, the situation is so very unique in many respects.



**Special measures for individual industry.**—The various general measures suggested in the foregoing paragraphs will help industry as a whole, but their adoption will not necessarily lead to the establishment of every industry for which conditions in India are favourable. It must always be remembered that the adoption of the measures suggested above will, to a certain extent, place industries in India in the same position in which industries in other countries find themselves to-day; but as industries in foreign countries have already had a start of many decades, the newly-established industries in India will still find it difficult to hold their own in competition with their foreign rivals, and as such it will be necessary to adopt special measures to counteract the adverse effects of the lack of experience and poverty of organization. In other words, artificial means will have to be adopted to increase the competitive power of Indian industries to such an extent as to enable them to withstand the struggle with their foreign rivals until they are able to look after themselves without extraneous assistance. Clearly this can be done only by means of import duties on foreign manufactures, or by export duties on raw materials, or by bounties on home manufactures, or by the combination of any of these three items.

But sometimes the cost of setting up a factory may be so great and the handicap of inexperience so heavy that (as was found in the case of the dye industry in England) even fiscal measures may fail to attract the requisite amount of capital for an industry of great national importance. In a case like this the State must be prepared even to participate in the establishment of the industry by direct financial contribution. Or again, an industry based on advanced scientific

and technical knowledge may find its prosperity bound up with fresh achievements in the field of scientific research, and yet it may not be so extensively developed as to undertake costly researches on its own account. Clearly in a case like this it is the duty of the State to subsidize research work and so to enable the industry to hold its own in competition with its more advanced foreign rivals. There are also certain industries based on forest and mineral products; but as in India the forest and mineral rights are often vested in the State, and as the future of these industries depends on the cost of raw materials, it may be necessary for the Government to encourage the development of these industries by granting forest and mineral concessions on favourable terms. And, finally, as the future of certain industries is dependent upon the quality and amount of agricultural and animal products available in the country, it may be necessary for the Government to help those industries by taking measures with a view to ensure the supply of those materials in desired quantities.

The Government must be prepared to apply all or any of the above-mentioned remedies when it is established that their application is necessary for the development of an industry. But as most of these measures, particularly those pertaining to the fiscal policy of the Government, are likely to cause a good deal of financial inconvenience to the consumer and the country as a whole, and as it would be positively harmful to the best interests of the country to grant any kind of *special* facility to those industries which have no chance of surviving after the removal of that facility, the Government must begin its programme with an industrial survey so as to know exactly for which industries conditions

in the country are favourable, i.e. which industries would ultimately be able to stand world competition without the props of State assistance. Moreover, as the requirements of no two industries are alike, the Government must determine what special measures would suit the requirements of various industries. And, finally, the Government must announce its policy in respect of various industries, and declare what amount of support it is willing to grant to an industry under specified conditions during the initial stages. Of course the Government should be willing to re-examine the whole position in the light of actual experience after an industry has been established, but a preliminary announcement with regard to its policy and proposed measures would be necessary if it is ever desired to expedite the development of some of the existing and the introduction of new industries. At this stage we might as well briefly examine the principles which the Government may follow in granting the various above-mentioned special facilities to an industry.

**Import duties.**—The protective import duties assist the industries of a country by increasing the price of foreign manufactured articles to such an extent as to enable the newly-established indigenous industries to compete with their better organized foreign rivals. They are meant to neutralize the adverse effects of the lack of experience and organization. They artificially increase the cost of the protected article, and that increase in cost represents the price which the consumer or the country pays for the development of an industry. It is a sacrifice: and that sacrifice can be justified only when it is proved either that it is of a temporary character or that

it is necessary for the safety of the nation. In other words, only those industries are entitled to receive the benefits of protection which are either necessary for national defence or which, given a temporary immunity from foreign competition, hold out promise of improving their organization and technique to such an extent as to be able to face world competition within a reasonable space of time. It is for these reasons that a full-blooded or all-round protection cannot be countenanced: for under this system even those industries for which conditions in the country are not at all favourable and which have no prospect of surviving after the protective barriers have been removed are likely to come into existence. Manifestly it involves perpetual sacrifices without any counterbalancing advantage. Hence the necessity of a preliminary survey which we have suggested in the preceding paragraph.

But in examining the claims of an industry to protection, the Government cannot be guided solely by the cost of production during the initial stages of development: for in some cases the cost of production may work out to be actually lower than in any competing country, and yet for various reasons the industry may not be in a position to face world competition. The most important of these disturbing factors is the prejudice against local manufactures in the mind of the consumer or the long-established prestige of the foreign article; and to smash this prejudice and prestige alike it may be necessary to bring about a substantial disparity in the price of the two articles by the imposition of protective duties.<sup>1</sup>

<sup>1</sup> It may also be necessary to resort to protective duties when it is found that the price of an imported article has been artificially lowered

But once it becomes reasonably certain that an industry would be able to face world competition after the demolition of tariff walls and that it is only within these tariff walls that its birth and development can take place, no consideration of inconvenience and sacrifice should prevent the Government from erecting those walls. We need not enter into a discussion of the various classical objections to protective duties: all we have to do is to refer once again to the pages of history, which show that every country which followed England on the road to industrial development had to make all those sacrifices and endure those inconveniences, and a late-comer into the field like India cannot hope to be an exception. Her rivals are now too far advanced to be overtaken without the help of extraordinary measures. Either she must make those sacrifices or be content to remain in the present precariously semi-industrialized state for ever and suffer the consequences.

As we have pointed out before, the rules laid down by the Fiscal Commission for the guidance of the Tariff Board and the Government are on the whole sound, and if in granting protection to an industry which has yet to be established the Government strictly adheres to those rules, it will be able to avoid many a pitfall associated with the imposition of protective duties. But one thing we must add: in promising protection to an industry it must insist on the adoption of the most up-to-date methods of production and management, and may even introduce a system of compulsory supervision. The Indian indus-

by means of bounties on production, or when it is proved that a country is engaged in "dumping" its manufactures, or exporting them at a price below the sum total of the costs of production and distribution. However, both bounty-fed and "dumped" articles are rare things nowadays.

trialist has yet to appreciate the benefits of being up-to-date and efficient in his methods, and unless this condition is satisfied the period of "apprenticeship" will be unduly prolonged and thereby the country will have to make unnecessarily larger sacrifices.

**Bounties on production.**—As protective duties always increase the price of imported articles, and as the price of protected indigenous products generally corresponds, however roughly, to the price of imported articles, it is clearly undesirable to assist each and every industry by means of protective tariffs. There are many manufactured articles which are used as raw materials or vehicles of production in various industries, and if the cost of these articles is artificially increased by means of protective duties, the cost of production in those industries automatically increases, which is by no means a pleasing prospect. The Government must not allow this increase in the cost of basic articles to take place; but at the same time as those basic articles have got to be protected against foreign competition, the two objects can be achieved only by the grant of bounties on the manufacture of those basic articles. If, therefore, the Government is convinced that any basic industry cannot be established without adequate protection, that protection should take the form of bounties on production so as to avoid the imposition of extra burden on dependent industries. In the case of some basic industries, however, it may be possible to tax the imports, and to utilize the proceeds of the tax in subsidizing the indigenous industry. Whatever the arrangement, the Government must assist a basic industry in such a manner as to keep the

cost of the article at a low level. We do not, however, know of an industry belonging to the non-basic group (excepting of course shipbuilding, but which, considering the requirements of the transport trade, is not a non-basic industry in a strict sense of the term) in whose case the grant of bounties or subsidies is permissible.

**Export duties on raw materials.**—The object of imposing export duties on raw materials is twofold: to bring about a difference in the local and export price of raw materials, and to conserve the supply of those materials for the use of manufacturers at home. Clearly if these duties are to serve their purpose, the country must hold a partial or complete monopoly in the production of the taxed article, otherwise the exports of that article would tend to disappear completely. As far as we can see, there is, apart from jute, no article of which India enjoys a complete monopoly, or for which some very good substitutes are not available. There are, however, many articles of which India is the largest producer in the world, but in most of these cases the conditions of supply are such that even the slightest artificial increase in the export price of Indian materials would promptly lead to an increase in production abroad and so bring about a heavier decline in exports from India than would be really justified by the size of the burden. Oilseeds and raw hides and skins are probably the only exceptions; but, as will be explained in connection with basic industries in the following part of this work, while no amount of direct and indirect encouragement is likely to bring about any great change in the oil industry so long as certain important conditions are not fulfilled, a light and scientifically

graduated tax on the exports of hides and skins is likely to prove useful in developing the leather tanning industry. On the whole, however, it may be said that the Government would be well advised in leaving this dangerous method of developing industries alone, as the least carelessness in handling this weapon is likely to do irreparable damage to the export trade of the country.

**Research work.**—As has been already explained, the Government may also assist an industry based on highly technical processes by grants in aid of research work, or by undertaking the work itself. It would, however, be better to infuse the spirit of self-reliance in the industries of the country and to encourage them to make their own arrangements (through their representative organizations) for research work. This arrangement will keep the research institutions in direct touch with industry, and will thus prove to be more efficient and useful than a purely official arrangement. But as these representative associations will be too poor to undertake this work, the Government must come to their rescue with funds, but not without some controlling influence on the conduct of research institutions. Arrangements may also be made to harness the universities of the country in the service of industry. Whatever the final arrangement, the Government will have to play a leading part in financing and organizing research work, and as there are certain industries whose future is inextricably bound up with research and investigation, the Government must not let this important item slip into the limbo of forgotten things.

**Financial assistance and direct participation.**—  
In a country where the public is not well-educated



in matters relating to industry, even the offer of various above-mentioned facilities by the State may fail to induce the capitalist to lend his support to an industry: for as a result of his old experiences he may still have, lurking in the back of his mind, some doubts as to the genuineness of the propositions put before him. In a case like this if the Government is satisfied that its various general and special measures are bound to put the industry on its feet—and those measures would be far from adequate if there is some doubt as to their ability to accomplish this end—the Government may stimulate the inflow of capital by guaranteeing dividends for a certain period. The Indian mind is peculiarly susceptible to these small things, and there is no doubt that the association of the State with an industry will always be helpful in breaking the reluctance of the investor to support that industry. Of course these guarantees must be accompanied by certain well-defined conditions as to the size of the undertaking, its equipment, and even the processes of manufacture in order to ensure efficiency and success; and if these conditions are fulfilled and if various general and special remedies, which have been described in the preceding paragraphs, are applied according to the requirements of the occasion, these guarantees with regard to dividends would become guarantees only in theory, for there would never be an occasion to apply them. They are likely to ensure an improvement in the organization of industry, and at the same time change the mentality of the investor, which are the two greatest needs of industry in India at the present time.

But sometimes the financial requirements of an industry may be so extensive and the pros-

pects of immediate success so slender that even the guaranteeing of dividends may fail to attract the requisite amount of capital. In cases like this the Government must be prepared to participate directly in the development of industry by making contributions towards the share capital—as was done in Britain in the case of the dye and beet-sugar industries. The participation of the State can be justified only when it is proved that experimentation would be long and costly, that the proposition would fail to interest the private investor, and that the success of only one undertaking of its kind would ensure the satisfaction of a greater part of the country's requirements. It is in very few cases that all these conditions are fulfilled, so that the scope of activities in this direction is very limited. But in any case it would be better for the Government to participate directly in the development of a new industry by buying shares in an undertaking than by setting up demonstration and pioneer factories. It goes without saying that whenever the Government decides to participate in an industrial undertaking, it must insist upon taking part in its control and organization—just to ensure that incompetence and corruption, which are the two old enemies of progress in India, are not allowed to ruin the prospects of the pioneer undertaking and therefore of the whole industry to which that undertaking belongs.

#### CONCLUSION

**The necessity for simultaneous action.**—The various general and special measures suggested in the preceding section must not be expected to yield the desired results unless they are all put into operation simultaneously. Their adop-

tion in a haphazard sort of way would serve little useful purpose : in fact it may be said without exaggeration that in the case of certain industries the omission of one single remedy would nullify the effects of all the constructive measures put together. Without the mobilization of the financial resources of the country, for instance, even full-blooded protection and the whole-hearted adoption of the various general and special remedies may fail to set the wheel going at the desired pace. Or again, without protection or subsidies an industry may never be developed notwithstanding the provision of all other facilities. And the same may be said of the establishment of basic industries, technical assistance, research, power development and other forms of State assistance which, though not quite so important as matters relating to finance and fiscal policy, are nevertheless powerful enough to sway the destinies of young and growing industries.

The Government may shudder to undertake so extensive a programme, and, as it has been doing under the reformed constitution, may elect to sit on the fence watching the march of events, and pleading that its actions must be justified by events. This would again mean the absence of a definite policy : for when we say that the Government must have a policy, we mean that events themselves must be forced by the Government to flow in the desired channel, and not that the flow of events should determine the lines of governmental action. And the Government can achieve complete mastery over these events only by storming the citadel on all sides, and not by out-of-date nibbling tactics.

**Constitution in relation to industrial policy.—**  
To conclude our inquiries, we may briefly examine

how the various functions suggested above can be efficiently performed by the Central and Provincial Governments, and on what principles the responsibility of action can be divided between the two powers. Let us point out at the outset that, barring constitutional disabilities, there should be nothing to prevent the Central Government from reserving for itself all the various functions connected with the development of industries: in fact, from the point of view of efficiency, it would be an infinitely more acceptable plan if somehow the unification of control and action could be effected. Again, in so far as the administrative side of the question is concerned, the Central Government may confine its activities to fiscal action, and let the provinces take care of other items in the programme of industrial development. But is it, under the prevailing circumstances, possible to choose one of these extremes, and yet achieve the goal in view?

We have just now seen that in order to ensure progress it would be necessary to tackle all problems relating to industry simultaneously. Is simultaneous action possible in a scheme of provincial responsibility, especially when this system cannot by any means ensure the uniformity of policy? The experience of the past ten years does not offer much hope. But even if all the semi-independent units agree to adopt uniform methods and policy, would this agreement lead the country to the desired goal? Or, in other words, would it be possible for the provinces to adopt all the various necessary measures to expedite the development of industries? Seeing how miserably they have failed during the past ten years, and knowing what their financial resources and requirements are, we would not

be justified in expecting great deeds from these quarters. Industrial banks (capable of meeting the requirements of small and large industrial undertakings alike), basic industries, expert technical advice and assistance, scientific research, central generating stations, and participation in large industrial undertakings may at once be ruled out as beyond the means of any of the provinces. On the other hand, it should not be very difficult for Provincial Governments to finance general and technical education, industrial housing and water power schemes, or to grant transport facilities and forest and mineral concessions. The conclusion is obvious: if it is at all intended to achieve results, and if the division of function is to take place on the basis of capacity to achieve results, the Central Government must reserve for itself the various functions which cannot be satisfactorily performed by the provinces.

But the division of functions on these lines will be found more difficult in actual practice than it looks on paper. First of all it will necessitate the intervention of the Central Government in the provinces, which, regardless of their own interests, the Local Governments do not appear to welcome. If proofs are needed in support of this contention, we have only to recall the fate of the proposal for the appointment of expert technologists which was unanimously turned down by the provincial Ministers, because they could brook no interference with their liberty of action! And, secondly, this division of functions will necessarily demand co-operation not only between the Central and Provincial Governments but also between the provinces themselves, and the history of the past decade shows that this co-operation or unity of action is extremely difficult, if not impossible, to achieve.

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As far as we can see, "provincialism" in the broad sense of the term has come to stay. Is it then possible to reconcile the political pretensions of the provinces to their economic interests? Not likely. In all appearance they would like to remould economic laws according to the requirements of the constitution. But there can be no two ways of achieving the best possible results in the field of economic development, so that the realization that political constitutions have to be moulded according to the inexorable laws of economics is bound to come sooner or later. And so long as attention is riveted on political constitution and the force of economic laws and facts is not recognized, no great progress is possible. In other words, as economic laws will always refuse to give way, it will be necessary for the constitution to yield. "If the hill does not come to Mahomet, Mahomet must go to the hill."

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