WEALTH AND WELFARE
IN THE
BENGAL DELTA

BY

B. R. BISWAS, M.A.

INDIAN INSTITUTE OF EDUCATION
121- B, Sitaram Ghosh Street, Calcutta-9.

INDIAN INSTITUTE OF ADVANCED STUDY SIMLA

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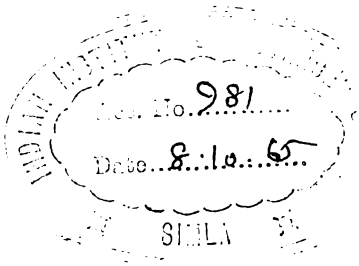

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For who could live or breathe if there were not this delight of existence as the ether in which we dwell? From delight all these beings are born, by delight they exist and grow, to delight they return.

Taittiriya Upanishad

II. 7 : III. 6.

WEALTH AND WELFARE IN THE BENGAL DELTA

and contiguous areas.

PREFACE

The present brochure includes several articles mainly prepared in course of my work and published from time to time in the Press. The subjects have been classified under three groups—(*a*) The land and people, (*b*) The New Industrial Base and (*c*) A cross-section of Economic life in the Thirties, In view of the fact that Partition of Bengal is still a grim reality with us, giving rise to a complex of forces rudely shaking our social, cultural and economic foundations, the articles might still retain some topical interest, which can be offered as the only excuse for their publication. "Greater Calcutta" and "Development of Tollygunje" (Chapters II and III) formed the subject-matter of talks given at the South Calcutta Rotary Club, and the remaining articles were published in the Hindusthan Standard, Indian Manufacture and Production and Calcutta Review to all o whom my grateful thanks are due.

During the 19th and first quarter of the 20th. centuries, the Middle Classes of Bengal moved ahead in the fields of trade, tommerce, industry and farming with a pioneering zeal, pinning their faith on (*a*) Security of land tenure based on the Permanent Settlement, (*b*) Joint-stock movement, (*c*) Small-scale banking and (*d*) Co-operative movement. The economic system built by them had been subjected to severe jolts since the Great Depression of the Thirties and ultimately collapsed with the scrapping up of the Permanent Settlement.

The papers on "Banking in Bengal", "A Plea for Banking Legislation" and "Co-operative Marketing of Jute" (Chapters XII, XIII, and XIV) were wrtten in Pre-Partition days and published in the Calcutta Review, Forward and Financial Times (now defunct) in 1936. These will probably illustrate the operation of some of the forces that led to the decadence of Middle Classes alongwith the economic fabric built by them long before the Bengal Famine of 1942-43, the Second World War, the Great Calcutta Killings or the Partition took their toll,

B.R.B.

November 19, 1964.
Calcutta - 19.
45, Ballygunge Gardens,

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islands in the Pacific, or Ceylon and the coastal areas of Persian Gulf, Arabia and Egypt or even distant Rome in the West. Ancient Bengal had a distinctive irrigation system based on the "over-flow" canals dug out of Bhagirathi and Damodar—"the like of which could only be found in the Nile Valley", as the late Sir William Wilcocks would put it. In the indigenous iron smelters of Chotanagpur Plateau was forged "Damascus steel", which formed a valuable merchandise in the hands of Phōēnicians and Arab traders taking their boats to the Port of Tamralipti till the dawn of the Christian era. Bengal had also been the home of well-developed industries in the medieval age based on cotton and silk, which culminated in the famous Dacca Muslin. It is therefore not an accident of history that the East India company was very keen to obtain a foothold in this region of India, engaged themselves very seriously in its trade and commerce, and ultimately presented an empire to the British.

Even as late as the 17th century, Bernier furnishes the following interesting account of his visit to Bengal—"The knowledge I have acquired of Bengal in two visits inclines me to believe that it is richer than Egypt. It exports in abundance cotton and silks, rice, sugar and butter. It produces amply for its own consumption wheat, vegetables, grains, fowls and goats. Fish of every kind it has in profusion. From Rajmahal to the sea is an endless number of canals, cut in bygone ages from the Ganges by immense labour for navigation and irrigation, while the Indian considers the Ganges water as the best". Even as late as 1815 Hamilton writes of Hooghly, Howrah and Burdwan—"In productive agricultural value in proportion to its size in the whole of Hindusthan, Burdwan claims the the first and Tanjore second".

The brief and casual accounts of foreign travellers down to the 19th century thus reveal that the social and cultural stream of the people of Bengal continued its course unabated, in spite of serious setbacks received from time to time and the eddies and cross-currents created by religious and political forces since the Muslim invasion of the 12th century

or the widespread devastation and insecurity coming from the Portuguese pirates in the Indian Ocean dating from the 14th. As a matter of fact through these vicissitudes and widespread insecurity the people learned to acclimatise themselves to a new form of life and commingling of cultures, forming into their minds as it were some sort of an ideological delta and blossoming into a new renaissance with the advent of Sri Chaitanya and the Vaishnava movement of the 14th and 15th centuries. An intellectual class arose out of this setting, which evinced extra-ordinary vitality in all spheres of life and handled with ease not merely abstruse branches of theology, metaphysics or philosophy but also day-to-day problems connected with socio-political life, offering new angles of approach and treading uncharted seas with the least hesitation. As we know, it was on the banks of the Bhagirathi that the twin national songs of New India—"Jana Gana Mana" and "Bande Mataram"—were composed, giving the nation the necessary inspiration to move forward and ultimately reach the goal of independence.

Through her Five-Year Plans, India today is passing through a gigantic industrial and technological revolution, trying in a generation to leap the chasm between the hand plough and the tractor, the dung fire and atomic power. If a new Bengal is to be planned out of the ambers of partition, this accordingly must have a wider and organic setting than that of merely finding employment for the "displaced persons" or building up employment potential for them. The Bengal delta with the contiguous areas of Orissa, Bihar and Assam has been aptly described as the "Ruhr of India", for the rich mineral resources, power supplies and its industrial belt. With careful and imaginative planning coupled with bold and vigorous execution, the growth potential of this North-Eastern region of India is indeed enormous and should be considered to be a tremendous source of strength for India as a whole. Unfortunately however, since independence, the craze for a "better" spread of regional development in India has resulted in some amount of deliberate state apathy or indifference so far

as this Eastern region is concerned. Secondly, since independence there has been a noticeable decline in the position of Calcutta as a financial centre and as the main clearing house of trade and commerce through its Port and the terminus of railway and road systems. Thirdly, the emergence of Pakistan in East Bengal caused a diversion of trade, commerce and Industry away from North-eastern India and created in its wake a tremendous refugee and unemployment problem facing West Bengal and the neighbouring states of India. And lastly, thanks to the industrial and fiscal policies pursued by the Union Government, the expenses of our welfare and socialistic state in the form of taxes and other burdens are being borne more than proportionately by the Jute, Tea and Coal industries which constitute the mainstay of the industrial base in this region, and stinting their growth and expansion as a consequence.

The integration of Bengal with her displaced population in the pattern of new economy that is now emerging in India is thus a vital feature requiring to be carefully examined. The National Council of Applied Economic Research conducted two techno-economic surveys, one for West Bengal and the other for Dandakaranya, projecting an investment of Rs. 21,000 crores during the decade 1961-71 in the public and private sectors for industrial expansion and development. The basic point that emerges out of these two surveys is that the rate of economic growth in West Bengal since Partition has become stunted ,being only 2.5% per year as against the optimum rate of 7.4% for keeping pace with the growth of population and maintaining a minimum level of economic efficiency. Besides West Bengal, the project report for Dandakaranya suggests specifically the starting of intense mining activity associated with the development of steel and aluminium and other mineral based industries, wood distillation industry for the vast forest resources available, an integrated steel plant in Bastar and smaller industrial units for manufacture of cement, calcium carbide, charcoal furnaces for pig-iron production on the Swedish model and the like.

The life-stream of people in the Bengal delta is thus proposed to be diverted once again along the banks and valleys of the Ganges series of rivers moving to the sea. If all our energies are harnessed in this direction, mother Earth may shower her bounties on them and the plant of cultural and social growth may blossom in its full splendour in a new soil, enabling the people to exclaim—

"I am a son of Earth, the soil is my mother. May she lavish on me, her manifold treasure, her secret riches. May we speak the beauty of thee, O Earth, that is in thy villages and forests and assemblies and war and battles."

(*Atharva Veda* XII, 1. 1, 8)

CHAPTER II

Development of Greater Calcutta.

Development of the Greater Calcutta Area has probably assumed an added importance to-days in view of the emergency caused by the Sino-Indian border conflict. Calcutta holds the key to the development, not only of West Bengal but also of the Eastern region of India as a whole. With the big industrial complex clustering round the city and its hinterland, including Jute, Coal, Chemicals, Cotton Textiles, Paper manufacture and Light engineering industries, a clearing centre for near-about two-third of India's annual volume of trade and commerce, the Calcutta region occupies a unique strategic position and poses a tremendous problem for the Town Planners. It is indeed unfortunate that in the initial stages of planning in India, two of West Bengal's most pressing problems did not receive serious attention which are (*i*) deterioration of the Bhagirathi and the Hooghly rivers, and (*ii*) the disintegration setting in the Calcutta area as a result of over-crowding and growth of unhygienic slums. As we know, both these problems are vitally inter-connected and it required the sharp pointer made in the World Bank Mission's report of 1960 for them to be included in the Third Five Year Plan. We have been assured that the Farrakka Barrage works are in progress, and that planning work for Greater Calcutta is well ahead in the hands of Calcutta Metropolitan Planning Organisation.

Greater Calcutta comprises some 272 sq. miles of area on both sides of the Hooghly river, with the city proper as the nucleus and covering 34 Municipalities including the Corporation of Calcutta on the eastern side and Howrah on the western. Urbanisation of this area has grown during the past two and half centuries—mainly as a port, an entrepot for trade and commerce, both internal and foreign and as an industrial centre. According to 1951 census, the population of this region is 4.63 millions, which had increased to

5.55 millions in 1961, an increase of nearly 25%. This gives the density of population at about 20,555 per sq. mile, which is perhaps one of the highest in the world. There are various factors responsible for this heavy density—opportunities created by industries, trade and commerce which have attracted entrepreneurs, investors as also a large working population from different parts of Bengal and from outside the State. Seeds of urbanisation of this area were sown from the early years of the 17th century with advent of the Dutch, the Portuguese and French traders who started settlements along the banks of the Hooghly. The pace of urbanisation thus set by trade and commerce and the administrative requirements during the British period continued in a rather unplanned way, there being no legislation in India in the lines of the Town and Country Planning Act of 1932 of the United Kingdom, to co-ordinate and put to effective use the work of the different urban centres. With the advent of Independence, there had been a large-scale exodus of displaced persons from Eastern Bengal, and it has been estimated that about 1½ million out of 3½ millions of them have settled in the Greater Calcutta Area, with the result that this density has exceeded tolerable limits.

A peculiar feature of this refugee influx is that they have unconscionably added to the slum population in the city proper and its spill areas. It is interesting to note that population in the immediate surroundings of the city proper, *i.e.*, in areas which are within half-an-hour's bus ride to a city terminus is 1,024,475 in 1951, distributed as follows :

Garden Reach	109,160
South Suburbs (Behala)	104,055
Tollygunge	149,817
Dum-Dum	87,549
Baranagar	77,126
Howrah city	433,630
Bally	63,138

These "spill areas" are served by municipalities which include Garden Reach, South Suburbs (Behala) and Tollygunge in the South, the Dum-Dum Group (Dum-Dum, North Dum-Dum and South Dum-Dum) in the North-east, Baranagar in the North and Howrah city and Bally in the West. In 1951 the total population of this region, including that of Calcutta proper, came to 3,573,152 as against 2,839,726 and 1,581,335 in 1941 and 1931 respectively. It will appear from these figures that the rate of increase in this region had been at the rate of 1 million per decade which is also roughly corroborated by the census figures of 1961. The displaced or refugee families returned from this region in 1951 is 624,164 (including 433,225 of Calcutta proper) which is roughly a third of the entire displaced population coming over to West Bengal. It has not yet been possible to assess separately the full impact of this sudden influx of displaced population in the socio-economic life of the State. But the census figures of 1951 throw an interesting sidelight in the picture. In the 3,615 bustees of the Calcutta area proper, having 21,556 huts and 155,624 living rooms containing 617,374 souls (which workout at a quarter of Calcutta's total population), no less than 112,515 are displaced persons which constitute as much as 18.2% of the bustee population.

If we look at the average density of population in the different urban centres covered by the Calcutta Metropolitan area, the need for a planned drive will appear to be much more urgent and essential. The figures given below are in respect of two districts and represent the picture as it existed in 1951 :

P.S.	*Area Sq. Miles.*	*Municipalities*	*Population*	*Density per sq. Mile.*
Dum-Dum	16.2	Dum-Dum North Dum-Dum South Dum-Dum	95,590	5,901
Bijpur	15.5	Kanchrapara Halishahar	105,185	6,786

P.S.	*Area Sq. Miles.*	*Municipalities*	*Population*	*Density per sq. Mile.*
Baranagore	7.7	Kamarhati Baranagar	154,377	20,049
Jagatdal	22.6	Bhatpara	152,624	6,753
Serampore	22.4	Serampur Rishra Baidyabati	141,071	6,298
Titagarh	11.2	Titagarh Barrackpore	121,798	10,975
Khardah	21.1	Panihati Khardah	81,464	3,861
Noapara	6.0	Ichapur Defence Estate, Garulia N. Barrackpore	75,077	12,513
Barackpore	3.2	Barackpore Cantonment	16,189	5,059

Population density increased further in the decade ending in 1961 by as much as 25% putting thus a further strain on the amenities available in the urban centres. The South Dum-Dum Municipality for example registers a growth of 81%, the population according to 1961 census being 111,507 as compared to 61,000 in 1951. In North Dum-Dum this has shot up to 38,000 in 1961 as against 12,000 in 1951. On the western side of the Hooghly river, Baidyabati records an increases of 77% from 24,883 in 1951 to 44,273 in 1961, and the corresponding figures for Kotrong is 30,977 in 1961 as against 14,177 in 1951—an increase of as much as 118%!

The rapid industrial progress along both sides of the Grand Trunk Road, the Barrackpore Trunk Road and the adjoining Railway lines accounts for this increase in density but unfortunately the poorly equipped municipalities and the local bodies could not take full advantage of

the situation. Paradoxically enough, the municipalities felt that their problems have been aggravated by the industrial progress, as they were faced with the mounting problems of water-supply, drainage and sanitation caused by the influx of a large labour population, without any corresponding powers under the Bengal Municipal Act to increase their tax assessment on the expanding industrial establishments. The major industries are ranged on either bank of the Hooghly river from Kanchrapara to Tribeni in the north and to Budge Budge and Bauria in the south. All heavy industries and manufactures, except mining and extraction of metals, are concentrated in this region together with all conceivable small industries employing power. The areas of greatest density offer attraction of petty trade, cottage craft, small industries, orchardry and vegetable raising, and accordingly the large mass of displaced population also closely hug those areas which easily offer employment or help and markets for their produce and products. The cricle is thus complete and pavements in Calcutta streets or in distant Jessore road alongside the most up-to-date International Airport have been over-crowded to the extreme.

This concentration of industries is limited to a depth of 5 to 6 miles from the Hooghly alongside the Barrackpore Trunk Road and the Eastern Railway lines and does not extend further eastwards into the countryside. There are several factors responsible for this limitation. On the one side there are the following to be taken into consideration *viz.* (*a*) Port of Calcutta with its facilities for haulage, transport and warehousing (*b*) navigability of the Hooghly river for barges and towing craft, (*c*) availability of cheap electrical power, (*d*) availability of municipal amenities for labour, (*e*) proximity of the metropolis and availability of alternative employment for labour, and (*f*) excellent trunk road systems. On the other side, any possible extension eastwards has been retarded by the great barrier of the salt lakes and river and canal beds which cannot be made fit for building except at prohibitive costs of filling work. The industrial zone can thus normally extend along either

of the two directions—(*a*) Firstly towards Diamond Harbour, which it has been doing for the last few decades and continuing to enjoy the benefits of the Hooghly river, and (*b*) Secondly towards Barasat, Bongaon, Basirhat along the trunk roads to the north-east of Calcutta. The State Electricity Board has extended its sphere to this region with a view to attract the industrialists and steps are also in progress by the State Government to transfer the administrative headquarters of the district which will undoubtedly make good for some of the past neglect. There are programmes for widening the trunk roads, which are still too narrow and winding to dispose of fast and heavy industrial traffic. The substitution of the old 2'6" Baraset-Basirhat Railway track by a wider one and the Express Highway to Durgapore under execution are also intended to improve the prospects of industrialisation of this region. The broad-guage Railway line (5'-6") from Dum-Dum via Duttapukur and Gobardanga to Bongaon, Bongaon to Ranaghat, and back again to Dum-Dum down the main Calcutta-Ranaghat Railway line serves as an excellent circular Railway. It is, however, curious that this circular track, though completed as early as 1882-83 did not lead to industrial growth thus encompassed. The reason is perhaps not far to seek as (a) the absence of water communications and good drainage and (*b*) the presence of low-lying swamps, marshy river beds and large paddy-fields—made reclamation of lands too costly for industries to be established or prohibitive by bringing them into clash with the agricultural producers of either paddy or Jute. A long-term remedy in this respect obviously lies with Drainage and flood-flushing schemes connected with the Farraka Barrage and points to the need for having a co-ordinating agency for the purpose.

While on this subject of the Ganges Barrage, we should realise that neither the Calcutta Port nor the entire industrial and urban base covered by the Greater Calcutta Area can be thought of or developed in isolation of the rest of the countryside of West Bengal. Dispersal of industries is necessary to remove the heavy congestion in the cities

and towns and this cannot be done unless the swamps are reclaimed and effective drainage provided. This involves that the spill-channels of the Ganges should be revitalised and new life put into the streams of the Hooghly and the Bhagirathi by inducing a substantial supply of fresh up-land water by means of the Ganges Barrage.

The weals and woes of the people of West and Central Bengal are inextricably linked up with the smooth functioning of the river Hooghly : on her depend the health, vitality and prosperity of the populace. The river provides the only outfall channel for other rivers in this eastern region of India left after Partition and its abandonment or decay would not only aggravate flood menace during the rains but the whole of the area would as a consequence get water-logged and unproductive. The arguments put forth have probably been strengthened to-day by the needs of development in the Metropolitan area, all schemes of which will have to be closely linked and co-ordinated with the drainage and flood-flushing projects connected with the Ganges Barrage.

The problem of water-supply in this region is an illustration of the infructuousness of all expenditure, unless the long term needs are looked into even from now on. As we know, salinity in the river in Calcutta area is gradually increasing for want of fresh up-land water. When the site at Palta was chosen in 1865 for supply of drinking water to Calcutta, water in that reach was free from salt. In 1936 the salinity in Palta rose to 360 parts per million as against the drinking water tolerance of 250 parts per million, and in 1959 this increased to 2,480 parts per million ! For perennial supply of potable water, big diameter tube-wells are being sunk but as we know the results are not much encouraging. The Calcutta Corporation has sunk 80 big diameter tube-wells, and it has been noticed that the water is not sufficient in quantity, worse in quality, gradually decreasing in yield and creates frequent troubles such as liming up in the strainers and supply mains due to high iron content and temporary hardness. The experience is almost the same throughout the entire

metropolitan area, and doubts are expressed whether we can expect any improvement in the sub-soil water supplies till the Farrakka Barrage is able to ensure a form of perennial supply of sweet water in the Hooghly.

A Consultant team set up in 1959 by the World Health Organisation suggested that the Greater Calcutta Area of 272 sq. miles should be formed into the Calcutta Metropolitan District and that the problem of sewage disposal, drainage and water-supply of this area should be entrusted to a statutory body to be called the Calcutta Metropolitan Authority. Besides suggesting the brief outlines of its organisation to consist of a Board of Directors, a General Manager and a large representative Council, the WHO Consultants also recommended that the requisite financial resources of this Authority should be obtained from (i) Union Government, (ii) State Government, (iii) other Government or private money-lending agencies and (iv) taxes on general property upto a limited amount for which the Authority should be invested with the necessary powers. Several schemes for water-supply have also been prepared, and it has been decided to entrust the West Bengal Development Corporation, a statutory body, to execute them in 24 municipal and 14 non-municipal areas in Greater Calcutta, for which funds have been allotted. There is also the Emergency Water-supply Scheme, as a result of which 154 deep and wide bore tube-wells are proposed to be sunk—42 in Tollygunge and 112 in other areas.

Another agency working in the Greater Calcutta Area for purposes of development is the Rehabilitation Directorate of the State Government. For obvious reasons, the scope of its work is restricted to near about 400 colonies or sponsored schemes set up for rehabilitation of displaced persons. The minimum amenities envisaged in these schemes are confined to internal roads, drainage and water-supply. These schemes are located in almost all the municipal areas of Greater Calcutta including Tollygunge and the ultimate idea of the State Govt. is to hand over them to the respective municipalities after completion of work for their maintenance and upkeep. Unfortunately,

however, the drainage problem of any of the areas, starting from Kanchrapara to Tollygunge could not be satisfactorily tackled in the absence of a proper out-fall, or an over-all plan for the entire region.

The Calcutta Metropolitan Planning Organisation is now at work in drawing up an integrated Master Plan to tackle satisfactorily the problems of sanitation, congestion, slums, silt and salinity of the river and communication, both internal and external. On the basis of data already collected or made available by expert bodies they have drawn some of the schemes such as water-supply and sewage disposal, slum clearance etc. The fact, however, remains that for any Master Plan to be worked properly, there is to be a basic administrative pattern on the foundation of which such a plan will work. This foundation depends on the type of executing authorities to be set up for the purpose, their position and powers in relation to each other and the Municipalities, and lastly a satisfactory arrangement for their finance, both recurring and non-recurring has to be made. Several permanent statutory bodies will have to be set up, each charged with the execution and maintenance of specific projects, and at the same time the existing municipalities will have to be entrusted with the residuary civic work. It has been suggested that municipal corporations should be created to bring them together in convenient groups so that they may handle a sizeable area and population with efficiency. This line of reasoning is more or less in line with the recommendations made by the Royal Commission on Greater London in 1957, which suggested the setting up of some 52 new Greater London Borroughs, each with a population of 100,000 to 250,000 and a Greater London Council covering the whole area.

The WHO experts stated that neither the Calcutta Corporation nor the adjoining municipalities had the power or financial resources to cope with the staggering problems facing the Greater Calcutta area, such as over-crowding, poor housing, primitive water-supply, lack of space for new industries, transport bottle-necks, power shortage and last of all the problems posed by the refugee influx from East

Pakistan. In all fairness to the existing set-up of the municipal bodies, it has to be admitted that they are helpless to handle any of these problems with their existing in-elastic resources. Their principal and sometimes exclusive source of revenue has continued to be taxes on holdings and under the Bengal Municipal Act there are serious limitations against increasing their assessments. If, therefore, the municipalities are to be entrusted with the residual civic work under the integrated Master Plan, it will have to be examined seriously how their revenues are to be augmented by either a greater share in the Motor Vehicles Tax, allowing them to take up certain specified lines of municipal trading, imposition of Octroi duty or some other elastic sources.

Since very ancient times, the traditional culture and social set-up of Bengal extended along the banks of the Bhagirathi, with her tributaries and branches, emptying into the sea. It appears that the historical currents have now turned a full circle and Bengal has once again to stand on this traditional base to function. As we have seen, the stage is now set for an all-out planning and execution of development in the metropolitan region, which may ultimately extend up to the mouth of the Hooghly skirting the sea. Let us hope that squalor and poverty behind lighted streets and pavements will be things of the past and that a prosperous life built up around our cities, towns and villages.

November 12, 1962
Talks at South Calcutta
Rotary Club.

CHAPTER III

Development of Tollygunge.

To speak about the development of Tollygunge, one cannot but refer to its early beginnings out of the deposits of silt and sand and the new lands thus created by the receding Adi-Ganga. The venerable Kali Temple on its bank not only drew pilgrims but also settlers on both of its banks with numerous other temples for her Consort Siva, the remnants of which may be seen even to-day. The growth of the region was however, hampered by the jungles and marshes lying between an unhealthy tidal swamp on the East and an unstable deltaic river on the West. The landscape is typical of the country side on both sides of the Hooghly river at its lower reaches, down to the Sundarbans. Initially "a place of mists, alligators and wild boars", as an early description of this region in the late 18th century said, with isolated pockets of human habitation, an important landmark in the development of Tollygunge was the renovation of the Adi-Ganga by Major Tolly from his muslim palace at Belvedere. The area was now connected with the rich agricultural granaries of the rice-growing eastern districts, followed by a brisk movement of country boats along the canal, henceforth to be christened as Tolly's Nullah, from which modern Tollygunge took not only its name but probably also its eventual shape. While the laying of the Railway lines at a later stage improved commercial traffic, development of Tollygunge as a suburb of Calcutta took a definite pattern at the turn of the century with the location of the National Council of Education at Jadabpur, the starting of the T. B. Sanatorium, and the work of a group of pioneering estate agents developing plots and building houses for people attracted by the prospects of a quieter life and the lower range of land prices.

In between two World Wars of 1914-18 and 1941-45 Tollygunge had its slow pace of growth with a municipality of its own. But to grow to its present proportions it required two major jerks *viz.*, the troop movements of the Second

World War, and the mass movement of population caused by the exodus of migrants from Eastern Bengal during 1947-52. Ironically enough, while the first Partition of Bengal sowed the seeds of development of this important suburb of Calcutta, it was probably reserved for the Second to set the stage for completing the process. During the hectic days of 1947-52, millions of people simply squatted on jungles and marshes and on lands partially built up for military needs and by enterprising estate agents. Tollygunge had by now more than its share of Calcutta's headache—about overcrowding, sanitation, drainage and water-supply, more so because the new impact proved a severe strain on whatever road and drainage system it possessed and brought about a virtual stalemate.

In April 1953, an area of 7.44 square miles of the Tollygunge Municipality was integrated into the Calcutta Corporation, raising thereby hopes of extending the municipal amenities of the city proper to the area. It appears from records that the number of privately owned premises, rose from 14,500 in 1957 to 27,500 in 1960. The number of filtered water connections rose from 1,068 in April 1951 to 1,467 in 1960—an increase of only 400 in a period of 10 years. Against the total mileage of roads maintained by the Calcutta Corporation, Tollygunge claims to have only 18.71 miles, most of which are mainly kutcha. There are approximately 100 miles of kutcha surface drains and that too without any arrangements for outfall drainage. It has not yet been possible to extend the benefits of brick-made or pipe sewers, not to speak of underground sewerage. The number of bustees in the Corporation portion of Tollygunge has been recorded to be 94 in number with a population of more or less 50,000.

When displaced persons from Eastern Bengal appeared in the scene, they came by thousands squatting on abandoned lands indiscriminately. The natural slope in this region being eastward, the existing drainage lines have been interfered with by numerous constructions made against the slope, resulting in water-logging during the rains. Indirectly however, they rendered useful service by

developing lands on their own account where-ever required and otherwise improving the landscape for habitable purposes. When Government stepped in, they did so to regulate the flow of population along approved channels, ensuring for them at the same time a minimum standard for purposes of habitation. These steps were mainly confined to formal acquisition of lands under a special Act and payment of compensation to owners. The displaced families had to be classified and arranged in groups in the shape of miniature townships—whether Government-Sponsored or Squatters' Colonies—, each with its own systems of residential plots, roads and internal drains, to be ultimately integrated into a common pattern through a Master Plan for the entire region. Just at the moment there are 63 such townships south of Tolly's Nullah, awaiting to be integrated into the development pattern of Tollygunge with a population of more than 20,000 families or 1,00,000 heads. Beyond Tolly's Nullah in the north, there are several more townships for displaced persons, where attempts have been made to redraw the drainage and road lines according to approved specifications. It, however, appears that without suitable arrangements for maintenance and upkeep and provision of outfall drain, no satisfactory solution for water-logging during the rains and other problems can be reached.

A Committee of engineers examined the scheme prepared by the Calcutta Corporation in 1957 for development in the Refugee townships in Tollygunge. This plan provided for (a) a system of roads inside the colonies together with main and trunk roads, (b) underground drainage system, (c) a zonal system of distribution of water-supply with a stand-by tube-well for each zone, and (d) street lighting. It was felt that if development of 1139 acres of land covered by these refugee townships is to take place, the over-all scheme of development will have to include a total area of 12.8 sq. miles (6.5 sq. miles within Calcutta Corporation and 6.3 square miles in the contiguous Union Board). In between refugee townships, there are considerable areas owned by private individuals and other

interests and it is obvious that these will automatically have to be integrated into the scheme to have their share of the betterment on account of roads, drainage, water-supply and street lighting. In other words, the betterment scheme will have to be approached from a different angle altogether, the administrative responsibility for which will have to be shouldered by a special agency, statutory or otherwise.

An important link in this chain of development schemes for Tollygunge is the Tollygunge-Panchannagram Basin drainage scheme running from Jadavpur and ending in Choubhaga, which has been taken in hand recently and may take near about three years to be completed. There are 4 link channels on the eastern and 2 on the western side of the Eastern Railway line, work of the main channel and the two link channels on the eastern side having already commenced. It appears that the unplanned development in Dhakuria, Haltu, Jadavpur and Garfa will be a bottle-neck to the smooth flow of storm water into this system of new channels, and that unless this is taken in hand immediately, difficulties are likely to crop up. The off-take points of the branch channels are very near the Corporation boundary, and the Calcutta Corporation will have to make arrangements to bring the discharge from the Corporation area to the off-take of these branch channels. Failing this the drainage congestion in Dhakuria and Jadavpore, and as a matter of fact in the entire eastern belt of Tollygunge cannot be expected to be relieved.

The Panchannagram basin drainage scheme, to be eventually successful, depends on the smooth functioning of the Bantala-Kulti Storm water channel. This involves that deterioration of the Kulti river itself will have to be prevented, for which there are two schemes under consideration *viz.*, (a) Sealdah-Gong Basin drainage scheme and (b) Nawi Basin Drainage scheme running through Barasat and Basirhat sub-divisions. Model experiments held at the West Bengal River Research Institute established that flood-flushing through these two schemes, when executed, will ensure conservancy of the Kulti river, so

essential for effective functioning of drainage works in the eastern belt of Tollygunge.

It should be clear that the problem of drainage and storm water disposal in Tollygunge is linked up with a vast catchment area, and has to be looked into from the point of view of over-all planning and development of Greater Calcutta Area. As we know, the Calcutta Metropolitan Planning Organisation has been entrusted with the task of preparing a Master Plan for an area of 272 sq. miles covered by the administrative zones of Calcutta and 32 other municipalities. It would indeed be desirable if this Planning Organisation deals with the problem of Tollygunge so that the proposals can be well fitted in the over-all planning. In order to introduce sewerage or good drainage, many of the existing roads would have to be widened, and there should also be a certain measure of re-arrangement of residential plots and buildings in view of the need to connect with the link channels of the Panchannagram basin drainage scheme. The stage is thus set for an appropriate administrative machinery to take up and integrate the responsibilities for executing the work of development, keeping in touch with the over-all planning now in progress.

Population density in the entire area of Tollygunge works out at 31.47 per acre, as against 130.07 per acre in the Calcutta City proper. This indicates that, if properly planned, Tollygunge may absorb the excess population of Calcutta to a much greater extent than hitherto and thus relieve the congestion. Modern town planning has both a technical and a human aspect. It is the human aspect which provides the background and the functional conditions under which a city grows and develops. Thus when the entire Tollygunge area is developed on the basis of a Master Plan, it can be expected that the cultural and economic life of the people will be given due recognition and necessary scope for expansion provided therein. As regards economic rehabilitation a survey is already in progress for siting suitable cottage or small scale industries in tune with the availability of local talents and aptitudes. As a matter of fact the Metropolitan Planning Organisation

has been charged with the task of making a comprehensive study covering practically all aspects of city life.

Metropolitan Planning is now very much in the air and we are tempted to enter the "Brave new World" of Aldous Huxley. Big projects are taking shape for re-building Calcutta and its hinterland such as Salt Lake Reclamation, the Power Project at Bandel, or the Panchannagram Basin Drainage Scheme. Along with the implementation of these and allied projects, the requisite authority will have to be set up for handling the administrative problems to the best possible advantage. When Mr. Herbert Morrison was lamenting over "the London that might have been", the Royal Commission on Greater London (1957) was already on its way to submit its report for the creation of 52 new Greater London Borroughs, each with a population between 100,000 and 250,000 and a Greater London Council covering the whole area. 'Will the Metropolitan Authority in the Second City take a similar pattern or something different ?

May 7, 1962
Talks at South
Calcutta Rotary Club.

CHAPTER IV

Maintenance of the Calcutta Port

The Port of Calcutta maintains a key position in the whole of Eastern India, as the only outlet for export of Jute, Tea, coal and the minerals to overseas and the import of essential merchandise and capital goods for building a Planned Economy. Besides its strategic position the Port has also become the life-line of the state of West Bengal after Partition, constituting for the people of this hapless state the only rallying centre of its trade, commerce, industry and the marketing of agricultural produce. It would indeed be disastrous to discard this city as a relic of the British or treat this as a derelict Port to make way for something better, either nearer the sea-face or in a contiguous state in the coastal region! The point unfortunately requires to be emphasised at the present moment, as there had been a neglect of the Calcutta Port during the First and Second Five-Year Plan periods, thanks to the mad craze for regionalism and dispersal of industries to underdeveloped regions of India. As a matter of fact this deterioration continued almost to desperate limits till the World Bank Mission made a special study of its needs in 1957 and submitted its findings for our serious consideration. As we know, the World Bank Mission in its report stressed the point that the Calcutta Port was neither derelict nor decaying except on account of our sad neglect, that there has been a great potentiality of the growth of trade through this Port in view of the rapid industrialisation of its 0.5 million square miles of its hinterland, and lastly that with a view to increase its potentiality the possibilities of a subsidiary or satelite port require to be explored for deep-draught vessels which cannot otherwise utilise the Port on account of shallow depths of the Hooghly river.

There are certain special features of the problem of maintenance of the Calcutta Port which require to be faced rather squarely. Firstly, deterioration of the Hooghly river is no longer in the realm of controversy and the river has

silted so fast within recent years as to prevent heavy draught vessels from coming to the Port at all. The need for dredging operations was felt as early as 1907 when the Calcutta Port Commissioners introduced a dredging plant, "not with the purpose of maintaining the existing depths but with a view to increase the depth on the upper bars in order to enable the Port to deal with the heavier draught ships which were then coming into vogue"—to quote from an official statement. These dredging operations however could not successfully cope with the increasing deposits of silt, as complaints were pouring in from the interests concerned and even as late as 1956 we had serious complaints from shipping agents about suffering inconvenience and and financial loss through trading with the Calcutta Port. As we know, vessels using the Port have to cross more than 15 bars, negotiating sharp bends and severe current conditions, and taking usually 36 to 44 hours to sail down the river with stoppages at Uluberia, Diamond Harbour or Kulpi and Saugar anchorages. A further limiting factor assuming serious proportions within recent times has been the increasing intensity and frequency of bore tides caused by a progressive reduction in the river's depth.

Until recently the Calcutta Port Commissioners pinned their faith on the potency of dredging operations for keeping the channel open from the sea to the docks, and raised a good deal of controversy by their ship canal scheme sponsored during the last World War. Dredging is after all an essentially improvised arrangment to keep the tidal channel alive and can hardly be expected to combat with natural forces even for a length of time. And the risks are really great if there is a temporary failure of the service, as it happened during the recent Calcutta Port strike. As a matter of fact if the life of the Hooghly river was to depend merely on the efficacy of dredging operations without a copious supply of fresh up-land water, the fate of the Calcutta Port would have been sealed forever without any hope of redemption.

We may refer in passing to a very familiar argument usually put forward, that an estuary of the Hooghly type can

almost indefinitely be maintained as a tidal channel without any flow of up-land headwater. It is however known that from Nadia to Calcutta the action of the tides is causing a distinct deterioration of the river Hooghly, for the very simple reason that the ebb tide being less strong is unable to scour away the entire silt deposited by the flow tide, and that a river channel subject only to the tides tends to silt up in its upper reaches first and the deterioration gradually spreads down through the entire length of the river. Yet this is not a unique experience with the Hooghly river alone. In our own times we have witnessed the rapid deterioration of the "beheaded estuaries" like the Matla, the Thankaran, the Saptamukhi, the Bidyadhari and other rivers, and we cannot evidently like this history to be repeated in the case of the Hooghly river if the Calcutta Port is to be saved from disaster. The Calcutta region (Geonkhali and Diamond Harbour) was considered to be an ideal site for a ship-building yard in view of its proximity to the steel-making districts and the growth of heavy engineer. ing industries in its immediate surroundings. But its claim was passed over in favour of Cochin on the ground that the Hooghly river was considered unreliable for safe launchings and that continuous dredging might in time endanger the heavy foundation works required to be under-taken for the ship-building yard. Unless therefore remedial measures are taken in hand from now on, the fate of the subsidiary Port at Haldia and the industrial complex proposed to be set up therein including a fertiliser works, an oil refinery and a ship-yard, may be faced with almost insurmountable handicaps.

Secondly, the river Hooghly was once described as a mighty river flowing past the city of Job Charnock, as in the past it was effectively fed with a copious supply of fresh water from the Ganges through a series of distributaries notably the Bhagirathi, the Jelingi and the Mathabhanga. Through diverse reasons, natural or otherwise, this fresh water supply has been diverted into other channels during the last century and half, the feeder rivers themselves have been silted up and dried and the bed of the river Hooghly

is no longer flushed and scoured as effectively as in the past. The main problem before our river engineers is therefore to resuscitate the Hooghly, and for that purpose divert an appreciable portion of the Ganges flood through the principal spill channels in Central Bengal *viz.*, Bhagirathi, Jelingi and Mathabhanga, improve the carrying capacities of these spill channels, and provide suitable outlets of distributary channals of adequate capacity and other facilities for spill over the countryside. This is indeed a monumental task requiring effective co-ordination of work between several agencies, as utmost care will have to be taken to induce the natural forces with as little disturbance as possible and at the same time ensure permanent results for maintenance of the Hooghly for the sake of the Port and the countryside. Simultaneously the life-stream of these channels requires to be recreated in the laboratories of the River Research Institute with a view to check up the progress of river control works at every stage.

Thirdly, the canal works and deforestation schemes conducted on a large scale during the last century and half in the upper reaches of the Ganges, notably in Uttar Pradesh and Bihar, are partially responsible for this deterioration of the stream in the down-river areas. An effective remedy in this regard was obviously to set up a Ganges River Commission on an inter-provincial or inter-state basis, with sufficient powers to co-ordinate the different canal and deforestation projects and safeguard proper conservancy of the river throughout its entire length. Though several inter-provincial conferences were held during the British period to settle this vexed question and elaborate discussions held about its engineering and constitutional aspects in the Joint-Select Committee of the Parliament, no tangible results could be obtained till the dawn of independence. Discussions at the Constituent Assembly Sub-Committees could not also bring the matter nearer solution, and even today, with the setting up of the Damodar Valley Authority and the Ganges River Commission we have seen how the clash of interests and the unseemly wrangle as between different states make it extremely

difficult to bring about effective measures for ensuring adequate water supplies in the down-river areas.

The problem of river control in the state of West Bengal does not brook any further delay or tinkering. In the interest of the Port, the Hooghly requires to be revitalised by infusion of fresh upland water from the Ganges. The river itself also provides the only outfall channel for the other rivers of West Bengal after Partition, the abandonment of which would not only aggravate flood menace during the rains but also lead to widespread water-logging and loss of agricultural productivity. Accordingly any scheme to improve the river stream should form an essential link in the chain of schemes for revitalising the dead and dying rivers of Central and Southern Bengal including the tidal channels. As a river engineer of repute making a special study of the needs of Bengal put it—"Improvement of the spill channels of Central Bengal and diversion through them of a portion of the Ganges flood appear to be necessary even in the interest of the tidal portion of Central Bengal, as this water after spilling over the land and depositing the silt content will have to pass through these tidal channels for disposal into the sea. With the help of a copious supply of sweet water it will be possible not only to maintain these tidal channels permanently but also to put down the salt water limit and extend cultivation more towards the sea face even without embankment".*

A scheme that therefore takes into account not only the improvement of navigability of the Hooghly river in the interest of the Calcutta Port, but also tends in its train to solve a multiplicity of problems connected with public health, agricultural productivity, salinity in the river water, dispensing with the need for embankments in the tidal areas, and a host of other vital aspects concerning the life-stream of the state of West Bengal is certainly worth striving for with the utmost seriousness.

In the Twenties of the present century the late Sir William Wilcocks put forward the scheme for having

River Problem of Bengal—S. C. Mazumder

a Barrage across the Ganges at a point about 14 miles below the Baral Head at an estimated cost of £ 19 million pound sterling. At that time this was considered to be too ambitious a project, and much water has since flown to waste down the Ganges till two sovereign states have emerged on its banks out of the ambers of Partition. A Barrage for the entire Ganges stream for resuscitating the dead and dying rivers of geographical Bengal would now require an Indo-Pakistan River Commission, which is obviously a far cry today. Accordingly the only available remedy left for West Bengal is to have the Barrage at Farakka and utilise the two feeder rivers of Bhagirathi and Jelingi for inducing a substantial supply of fresh upland water for revitalising the Port along with the valley of the Hooghly and Bhagirathi. It is indeed unfortunate that more than a decade since independence has passed away without any tangible steps being taken and that the Farakka Barrage Project has been passed over on more than two occasions in favour of less important projects such as the Mokameh Bridge and others for the up-river areas. As we know, since the First five-year plan, the Farakka Barrage Project with its original estimates of Rs. 36.6 crores (since revised to Rs. 50 crores) is on the discussion table and its non-inclusion in the First, Second and even Third Five Year Plans cannot be explained away simply by hinting at Pakistan's possible objections. The Indus River Commission had been a much more controversial subject, and thanks to the intervention of a World Bank Mission a solution was reached on that account as well.

Yet there appears to be no further choice in the matter if the Calcutta Port is to be maintained as India's life line and the countryside of West Bengal revitalised for its numerous displaced population. Will New Delhi be able to disclaim its responsibility if West Bengal relapses into a "big old deserted village" or Calcutta continues to be a "night-mare" to Mr. Neheru for all times to come ?

June 1, 1958
Indian Manufacture and Production

CHAPTER V

Irrigation and Canal Rates in Damodar Valley.

The recent discussion in the West Bengal Legislature about the Irrigation (Imposition of water rate for Damodar Valley Corporation water) Bill has raised some very pertinent issues involved in the imposition of canal rates on a compulsory basis and the adoption of the principle of a "Development Levy", in West Bengal.

It may be recalled that the maximum rate for supply of water from the Damodar and Eden Canals in the district of Burdwan had been at the rate of Rs. 5.50 per acre, and what the Irrigation bill sought to introduce was to raise the levy to Rs. 12.50 for the Kharif crops and Rs. 15 for Rabi. It was argued that such an increase was not only unjustified by results, but that the compulsory basis of the imposition of canal rates in West Bengal was unsuitable in the interest of agriculture.

A compulsory levy on the farmers without a compulsory supply of water is obviously an anomaly, and the opposition was particularly unassailable when it stated that the D.V.C. Project had not yet been completed and that there were breaches in the canals which made a regular supply of water impossible. Then again the system of canal water distribution, as adopted today, has been found to be uneconomic and a suggestion has been put forward for entrusting the task of canal water distribution to the co-operative societies of farmers themselves—a suggestion which may very well be tried along with the introduction of volumetric systems with a view to find whether a more economical use of canal water can be ensured in the interest of agriculture.

Development Levy :

When the Damodar Canal was originally opened in 1933, the rates fixed were Rs. 3.50 and Rs. 4.50 per acre respectively for the long and seasonal leases. Under the

Bengal Irrigation Act of 1876, it was optional for the cultivators in the commanded area to apply for water, and initially the Canal water proved to be rather popular—the area under lease showing a continuous tendency to increase since 1933-34. It may be interesting to observe that in 1935-36 the entire commanded area was under lease on a voluntary basis, a special feature of the year being that of a drought.

It was in 1936-37 that the principles of the Bengal Development Act were applied to the Canal area, replacing the voluntary basis of the Bengal Irrigation Act of 1876 with the consequential agreement rates, and providing for the imposition of a canal rate on all plots of land of the commanded area up to a maximum of half the value of the increased outturn due to irrigation from the canal, this maximum being fixed at Rs. 5.50 per acre for the Damodar and the Eden canal areas,. Prior to the imposition of the canal rate, an elaborate enquiry was made about the pre-canal and post-canal yields and while the statistical data indicated an increase in out-turn of Rs. 11/- per acre, the actual "development levy" was fixed at 50% of the improvements effected by the canal. Unfortunately however, the imposition of a "development levy" at that time raised an acute controversy and had ultimately to be abandoned.

The current rates in the Damodar and Eden Canal areas have been fixed presumably on similar statistical data, but the timing of the enhancement of the canal rate is rather inopportune as it conflicts with a sound dictum that a water rate once fixed "should be examined with a view to increase or decrease periodically not less than once in ten years". There is a definite *quid pro quo* in the imposition of a canal levy and a reasonable time ought to be allowed to demonstrate to the user of the canal its economic value, without making him depend too much on the statistical data of an experimental farm.

Explaining how the water rates were collected from the Mayurakshi area, it has been stated that at first it was fixed at Rs. 6.50 an acre, and in five years it was gradually raised

to the maximum Rs. 10 per acre, as provided for in the Act. Even then it was intended to cover only the maintenance charges—the capital costs being left out of consideration altogether for the present. The requirement is to impose a "Betterment Levy" for the purpose, and though the D.V.C. Act provides for such an imposition and some of the States of the Indian Union have introduced such a levy, it has not yet been feasible to impose a similar levy for the purpose in West Bengal.

Overflow Irrigation

If there is any tract in India today which is in dire need of scientific and wellplanned irrigation projects, it is the decadent areas of West, North and Central Bengal, and obviously we cannot make any headway till it becomes possible to recoup the capital and maintenance charges of the projects by the imposition of suitable canal rates. The old and familiar argument, often heard in Bengal, is that the Damodar Canal is to be considered as an insurance against drought—essentially a "protective work" against famine. But the fact cannot be overlooked that the Canal has also brought in an increased productivity of the soil accruing to private owners of land. The Irrigation Commission of 1901-03 pointed out that "apart from the question of famine protection, there is no reason why the State should accept a permanent charge on the revenue for the sake of increasing the productiveness of land belonging to private owners". Though it is a far cry from the Irrigation Commission of 1901-03 to the D.V.C., the argument for the imposition of a suitable canal rate on the basis of increased agricultural productivity is practically unassailable.

We are thus led to the fundamental proposition as to what constitutes the real irrigation need of West Bengal, and whether the D.V.C.—the Damodar and the Eden Canals particularly—is serving any crucial need for the improvement of agriculture. According to the late Sir William Wilcocks, the eminent Irrigation Engineer, the special need of Bengal is that of "Overflow Irrigation"

or irrigation during the rains with a proper admixture of siltladen river-water with rain water in the fields. It is this system which is peculiarly suited to the conditions of alluvial Bengal, the 'land of mighty rivers and copious rainfall, where there is at present a decline in agricultural productivity and aggravation of public health problems. There has been a good deal of criticism recently about the effectiveness of the D.V.C. system of canals to satisfy this crying need, and to the extent the D.V.C. can be made to serve the needs of agriculture much of the criticism levelled against it can really be disarmed and the justification of canal rates imposition established beyond dispute.

Ideal Basis of Water Rates

Apart from the question of a scientific execution of canal works, there is the problem as to what constitutes the ideal basis for the imposition of water rates. According to the Taxation Enquiry Committee, the minimum charge should be fixed at the cost of supplying the water—*i.e.*, to say, the cost of maintaining the irrigation canal plus interest on capital costs ; while the maximum should be at a figure so fixed as to take for the government the whole of the increase in out-turn from the land except such portion as will be just sufficient to induce the cultivator to take the water. The normal water rate should accordingly be within these two limits, allowing a moderate share of the value of the water to the cultivator. The rates may be fixed per acre or if possible on a volumetric basis and should preferably be examined with a view to increase or decrease periodically not less than once in ten years.

How to judge this "value" of canal water to the cultivator ? This value to him is determined by several factors, *viz.*, (*a*) the estimated excess of post-canal yields over the pre-canal figures, (*b*) prices of agricultural products, (*c*) extent of rainfall, (*d*) reliability and regularity of the sources of water supply, and (*e*) the quality of silt-laden river water, *i.e.*, to say in so far as the canal water is composed of the valuable fertilising properties of river silt and not sand.

The problem of prices can very well be incorporated in a scheme of periodic reassesment. The problem of demand in so far as it relates to rainfall should not arise in Bengal if the system of overflow irrigation (irrigation during the rainy season with a proper admixture of silt laden river water and rain water) as suggested by the late Sir William Wilcocks is systematically and and scientifically worked out and its economic value demonstrated to the peasants. The reliability of the source of supply is again a question of scientific planning and execution of canal works. Before the imposition of water rates is decided upon, it is obvious that there should be a proper assessment of all the factors involved in working out the capital and maintenance charges of irrigation works on the one hand and what is more important in estimating in the manner indicated the practical benefits accruing to the cultivator himself.

Volumetric System

This again brings us to the question of the different systems in vogue, in India and elsewhere, of levying irrigation charges—(*a*) the volumetric system, (*b*) uniform rate system, (*c*) different rates for d fferent crops and (*d*) Lease system. Under the volumetric system water is sold like gas or electricity, on the basis of the quantity supplied rather than on the area of matured crops which is at present the basis in West Bengal for levying water charges on the cultivators. From the administrative point of view, the area basis—under which the individual cultivator receives only the amount of water based on the average water allowance for, say, every thousand acres—is convenient no doubt, but it is neither scientific nor in conformity with the requirements of maximum sales. If it is intended to build up the incentive of the cultivators and encourage consumption of water for purposes of better farming and raising additional crops, the area basis is obviously no substitute for the volume system of canal levy. Water metres of small cost and simple mechanism are in use in Italy,

Australia and U.S.A. and even in the Punjab in pre-partition days volumetric measurement tariffs were in use in some of the Canal colonies, in the outlets on the lower Chenab and the lower Bari Doab Canals for example.

The Damodar Valley Corporation decided recently to levy water tax at the rate of one anna six pies and one anna per 1000 gallons of raw water extracted from its canal systems for industrial and domestic purposes respectively. It has constructed a number of dams across the Damodar and its tributaries which were seasonal before but now became perennial. The storage capacities of the Tilaiya, Konar, Maithon and Panchet Hill Dams are enormous and sufficient for dry weather requirements in the area, and the working out of its volumetric assessment of bulk purchases for larger agricultural estates, factories or industries should be watched with considerable interest. In the case of the Damodar, Eden or the More Canal, a volumetric calculation can easily be made for a full cropping season. The user, who in this case will be the cultivator, will have the advantage of being free to apply for the water to as much area as he likes, and should be in a position to exercise his full initiative in the planning and management of agriculture. The system also ensures an element of freedom from interference by subordinate officials ; but as volumetric assessment works out successfully in cases of bulk supplies, and as agriculture is also better managed if done on a collective scale, there is indeed a good case for joint-management of irrigation water by a group of villages working on co-operative lines. In this matter, the Gramdan movement and the Community Development Projects can obviously play a great part and effect a better utilisation of Irrigation canals in the interest of agriculture.

At the end of the Second Plan India will have about 145 million acre feet of Irrigation supplies to distribute. Its effective utilisation depends on the introduction of a satisfactory system of canal rates, satisfying the needs of capital and maintenance costs of Irrigation works as also

the crying needs of agriculture. The tragedy in development in West Bengal is the Canal rates controversy, which has many historical twists and cross-currents. What is needed today is a bold attempt to work out a scientific system of canal rates and move ahead to build up agricultural prosperity.

August 1, 1958,
Indian Manufacture and Production


BENGAL
SCALE 1 INCH = 16 MILES
REFERENCES
BENGAL BOUNDARY
DISTRICT BOUNDARY
NATIVE ESTATE
RAILWAYS
RIVERS
WEST BENGAL
SIKKIM
BHUTAN
SANTAL PARGANAS
SINGHBHUM
MAYURBHANJ
BALASORE
MOUTHS OF THE GANGES
BAY OF BENGAL
BURMA

CHAPTER VI

Iron and Steel Industry in New India

"The Hindus excel in the manufacture of iron. They have also the workshops wherein are forged the most famous sabres in the world. It is impossible to surpass the edge you get from Indian steel"—Arab Edrisi.

The Iron and Steel industry is a gift of the Damodar Valley to India—the main raw material resources, Coal Iron and the refractories, being available in an abundant manner in the valley of the Damodar and the Barakar river systems. As if to match the natural gifts of coal and iron which constitute as it were the beds of these two historic rivers, there appears to be an ideal site for a modern steel mill at their junction-pointed out to the author by the late Sir Cyril S. Fox in course of a visit to the area in 1947-, where the iron stone shales under neath act as the natural barrier between the Raneegunje and Barakar coal measures. Abundant deposits of high grade iron ore and limestone are available within a radius of some fifty miles of the site—in Singhbhum and Gangpur—, the site itself containing considerable quantities of low-grade iron ore at the surface and huge reserves of metallurgical coke at depths ranging between 780′ to 1500′ ft., "good enough for more than a hundred years' supply of metallurgical coke for a modern steel mill with a capacity of 1,000,000 tons per year" (to quote the late Dr. Fox).

As a matter of fact, the area itself had been the traditional centre for the indigenous iron smelters till up to the close of the last century, which is even seen occasionally to-day in the more inaccessible jungle tracts in the Chotanagpur plateau. Depending upon the locally available material these indigenous smelters made use of several types of ore—"magnetite concentrates in river sands, laterite, iron-stone concretions in Gondwana rocks, magnetite and hematite associated with archean rocks". The forbears of these iron smelters had probably been the famous producers of

Indian steel in ancient times, a testimony to the skill of the Indian technicians still standing to-day in the Iron Pillar of Delhi—as marvellously free from rust to-day as when it was forged some seventeen hundred years ago. It was at the Indian smelters again that the famous "Damascus steel" was produced, which formed a valuable merchandise in the hands of the Phoenicians and the Arab traders at the dawn of the Christian era. In the words of Sir George Birdwood, "the blades of Damascus which maintained their pre-eminence even after the blades of Toledo became celebrated, were in fact made of Indian steel". It should therefore be clear that long before iron-smelting on modern lines took shape in India, the Indian technicians established for themselves a rich heritage through the centuries. Another heritage, probably lost altogether, is the effective utilisation of particulaly low-grade ores by the traditional iron smelters and the delicate blendng with other minerals with a view to work out innumerable grades of iron for different uses, medicinal or otherwise.

New Era of Indian steel

It was in the Jherria coalfields that the manufacture of pig iron and steel by modern methods was commenced as early as 1874 by the Barakar Iron Works, later on acquired by Messrs. Martin & Co. as Managing Agents of Bengal Iron and Steel Company. Originally founded on such deposits as the ore in the ironstone shales of the Gondwanas, supplemented by magnetite and hematite collected from small deposits in Manbhum and Dhalbhum, this early attempt to manufacture steel resulted in heavy losses, and the production had to be confined to approx. 35,000 tons of pig iron per year. It was only when new sources of high grade iron ore were discovered and the vast hematite deposits in Southern Singhbhum came to be opened up that a new era for Indian Steel started.

It was in 1904 that Mr. P. N. Bose of the Geological Survey of India discovered the rich iron ore deposits at Gorumahishani in Mayurbhanj and made possible the

erection of the Tata's smelters at the junction of the Subarnarekha and Kharkai rivers—the jungle-clad site which has later on developed into the extensive industrial township of Jamshedpur. The first blast furnace of the Tata's came into operation in November 1911 and along with the the production of steel there gradually developed a net-work of industrial concerns in the allied lines. Simultaneously in about 1907, Mr. R. Saubolle, engaged in prospecting on behalf of Messrs. Martin & Co., collected limonite and and other high-grade iron-ore specimens from Singhbhum and since 1910 iron ore from Pansira Buru in Singhbhum began to pour into the smelters of the Bengal Iron and Steel Co. at Kulti in Bengal. The Steel era in India thus began with the initiative and enterprise of two private firms—the Tata Iron and Steel Co. and Martin & Co.

"No country could become industrially great which did not manufacture iron and steel", stated Jamestji Tata at at the turn of the century, and it was with the vision and energies of a pioneer that he plunged into the field. It was he who initiated the project, explored the field, selected the technical experts abroad, and constituted in the words of Nehru "a sort of planning commission by himself". Probably much more, as he staked his all to make the venture a success at a time when the path was already strewn with wreckages of previous failures in projects undertaken by others in India. Jamsetji Tata was however fortunate enough to get around him a faithful band of ardent workers, and when the Prospectus of the newly registered Tata Iron & Co. was issued in 1907 the floation was made virtually on the crest of the wave of enthusiasm generated by the newly started Swadeshi Movement in Bengal, with the result that the capital was fully subscribed and paid for to the tune of Rs. 2,20,00,000. Starting with an initial output of 49,000 tons in 1913-14, the Tata Steel Works gradually expanded production to about 163,000 tons of steel ingots or 122,000 tons of finished steel by 1920. During the First World War the Jamshedpur Works were able to supply to government nearly 300,000 tons of steel in the shape of rails, structural steel and shell steel, much of

which was shipped to the Eastern theatre of the War in in Mesopotamia, Egypt and Africa and was thus of vital assistance in winning the War.

Thanks to the intervention of the First World War, the Indian Iron and Steel Co. was unable to commence its operations till 1918, when it set up its blast furnaces at Hirapur with a capacity of 360,000 tons of pig iron. In 1923 the first State enterprise was made by the Mysore Government when it erected its charcoal blast furnace at Bhadravati with a capacity of 86,000 tons of pig iron per year. The full complement of the Iron and Steel Industry in India was thus completed, with three units functioning side by side and gradually taking to further expansions in response to a rising demand of iron and steel. The general slump in the world steel trade and the import of foreign steel at cheaper prices during the twenties however put the Indian infant industry into considerable difficulties and the Tata's were overtaken half-way in the midst of a major expansion programme already committed into. By 1924 the Jamshedpur Works put the new plant into operation and raised the output to about 436,000 tons of steel ingots or 327,000 tons of finished steel. By this time however the price of imported steel declined to a very low level as a result of the world consumption of steel falling severely along with a simultaneous increase in the world's steel manufacturing activity. The competitive position of Indian Steels thus weakened considerably and reached such a stage that the industry itself faced the prospect of extinction unless government came forward with protection.

Tariff Protection.

In 1924 the Tariff Board was satisfied that the industry deserved "discriminating protection" on the ground that it satisfied all the criteria required except that of skilled labour, and accordingly a scheme of protection to this infant industry by tariff duty as also subsidies from time to time was adopted by the government under the Steel Industry Protection Act. Since then the progress of the industry was kept under strict

supervision by the government through two statutory enquiries conducted in 1926 and 1930 and the final summary enquiry in 1947. At the last enquiry held in 1947, the industry did not press for protection any further, and the Indian Tariff Board was also satisfied that the Iron and Steel industry gained sufficient strength to withstand foreign competition and accordingly recommended withdrawal of protection altogether. Thus after enjoying protection for a period of near about quarter of a century, the Indian Iron and Steel industry may be said to have come of age just at a time when India attained independence.

In course of this period of protection, a second steel plant was installed in India, when the Mysore state government installed at their Bhadravati Iron Works electric furnaces with an annual capacity of 30,000 tons. In 1939 a third steel plant came into being at Burnpur with the establishment of SCOB, following a merger between the Bengal Iron Company and the Indian Iron and Steel Company, thanks to the initiative taken by the late Sir R. N. Mukherjee, the Burnpur Plant turning out 240,000 tons of ingot steel by 1942. The Second World War led to an intensive operation of all the steel plants and the Indian output was raised to the peak figure of 1,151,000 tons in 1943. Grown to full maturity, the Jamshedpur Works began to produce for the first time in India Railway wheels, tyres and axles as also alloy and special tool steels. As a matter of fact the Tata Iron and Steel Co. was able to produce during the World War II special steels like armour-plates, welding rods for fabricating armour-cars, stainless steel for surgical instruments, high-speed steels for tools etc. to the tune of 3 million tons.

Just as the Second World War acted as a stimulus to further and improved production of steel, it also brought in its wake an increasing measure of government control over its production, distribution and selling prices. Under the Steel Control Order of 1944, government fixes the selling price of steel, as also what is called the "retention price"—representing the quantum of the selling price which can be

retained by the producers of steel in India. While the selling price is fixed in relation to the prices obtaining for imported steel, the "retention price" for the Indian producer is invariably lower by an average of Rs. 120 per ton—the difference being credited to the "Price Equalisation Fund" maintained by the government. The price-fixing arrangements indicated above have their origin in the exigencies created during the last world war and are probably justifiable to-day if the proceeds of the Price Equalisation Fund are exclusively devoted for purposes of financing the needs of expansion of the industry. India depends a good deal on imports of foreign steels to-day and there is a heavy drain on her resources of foreign exchange on this account alone, incurred to meet the growing needs of the First and Second Five Year Plans. As a matter of fact, there is a feeling that if the Indian industry was not thus prevented from utilising its own internal resources, the much-needed expansion of their output could have been achieved and this dependence on foreign steel imports could have been avoided much earlier.

Changes in Government Policy

Just at the dawn of independence and before the new steel policy was outlined by the Government in the Industrial Policy resolution of 1948, production of steels in India stood as follows :

Tata Iron & Steel Co.	1,070,000	Tons.
Indian Iron & Steel Co. ..	525,000	,,
Mysore Iron & Steel Works	35,000	,,
Re-rollers	70,000	,,
Total	1,700,000	,,

During the four years 1948-51, there had been a slight recession in production, the figures of the production of iron and steel in India being as follows :

	Pig iron (Tons)	Finished steel (Tons)
1948	356,398	853,815
1949	427,575	926,891
1950	290,457	976,100
1951	287,209	1,050,111

During this period the talk of nationalisation was too much in the air and this hampered the private industry in attracting fresh capital in their expansion schemes. Besides, after considering the Steel Panel's report in 1947, it was decided to take immediate steps to set up two major steel works in the public sector, each with a capacity of 500,000 ingot tons and foreign steel missions were invited to submit project reports—a measure which delivered a big jolt to the private industry. It was in 1953 that the Indian Iron and Steel Company and the Steel Corporation of Bengal were amalgamated into a single integrated unit and plannings were completed to increase its capacity to 700,000 tons of finished steel and 400,000 tons of pig iron a year. To help to finance this expansion, the World Bank advanced a loan of $31 million while the government provided a special advance of Rs. 10 crores and a loan of Rs. 7.9 crores from the Equalisation Fund.

In the same year Tata Steels launched its modernisation and expansion scheme to meet the war-time arrears in repairs and renewals, to diversify the production facilities and to raise steel output to 931,000 tons a year by 1958. The programme was estimated to cost Rs. 25 crores, the government having agreed to lend Rs. 10 crores, interest-free, from the Equalisation Fund. Basically it was a modest programme—an interim arrangement till the broader and bigger scheme of Tata's two-million ton programme was sanctioned by the government and launched in December

1955. The Tata Steels entered into a $130 million agreement with the Kaiser Engineers to undertake the designing, procurement and construction of the new facilities to raise its output to two million tons. The financial requirements for the new arrangements had also been quickly finalised, the Government agreeing to sanction a special increase in the retention prices of steel which was estimated to yield Rs. 20 crores over a five year period. In addition, the Tatas were able to raise an additional equity capital of Rs. 13.5 crores and the World Bank agreed to lend $75 million (Rs. 30 crores) to meet the foreign exchange requirements of the expansion project. The expansion programme taken up along with close collaboration with the Kaiser Engineers has been integrated with the modernisation plan taken up in 1953 and covers every phase of operations—from the winning of the ore and the mining of coal to the installing of new rolling capacity for shaping the final product.

The Public Sector in Steel.

It will appear from the foregoing that the private sector has been entrusted with the production of 3 million tons of steel per year—2 million tons by the Tatas and 1 milion by the Indian Iron and Steel Co.—by the end of 1960-61. Under the Second Five year plan, an additional 3 million tons are to come from the Public Sector—the three state-owned steel plants at Rourkela, Bhilai and Durgapur—for which an allotment of Rs. 350 crores has been made by the Government. The revised Industrial Policy Resolution of April 1956 lays down that all new units of the iron and steel industry will be set up by the State alone, the scope for private enterprise being restricted to the expansion of their existing capacity. Pursuant to this policy, a Steel Plant has been set up by the State at Rourkela in Orissa in collaboration with the German Combine Krupp-Demag at an original estimated cost of Rs. 128 crores, since revised to Rs. 170 crores. The Steel Plant at Rourkela obtains its supplies of iron ore from Taldih which lies 60 miles away,

coal from the Bokaro-Kargali mines and the Jharia field, and electric power from the Hirakud Power station and a Thermal power station of 75,000 KW capacity built at the site. The Works will specialise in the production of flat-rolled products such as plates and sheets and strips, and for the first time in India the manufacture of steel is being made by the oxygen-blowing process—known as the L. D. Process.

The Second Steel Plant in the Public Sector has been set up at Bhilai with assistance from the U. S. S. R. and specialises in the production of rail and structural steel. The Iron Ore supplies will be drawn from the rich deposits in Delhi-Rajhara in the district of Durg while coal will be obtained from the Korba mines as also from Jharia. The third steel plant has been located in Durgapur in West Bengal and is the outcome of collaboration with a British consortium of manufacturers. There is a loan of £ 11.5 million from a syndicate of British banks and a further £ 15 million from the U. K. Government. While the plant will draw its supplies of iron ore and coal from Gua and Jharia, its output will specialise in medium and light structurals and railway wheels, tyres and axles. The first blast furnaces at Rourkela and Bhilai have already been opened and the stage has thus been set for a new pattern of development in the production of iron and steel in India.

Raw Materials for steel production.

The Steel expansion programmes under both the public and private sectors indicate a formidable set of problems to be faced—in bringing the raw materials to the site and providing trained personnel. It has been estimated that each steel plant needs two million tons of iron ore, half a million ton of limestone, 160,000 tons of manganese ore and 1.6 million tons of coal—not to mention 75 million gallons of water per day.

As regards iron ore, it has been estimated that another 8 million tons of ore will have to be mined annually. India has very large reserves of high grade iron ore and the necessity of beneficiating it does not arise in most cases.

In the public sector, plans have been completed to develop the Barsua Mines in addition to Taldih to supply iron ore to Rourkela and the Delhi-Rajhara Mines for the Bhilai Steel Plant. In the Private sector the development programme of the Tatas includes mechanising the Noamundi Iron Ore Mines and the opening up of a new mine in Joda. During mining operations however appreciable quantities of fines produced at present go to waste and these might with advantage be used in the blast furnaces after sintering. In the new State steel units as also in the Tata Steel works sintering has been introduced, enabling the use of iron ore fines and improving the operational efficiency of the furnaces.

As regards manganese ore, the National Metallurgical Laboratory has taken up the beneficiation of low-grade ores with effective results. Four ferro-manganese plants have already gone into production and five more are expected to commence operations shortly so as to increase production to 160,000 tons per year—100,000 tons for export and the balance available for use in the steel plants in India. These include the new plant set up by the Tatas at Joda with an initial capacity of 30,000 tons of ferro-manganese per year, going up to 100,000 tons by stages.

The demand for refractories is expected to go up to 400,000 tons per year as against the current production of 200,000 tons. The new steel plants will also require for their construction some 550,000 tons of refractory bricks. The Tata—Didier Project in Belpahar, has been designed to have an initial capacity of 60,000 bricks per year, with prospects of doubling its production when needed. Besides it will have three types of bricks needed by the Steel industry —30,000 tons of fireclay bricks, 20,000 tons of silica bricks and 10,000 tons of basic bricks. With further progress of the steel plants in the public and private sectors, it might be necessary to augment production in this plant as also to start new plants altogether.

Supply of coking coal is another serious problem to be encountered by the steel plants, as there is an over-all shortage in India in the available deposits of metallurgical

coke. It has been assessed that the present output of 3.9 million tons of coking coal will have to be augmented to 11.2 million tons by 1960-61 to meet the requirements of the steel plants. This indeed will be a tall order on the coal mining industry, and its rigours can be mitigated by a proper development of washeries and blending plants. The Tatas have already set up several washing plants in the Jamadoba and the West Bokaro coalfields, and similar attempts are also being made in the Public Sector for blending suitable cokes and beneficiation of the inferior grades of coal. Besides experiments are also being made with initial success for having low-shaft plants in India designed to smelt pig iron by the use of non-metallurgical coke and fuels.

Fluorspar is used as a flux for metallurgical purposes, and with the expansion of the steel industry its requirements will also increase threefold. Another steel alloying element is chromite, the supply of which is limited in India. Wolfram concentrates are in demand for the manufacture of ferro-tungsten, special alloys, tungsten powder and tungsten carbide. There are known deposits in Bankura in West Bengal and workable deposits have also been located in Rajasthan.

Transport Bottleneck.

In the development of steel, the wide dispersal of the steel plants has saddled the industry with an additional load of costs, not to speak of adding to the complications in providing the required transport facilities. It has been estimated that for every ton of steel manufactured, it is necessary to transport 5.5 tons of raw materials and coal. In other words, when in full production, each of the new steel plants will require 12 trains of raw materials every day—five trains for iron ore, five for coal and two for lime-stone, each train carrying a load of 12,000 tons. From each of these plants two trains will be needed every day to remove finished steel. All these involve that there should be corresponding expansion of the facilities available at the

clearin ports of Calcutta, Visakhapatnam and Madras and in the working of the railway systems.

Foreign collaboration and the future.

The presence of foreign collaboration in the progress of the Indian Iron and Steel Industry is an outstanding feature worth serious consideration. This emphasises the fact that the required trained Indian personnel should be at hand as early as possible to take over. It has been observed that each of the Steel Plants at their present scale of production require 670 engineers and higher supervisory staff and 6,300 operatives and skilled workers. The Estimates Committee of the Parliament suggests that a separate Public Service Commission should be set up to recruit the personnel of the public sector undertakings, a suggestion which may be acted upon in the interest of speeding up the process and maintaining the requisite efficiency and morals. As a matter of fact there should be a common pool of trained Indian personnel to be drawn upon both by the Public as well as the private sectors in the industry.

The Estimates Committee regretted the "inordinate" delay in finalising the proposals to establish the new steel plants in the Public sector. The fact however should not be overlooked that in this matter the goverment was breaking new grounds and that too in a very large scale. The original estimates "were merely project estimates differing in scope and singnificance" and had to be revised. Difficulties were ahead—in making a dependable estimate of the country's over-all requirements of steel in the years to come, of securing foreign collaboration, of obtaining the required capital equipment in the early post-war years and of encountering "rocky" soil at Rourkela and elsewhere to a greater extent than that visualised. All these factors have now been successfully negotiated, and productiom commenced and the country is now on its way to implement the very exacting targets of steel production programme set by the second Five Year Plan.

As regards the future, the Estimates Committee suggests the setting up of a joint-advisory council and a specialised organisation including non-official experts to secure better management and effective co-ordination of work in the public sector. The real problem is however to secure the maximum possible co-ordination of work as between the public and private sectors and at the same time obtain the best results by retaining a healthy competitive feature. It will have to be admitted that in the new pattern of development, the scope of private industry has been seriously restricted which is probably not consonant with its proud record of achievements in the past and its pioneering activities. The three new steel plants in the public sector constitute a basic investment and a spectacular undertaking by Independent India initiated with foreign collaboration. Their success must be assured, and this depends ultimately on requisitioning the best of talents available within India herself, capable of taking the required initiative and trained in the hard school of experience in the past.

April 13, 1959.

Hindusthan Standard

CHAPTER VII

Changing Pattern of Coal Mining Industry

The Indian Coal Mining Industry has before it two sets of problems. In the first place coal output has to be increased to meet the anticipated demand of 60 million tons a year by the end of the Second Plan Period in 1960-61. According to the Plan Steel output must rise to six million ingot tons, cement and aluminium are scheduled for substantial increases in production, and the various ancillary industries will have to utilise the extra production thus brought about. The industrial targets set for the country, the programmes for thermal power generation and railway expansion, and the increase in the mileage covered and tons carried by the railways—all indicate rather urgently that the target of coal production must be reached at all costs and accordingly invest coal production with the importance of a national emergency.

In the second place, the technological level of the industry has to be improved so as to meet the specific requirements of the different users of coal and proper utilisation of its by-products. All these involve (*a*) maximum scientific extraction of coal with utmost safety, (*b*) utilisation of all the grades of coal in an adequate manner, which connotes blending, benificiation and cleaning, and (*c*) utilisation of by-products by a suitable process of carbonisation through high, medium as well as low temperature according to requirments. The objective of our national plannings is to have a highly industrialised economy in India and in this context coal carbonisation with all its products—solid, liquid and gaseous —evidently assumes a significance of profound importance. The Coke Ovens at Durgapore accordingly constitute a very timely measure and there should be an extension of similar workings in the Indian Ruhr which is another name for the Damodar Valley.

Coal Target and the Public Sector

The Public Sector of the Indian Coal Mining industry has taken shape out of the eleven "captive" collieries run by the Indian Railways in the past as a bargaining counter for obtaining a regular supply of coal from the industry at "economic" rates. These are (*a*) Kargali (*b*) Bokaro, (*c*) Sawang, (*d*) Kurhurbaree, (*e*) Serampore, (*f*) Karangdih, (*g*) Kurasia, (*h*) Talcher, (*i*) Deulbera, (*j*) Argada and (*k*) Bhurkunda. The average output of these collieries per year is of the order of 3 million tons, and unless large-scale mechanisation takes place, any spectacular increase in their production cannot be looked for in the immediate future.

The Industrial Policy resolution of April 1956 lays down all future development in coal mining to be an exclusive responsibility of the State. Though this does not preclude the expansion of the *existing* privately-owned units or the possibility of the State securing the co-operation of private enterprise in the new mining units when established "where national interests so required", the resolution clearly states that "the expansion of production by the establishment of new collieries will be undertaken *wholly* in the public sector". As regards the setting up of new mining units and the areas to be developed, it has been laid down that "development of new mines should, as far as practicable, be in the outlying fields".

Coal production

During the First Five Year Plan, it was envisaged that the development programmes would require coal production in the country to be raised from 32.31 million tons in 1950 to 39 million tons by 1955-56. The actual raisings,, despatch and export of coal from 1950 to 1956, will indicate that substantial progress has been achieved and that coal production has reached the target set for it.

Table 1

(*Figures in million tons*)

Year	*Raisings*	*Despatches*	*Expor s*
1950	32.31	26.80	0.950
1951	34.30	29.19	2.731
1952	36.30	31.00	3.298
1953	35.97	30.60	1.991
1954	36.71	31.94	2.022
1955	38.22	32.96	1.574
1956	39.43	34.96	.730

It will appear that in 1956 production has increased by 1.21 million tons over that of 1955. The bulk of this production is from collieries in the private sector, the public sector accounting for about 4.5 million tons in 1956 or 11.5% of the total production. In course of the year the production from the Singareni collieries in the public sector has been stepped up to 1.5 million tons and it was felt that some of the collieries in Central India were capable of stepping up production at short notice, but limitations of transport kept the production in check.

In order to meet the increased demand for coal during the Second Five Year Plan, estimated at about 22 million tons over the level of 1955, it was envisaged that this increase should come from the Public Sector to the maximum extent possible. It was accordingly decided tentatively that 12 million tons should come from the public sector, either from collieries already existing or by opening up new ones, and that the balance of 10 million tons should be raised from collieries in the Private Sector, from their existing workings and workings in the immediate contiguous areas. The actual allocation to the Public Sector has been as follows—

	Area.	*Tons (Millions)*
1.	Korba coalfields	4.0
2.	Jhillimili-Bisrampur	3.0
3.	Karanpura	2.5
4.	Singareni & existing collieries	2.5
	Total allocation ..	12.0

In allocating this quota to the Public Sector, the Planning Commission asked for an increase of more than 3000% in the production capacity of the State Collieries and that too in the short span of five years. It was suggested that instead of departmental management of State Collieries, the Government should set up a limited company to own and manage them as also to take up any new collieries that may be opened during the period of the Plan. This suggestion has now been acted upon by setting up the National Coal Development Corporation Ltd., and making a provision of Rs. 40 Crores towards capital investment required for raising the additional production. However though some improvement might be expected from the introduction of the commercial principle in management, it should be realised that the bulk of the increase in production envisaged for the Public Sector will have to be raised from new workings : but opening new pits and bringing the same into full production usually requires a period much longer than five years.

An "over-riding" consideration in opening out new areas has been that the development of new mines should be in the outlying areas as far as practicable. In actual practice this principle is being followed up irrespective of costs or the availability of the requisite quality of coal seams. It was for example decided to open the Korba coalfields with an estimated yield of 4 million tons per year. The preliminary drillings however indicate the occurrence of inferior coal in the major seam of about 100' ft. containing 70 million tons—with an average ash

percentage as high as 35%. The seam of good quality coal that has been proved is rather thin and is reported to contain only 19 million tons, the output of which will have to be reserved entirely for the Bhilai Steel Plant. This means that other sources of supply will have to be looked into to work out the allocation made for the public sector and meet the requirements of the Railways and industries. Alternatively, the State will have to look to the Private Sector to make up for the deficit in production—not to speak of any increase in production that might be required in the interest of industrial targets or proposed expansion of of railway development.

Private Sector and Plans of Development

The Private Sector in coal has been charged with the responsibility of increasing the output of coal by nearly 10 million tons to 43.5 million tons in 1960-61. The allocation of this additional tonnage, area-wise, has been as follows :—

Area		*Tons (Millions)*
(*a*) Raneegunje field	..	5.70
(*b*) Jharia Field	..	3.25
(*c*) Karanpura field	..	.55
(*d*) Central India field	..	.50
Total	..	10.00

In the past few years, output of coal has risen by one to two million tons per year, it being 39.43 million tons in 1956 and representing an increase of 1.20 million tons over the production in 1955. The Private Collieries are responsible for more than 88% of the total production and it must be said to their credit that progress has been maintained by them sometimes against heavy odds and prejudices. The targets set by the Second Five-Year Plan require the Coal Industry to step up output to an annual rate of increase of

over 4 million tons—of which the share of the private sector will have to be not less than 2 million tons. This requires that a good deal of new efforts will have to be put up, modern equipments will have to be employed and probably many new areas and seams will have to be opened. As a matter of fact the coal-mining industry will have to be ready for still bigger targets of the Third Five-Year Plan—probably of the order of 120/150 million tons of coal production per year.

It is important to realise that this over-all position must be reached in the wider interest of the country and accordingly it should not matter if in the process the nice balance drawn up as between the private and public sectors is disturbed and facilities for production are made available in the sole interest of getting results and irrespective of the needs of any ideology. The Chairman of the Indian Mining Association correctly placed the matter when he stated—"If the one sector, due to unavoidable reasons is unable to achieve the targets, it is the duty of the other Sector to make good any short-fall in production".

As a matter of fact the Private Collieries submitted blueprints to the Ministry of Production indicating their plans for expansion of production—not by 10 million tons, but by as much as 30 million tons. It was indeed creditworthy for them to have taken a long-range view of their responsibilities and have felt that if long-range increased production was to be expected of them, they should have been permitted to open new pits and new workings. It should be considered seriously again that unless a coal company is allowed at least to work out a part of its existing reserves of coal, it will not be able to sustain itself for any length of time. It was accordingly unfortunate that permission for opening or re-opening of coal seams had been sparingly granted, and that all proposals for developing new areas by them had been rejected altogether. As regards plans for developing "contiguous" areas, the proposals of private collieries were held up for a detailed consideration of legal rights, rights as to leases, and matters

relating to boundary revision on account of the recommendations of the Amalgamation Committee. All these were delayed for no fault of theirs and much valuable time had been lost due to the operation of probably mere red tape and possibly also due to the requirements of ideology. As the collieries are moreover subject to the whole series of control measures exercised by the Department of Mines and the Coal Board on the one hand and the Coal controller on the other for the whole business of coal distribution, the need for evolving a more liberal and well-co-ordinated coal policy has increased so as to ensure results.

The first essential measure in this regard is to inspire confidence in the minds of the private owners of Collieries so that it would be worth while for them to evince the required initiative and risk-taking. The Industry repeatedly sought clarification from the government about their position and a reasonable security of tenure—particularly in relation to the general policy towards nationalisation. Secondly, it was desired that their rights as to leases already held by them should be respected, and thirdly that the existing plans of expansion of their collieries should not be interfered with. Lastly, in respect of the move for amalgamation of collieries, there should not be any unnecessary boundary revision, particularly at a time when a fully mechanised colliery unit should be left undisturbed in working out its development plans. The amalgamation move is otherwise a healthy measure for the improvement of workings in the private collieries. The Committee on amalgamation of collieries was appointed by the Ministry of production in 1955, and it appears from its report that out of a total of 734 collieries in Jharia and Raneegunje coalfields, as many as 666 units have a production of less than 10,000 tons per month. None of these units have the required equipment and technical staff, nor are they in a position to take to scientific and planned methods of exploiting coal. The Jharia and the Raneegunje coalfields are still reserved for the private sector, and the amalgamation scheme is best calculated to eliminate waste in coal resources and coal production methods employed there.

Coal price and wages policy

There is the statutory control on coal prices and control is also exercised on the wages superstructure by the Industrial Tribunals (Colliery disputes) issuing awards from time to time. Repersentations have been made by the Coal Industry pointing out the difficulties experienced, especially in regard to the inadequacy of the statutory prices fixed for coal. The recent award of the All-India Industrial Tribunal (Colliery disputes) has further added to its costs, estimated by the industry at approximately Rs. 3-8-0 per ton. Apart from the increased cost of production due to implementation of the award, there has been a further reduction in the profit margin due to (a) a steep rise in replacement costs of items of plant, machinery and colliery stores and (b) extra expenditure imposed on the industry by the Coal Mines (Temporary) Regulations. As the Industry has been saddled with extra expenditure on account of wages and has moreover been called upon to embark on a development programme unprecedented in its annals, there is indeed a clear case for a general revision of coal prices. In the past, financing of development in the Coal Industry has almost exclusively been done by the utilisation of profits ploughed back. In the changed atmosphere of the general economy this is no longer possible, and accordingly it is imperative that a suitable margin for development reserve should also be provided for in framing the selling price of coal. In respect of steel and cement prices a similar provision has been made by the State, and it has moreover to be remembered that the Coal Industry so far has never asked for any special subsidy in outlining its policies and plans for development to meet the requirements of the Second Five Year Plan.

Coal Exports

Coal exports constitute an important earner of foreign exchange, and in the early twenties of the present century care was taken to build up a good reputation for Indian

coal in overseas markets by setting up the Coal Grading Board. A rebate on rail freight on coal shipped to foreign markets was also allowed as an additional encouragement, with the result that in 1956 coal exports reached the figure of 1,413,000 tons. At the end of the Second World War however, official obsession for conserving India's resources of high grade coal became rather pronounced, the rail-freight rebate disappeared and the insistence on exporting low-grade coals gradually injured India's reputation aboard. In the Far-Eastern Markets as well as in Burma and Ceylon India had a virtual monopoly of coal exports, and this together with the coal exports to Pakistan accounted for as much as $1\frac{3}{4}$ million tons and earned for India as much as Rs. $2\frac{3}{4}$ crores worth of foreign exchange. The absence of adequate shipping facilities proved no doubt a great handicap to Indian coal exports, and as a result of official indifference Communist China has gained a strong foothold in what had been a virtual monopoly area for Indian coals, with Japan and South Africa following closely. Having regard to the internal requirements of coal and the need to earn foreign exchange at the same time in the interest of a satisfactory working of the Five Year Plans, it may perhaps be necessary to stick to the policy of maintaining coal exports to the three neighbouring countries of Burma, Ceylon and Malaya at any cost.

Coking Coal reserves

The prevailing obsession about the need to conserve India's coal resources probably arose out of the estimates made by the late Sir Cyril S. Fox in the thirties—fixing the total reserves of coking coal at 1,500 million tons. If this estimate is correct, at the prevailing rate of consumption we would be exhausting our reserves of coking coal by 1985. A pessimistic view like this is however belied by the following considerations—(i) The wider and more intensive prospecting now under way in India will indicate that we have far greater reserves of coking coal than the figure arrived at by Sir C. S. Cox in the thirties. As a matter of

fact, in a subsequent report in 1948 the late Dr. Fox improved on his earlier estimates and put up a much higher figure. (ii) We could cut down our consumption of coking coal by utilising the new means of coal preparation and blending—and as a matter of fact inferior varieties of coal can be upgraded through washing for use in the blast furnaces. (iii) Thirdly, non-coking coals can be effectively blended with coking varieties for use in iron-smelting. (iv) Fourthly, such developments as the low shaft furnace operation in East Germany might make possible the use of the brown lignite from Naivelli and inferior grade of coal of the Damodar basin in steel making. (v) Fifthly, the increasing use of hydro-electric power and indigenous petroleum might lead to a decline in the use of coal as a fuel in the steel industry. As a matter of fact in the new melting shop at Tatanagar, all the seven open hearth furnaces are being fixed by liquid fuel. The 1,650 ton blast furnace has adopted a high top pressure technique and used a sinter burden made of iron ore fines and coke breeze, both of which had hitherto been thrown away. If there is a close co-ordination of work as between the government and the steel industry and a proper utilisation of the latest technological devices is made, conservation of coal resources should not be a source of worry to the country at all.

The Transport Bottleneck

The real source of worry in the interest of an increased production of coal is the transport bottleneck, the position about rail transport being indicated in a nutshell in the following table—

Year.	Number of wagons required daily in (i) West Bengal and Bihar.	(ii) Balance areas of coal.	Total.
1957-58	3,778	1,082	4,860
1958-59	4,603	1,556	6,159
1959-60	4,810	1,671	6,481
1960-61	5,016	1,788	6,804

The present guaranteed supply of wagons for West Bengal and Bihar coalfields is 3,500 wagons per day, which means that the daily requirements are not met to the extent of 278 wagons per day for the current year. Coal constitutes as much as 30% of the total goods offered for transportation by the Indian Railways. Judging by the estimated targets of 1960-61, the demand for daily requirements of wagons will increase to 8,000 wagons per day in 1961 as against 4,860 in 1957-58. The existing position as regards supply of wagons is not satisfactory, and even when the Railway Board claims "operational efficiency'—improvement of equipment, addition to marshalling yards, speeding up of goods trains etc. and the prospects of importing more locomotives and wagons have brightened up owing to the satisfactory report of the World Bank Mission, the over-all position as regards coal transport is not very much assuring and alternative means of transport are to be seriously investigated.

Coastal shipping can certainly bring forward some relief in this direction and the recommendations of the Rail-Sea Co-ordination Committee are worth serious consideration. The matter is however not merely a question of putting up shipping or rail freights a bit higher, or lower. It is really a question of finding additional space and providing extra tonnage in the Indian coastal lines. It has been estimated that an additional fleet of 30 vessels would effectively fill up the gap and the recent acquisition of 13 Liberty Vessels from the U. S. Government will indeed prove to be a valuable help. It may also be recalled that during the last World War about 3 lakhs tons were diverted from the Railways by employing Indian sailing vessels. It has been suggested that given the necessary encouragement, it might be possible to build sailing vessels with larger capacity every year—a measure which may in addition help establishing the boat-building industry in India on a firm basis.

A National Sector

In the current setting of the first, second and third five year plans, an all-round programme for coal has been taken

up for implementation. A careful allocation of quotas of production has been made in respect of the spheres and areas to be taken up by the Public as well as the Private Sectors. The Indian Standards Institution has recently published the draft specifications for a scientific classification and garding of coal. While the Fuel Research Institute has already indicated the main lines of technological progress of the coal industry, provision has been made in the Second Five Year Plan for laying out a carefully prepared programme of high, medium and low temperature carbonisation of coal and the utilisation of its by products. It can accordingly be said that the plannings of production, conservation and proper utilisation of coal in India have by this time been well set. It is indeed essential that there should be maximum possible co-ordination of efforts, not merely as between the public and private sectors but also as between the Industry itself and its diversified consumers.

April 1, 1957

Indian Manufacture and Production

CHAPTER VIII

Clay Mining in the Damodar Valley

"Though a mining industry has been in existence in this country for about half a century", writes the Planning Commission, "only a comparatively small number of mines are being worked in an efficient manner under proper technical guidance". This assessment of the position of the mineral industry in India is probably more correct in the case of Clay mining than elsewhere, as most of the mining units in this line in the Damodar Valley Wperational area are either too small in size or too poorly financed for taking up technical improvements to build up their efficiency.

The general pattern of development in this industry during the last two or three decades has been conditioned by the growing requirements of processed clay by the large-scale industries in India. It is only recently that the Industries Conference suggested to the Government to investigate in the case of small-scale and cottage industries "how far and in what manner these industries could be co-ordinated and integrated with large-scale industries". In the case of clay mining, though this need has been felt strongly for some time, no conscious efforts appear to have been made by the adoption of a well-thought out programme of development. Yet the need for co-ordination is being felt keenly, particularly in view of the expressed desire of the Government to make India self-sufficient in the production of essential raw materials. There is an additional reason why clay mining units deserve special consideration at this stage. The majority of these units in the district of Singhbhum or else-where conduct operations on a small scale on a cottage industry basis, and provide employment to a large number of Adibasis, mostly local villagers. Accordingly the well-being of a considerable section of the village folks depends on the prosperity of this industry, proving the dictum of the Planning Commission—"the planned development of small industry is a task of immense magnitude, of equal importance with the planning of agriculture, or transport or industry."

The outlook of the mineral industry in the Damodar Valley areas has improved considerably within recent years. Firstly, there is the power potential of this multi-purpose project and the supplies commenced already by the D. V. C. grid. The Central Water and Power Commission recently made a survey of the power requirements in the Damodar Valley on behalf of the Government of India, and recommended an additional 365,000 KW for industries within the next decade. It is indeed encouraging to note that this grid is already supplying to the industries at Burnpur, Kulti, Chittaranjan and Tatanagar and that expansion schemes are also making rapid headway, brightening up the prospects of development. Secondly, thanks to the impetus provided by the Planning Commission for "co-ordinated, orderly and economic development" of mineral resources, steps have been taken for the first time in India to make a thorough and systematic investigation into the extent, nature and value of the clay resources available. It is also encouraging to note that this task of investigation has been a well co-ordinated effort by three agencies concerned, *viz.*, Geological Survey of India, Indian Bureau of Mines and the Central Glass and Ceramic Research Institute. This investigation is now in progress, but from the preliminary reports it has been clearly established that the reserves of clay deposits in the Damodar Valley and the adjacent regions are "large enough for the requirements of industry and would appear sufficient to sustain a major plant scientifically located and designed for production capacity in keeping with the expanding requirements of commerce in India."

Apart from the availability of large reserves of clay deposits and cheap power in the Damodar Valley, the recent establishment of National Laboratories and Research Institutes has added an additional feature improving the general outlook. Most of the producers in the mineral industry, and clay mining is certainly not an exception, conduct their operations on a small scale and can hardly afford to have research facilities on their own account. Yet this being the secret of commercial success in the mineral

trade, one can very well agree with the Planning Commission that the organisation of the newer industries provides "a most promising field for the educated young man who is prepared to make his way on the strength of his own skill and enterprise". The Research Institutions recently started will bring the fruits of research within his easy reach and enable him to reduce costs and improve the quality of the products. Along with the technical improvements available within their reach, assistance from the Government may also be obtained in assuring a market for their products—in as much as the large-scale industries are being brought within the ambit of systematic planning and their requirements of raw materials estimated and integrated accordingly with the producers.

Wihtout going into the manufacturing stage, the mining and processing of clay alone has all the possibilities of an assured commercial success. Immense quantities of China Clay go to the pottery industry all over the world. Research has also found many other uses for it, particularly as a filler and coating for paper. Today paper-making absorbs half the total output approximately, pottery a quarter, while the balance goes to a variety of industries among which may be mentioned Rubber, Paints, Chemicals, Linoleum, medical supplies and cosmetics. China Clay or kaolin has been included in the list of strategic materials in U.S.A., because of its essential use in the production of high quality ultra-marine blue pigments. High-grade kaolin for ceramic use (low in iron contact and with only a trace of titanium) is gaining increased application for various filters and in special products such as special paper coatings—the coarser fraction being sold to ceramic industries. In the manufacture of earthenware, China Clay gives added whiteness to the body and is more plastic than flint. Hard procelain for the electrical trade must be rich in silimanite. There is no known substitute for China Clay in the manufacture of electrical insulators. The use of the substitutes in the manufacture of china ware and paper results in the production of only inferior grades, while high-silica kaolinite clays are used in white cements,

as rubber filler and as foundry clay. Insulating parts for high power transmission lines and transformer stations are made of China Clay.

The above is only a brief indication of the different lines which find a ready consumption of processed clay. From the available statistics, it appears that there is more or less a consistent demand of good quality clay of approximately 10,000 to 15,000 tons per month from the different industries in India, and that the paper mills alone account for more than 50% of the total consumption, the balance being consumed in the textile industry, and the manufacture of ceramic wares, rubber products, etc. As almost all our factories are expanding their production under the impetus of the Five-Year Plan and the power supplied by the River Valley Projects, the demand for processed clay is further growing which is reflected in the better price structure of marketable clays in India than at any time previously. As the policy of the Government is to put restrictions on the imports of essential raw materials and assist Indian mine-owners, there is clearly a very strong case to attract the right type of persons for setting up a well-equipped mining and processing unit for China Clay.

It would appear from the available statistics that the district of Singbhum, Bihar, is the largest single producer of China Clay in India—though within recent years there have been scattered efforts in the adjoining areas. The clay mining industry made a definite progress out of the conditions created by the Second World War, as the following Table for the quin-quennium 1942-46 will indicate—

	Production in Indid		*Imports*	
Year	*Quantity Tons*	*Value Rs.*	*Quantity Tons*	*Value Rs.*
1942	57,458	12,36,974	100,724	5,70,338
1943	40,068	9,48,450	3,650	30,600
1944	46,474	10,28,227	4,554	41,071
1945	67,085	12,10,372	6,656	57,218
1946	72,028	15,25,962	6,303	57,070

The serious curtailment of imports during the war years provided an artificial stimulus to the clay mining industry, but as most of the mining units were neither well-organised nor scientifically operated, it was not possible for them to take full advantage of the situation and maintain the progress. With their primitive equipments, the outlook of an average mine-owner is that, having located a kaolin deposit all that is required of him is to dig it out and sell it. It is only rarely that the importance of washing kaolin properly is realised, and unfortunately even in such cases the technical improvements introduced by some enterprising pioneers were not continued in the long run for the sake of "speedier" profits.

The existing position of production in India is that there is really a wide gap between consumption of clays and its supply. This gap consists of (*i*) clays of a more or less uniform specifications, and (*ii*) high grade kaolins used as a filler in cotton cloth, production of superior ceramic wares, imitation art paper and similar other quality articles. The main difficulty about the production of processed clay in India is that very few of the mine-owners can be depended upon to bring out washed clay of more or less uniform specifications, whereas imported clays mantain a standard. It has also been demonstrably proved that if properly processed with scientific equipments very high grade kaolin can be produced in India out of the existing resources of clay deposits. As a matter of fact, with a little more care in purification and capital investments in proper plants and research, the requirement of high grade kaolin in India may be met entirely from indigenous sources, and imports of clay dispensed with. The Indian industries are so much keen to have this supply that they are prepared to pay for imported kaolin a price four to five times as high as that paid to Indian clays. One of the main reasons for this preference is that imported clays are standardised to a specification and a continuous supply is assured to meet the requirements.

The Indian trade requirements of China Clay for general purposes (ignoring pottery works) appear to be (*i*) Good

colour, (*ii*) Low Grit content, (*iii*) Low Iron content and (*iv*) suspensibility—these varying in order of importance according to the purposes for which the clay is required.

Good Colour in China Clay implies absolute whiteness, and experience has shown that if properly treated and the crude carefully sorted out of all impurities, Indian clays can easily reach the standard of colour set by best quality Cornish clay and satisfy the entire requirements of Indian industries.

Suspensibility is of great importance when the clay is used for such purposes as paper-filling. The inherent qualities of the clay governing its suspensibility are primarily the fineness and form of its particles as well as its specific gravity. The question ultimately resolves itself into two main factors—(*a*) availability of suitable deposits of clay, and secondly (*b*) production of clay containing the greatest possible number of particles of sufficiently small dimensions by setting up an up-to-date washing and levigation plant.

Iron content—A comparative analysis of the Indian and imported clays indicates that the oxide of iron content of the former ranges between 0.57% and 1.24% while that of the latter varies between 0.85% and 1.6% Selective raisings of crude from the quarries, careful sorting as also processing in the washing plant have resulted in the case of several mine-owners an effective control of the iron oxide content of Indian clays and improving their commercial prospects.

Grit content—The standard required for papermaking in the matter of grit content is usually a maximum permissible limit of 2½%, while textile mills would insist on a standard of less than 1% and prefer gritless clays. Here again careful processing ensures the requisite standards and a good market for Indian clays.

In the Damodar Valley and the adjacent areas, there is no dearth of ceramic raw materials such as China Clay, other clays, feldspar, quartz and minor minerals like Sillimanite, Kyanite, Steatite, etc., and as further investigations

by the Geological Survey of India are in progress the clay resources of this region have been more definitely located.

The mining units of Singhbhum and the adjacent areas are, as has already been stated, mostly on a small and improvised scale, the clays being won by hand labour in open cast quarries. In numerous cases the quarries are no better than burrough holes and show no attempt at orderly working, resulting in wastage of good clay mixed with overburden, loss of valuable resources in abandoned quarries, and wastage in many other directions. Similarly, as it is not possible to maintain the average standard of quality in their outmoded washeries or prevent leakage, losses are incurred specially in not being able to obain the best price for the clays produced. In spite of all these handicaps, a careful mine-owner is in a position to make a decent margin of, say, Rs. 25/- to 30/- per ton against the current selling price, and this without practically making any investment at all in mechanical or technical improvements.

In working the quarries of clay deposits, the mining costs may be considerably reduced by mechanising the work as far as practicable, and assuring the exhaustion of the pit within one dry season. It has been the experience that the best quality and richest deposits are usually at the bottom of the clay strata, and while the existing practice of manual digging has to abandon the pits just at this stage in view of the higher raising costs and other practical difficulties, including heavy water percolation, the employment of mechanical means for quarrying at least partially may solve the problem. Similarly it is possible to obtain the best results by installing a processing plant for separation, concentration, dehydration and drying of clay, and utilisation of the residue by installing a sand processing or other suitable equipments. It has been estimated that with a capital outlay of rupees three lakhs towards the processing and the mining equipments, a production target per year of 15,000 tons of processed kaolin and 5,000 tons of utilisable by-products may be realised, and this ensures not only the

commercial success of the scheme but also a decent margin and profit expectancy for the entire investment against the current selling prices.

It is thus clear that a mining and processing plant for clay, exclusively devoted for the purpose of washing and levigation alone, may be made self-supporting by itself and a commercial success. At the same time the prospects of setting up a ceramic plant and the subsidiary industries for manufacture of high tension electric wares, sanitary wares, pottery works, etc., have also to be kept in view. In selecting the site of the plant accordingly, the general distribution of the other important plants in the Damodar Valley areas will have to be considered. The availability of sufficient workable deposits within easy reach of the Washing and Levigation plant, if not within its immediate vicinity, is an important point to be considered. But there are also other important factors, *viz.*, availability of cheap electrical power, fuel, water supply, labour, communications by good road as also facilities of railway transport for the finished stuff.

From all these points of view, the site of Durgapore appears to be a very promising one, as preliminary investigations in this regard have been satisfactory in locating considerable clay deposits in and around the locality. Durgapore has already been selected as an important focal point for several very important industries proposed to be started at Government initiative, and accordingly if a clay mining and processing unit is located at the same centre, there is every chance of private initiative coming out successful, either out of its own resources, or with assistance from the Government or the D.V.C. authorities if necessary.

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CHAPTER IX

Manganese mining and production of Ferro-manganese

In modern metallurgy manganese ores play a very important part—the manufacture of iron and steel being entirely dependent on it and its use in the production of special steels for armaments investing the mineral with a strategic significance.

About 60%of world's manganese production is used for making ferro-manganese (with Mn contents averaging 72.95%) which acts as a de-sulphuriser, de-oxidiser and a general scavenging agent giving rise to a fluid slag. Manganese ore is added to the blast furnace in the manufacture of pig iron and to the open hearth furnace in the production of steel.

In the chemical industries manganese ores are used as oxidsing agents, the actual manganese content of the ore being not so much important as the available oxygen, which is usually expressed in terms of manganese peroxide—Mn02. In the manufacture of Dry Cells, a praticularly pure variety of "chemical ore" is used, and manganese ores containing mainly pyrolusite appear to be most suitable—particularly the more porous and fine-grained types. Though it is not quite clear what is the best ore for the purpose, the trade usually prefers 85% to 90% Mn02 or chemically prepared Mn02 of the required specification

There are plenty of other uses of manganese ore in the different industries—ceramics, glass, non-ferrous manganese alloys, manganese metals, low manganese-iron alloys, silico-manganese, silico-spiegel, manganese steel, manganese driers, hydroquinone, potassium permanganate etc. The polyvalent nature of manganese renders it very useful in various chemical applications of everyday use, such as Barium Manganate which is a green pigment, manganese arsenate used as an insecticide and manganese phosphate used as a protective coating on steels etc.

World Reserves of manganese ore

The global reserves of high-grade manganese ore have been computed at over 10,000 million tons, out of which the U.S.S.R. accounts for as much as 48%. The Chiatura deposits in the Caucasus mountains is the largest single mine in the world, being continuous for more than 14 miles. The second major Russian manganese ore deposit is located in Nikopol in the Ukraine and is being exploited on a large scale. In South America, Brazil and North Chile there are extensive deposits with a manganese content of over 45%. Discovered in 1946 the manganese deposits in the Amazon region are being explored jointly by the Brazilian interests and the Bethlehem Steel Company of U.S.A. which latter holds 49%interest in the undertaking. With the assistance of an Export-Import Bank loan of $67,500,000 a 120-mile long Railway line has been built from the Mines to the Amazon and a modern deep-water port capable of handling ocean-going vessels has also been constructed with floating loading piers and a capacity to handle 2,000 tons of ore per hour. As a result of this development project, manganese ore output in this region is likely to total 600,000 tons per year, of which 400,000 tons are to be shipped to the United States. In North Chile another American Company —the National Tungstein Corporation—is engaged in developing the extensive manganese deposits for their use. Besides the above, there are good deposits of manganese in South Africa, French Morocco, Tunisia, Mozambique and Egypt. The new independent state of Ghana in the African coast is likely to be another largescale producer of manganese ore, the African Manganese Company owning the world's largest single property of manganese and developing plants to raise and export manganese ore on a large scale.

Manganese deposts in India

According to the latest estimates made by the Indian Bureau of Mines, the reserves of manganese ore available in India have been estimated at about 112 million tons, of which as much as 100 million tons of all grades have been

located in the region now named as Madhya Pradesh. The remaining 12 million tons are scattered in other areas, mainly in Singhbhum and Keonjhar in Bihar and the contiguous areas of Orissa, Andhra and Madras states. Of the total reserves available, about 60 million tons are of the high grade containing over 45 % of manganese.

The distribution of occurrences of high-grade manganese ore is such that with the exception of U.S.S.R all the major producers of steel-Gt. Britain, Germany, France, U.S.A and Japan—do not possess any appreciable deposits located within their territories. This explains why all these countries producing more than 70 % of the world's output of steel are dependent to a large extent on imports of manganese ore amounting to several lakh tons per year.

The Indian Union is perhaps the most important producer of certain qualities of hard, high grade, metallurgical ores in the world, and exports more than 16 % of the world's total requirement of manganese ore. As a matter of fact, manganese has been a traditional item in the Indian export trade, being one of the major earners of foreign exchange for more than two decades. For purposes of export, there has been a suggestion of the U.S. Bureau of Mines for classification of manganese ore into—(1) Manganese ores (35 % Mn content and over), (ii) Ferruginous manganese ore (10 % to 35 % Mn contents), and (iii) Manganiferous Iron Ore (5 to 10 % Mn contents). The grading of metallurgical ores has however been made by the Indian Trade mainly as follows—(*a*) First Grade Ore (over 48 % Mn contents), (*b*) Second Grade Ore (between 45 %and 48 % Mn contents) and (*c*) Third Grade Ore (below 45 % Mn contents). Within recent years the export of manganese ore has been made on analysis, the ores containing less than 30 % Mn and low in iron content being seldom marketable.

Production of Ferro-manganese

It would probably be wise to substitute exports of raw manganese ore by ferro-manganese, special manganese steels, manganese alloys etc, that is to say by finished

products in the manufacture of which manganese ore figures as a raw material. Manganese ore gives a very much smaller return (ranging between Rs 140 and Rs 225 per ton of high-grade ore) than ferro-manganese, the processed material (which would fetch about Rs 800 to Rs 1000 per ton). Besides as the manganese contents of the ore exported are about 48% (which alone are effective in its various uses and are paid for), the remaining 52% of the exported material are transported without any purpose and merely add to the transport costs.

Accordingly it was recommended in the First Five Year Plan that the export of the finished ore, at least the semi-finished product, should be encouraged in place of raw manganese ore. The present domestic production of ferro-manganese is intermittent and small as the following Table indicates :—

Ferro-manganese production in India :

Year	*Production (Tons)*	*Imports (Tons)*
1952-53	34,900	1,293
1953-54	1,221	3,447
1954-55	43,513	3,567
1955-56	Nil	244

The requirements of ferro-manganese for the Iron and Steel Industry by 1960-61 have been estimated by the development programme of the Second Five Year Plan at 60,000 tons for an output of 6 million tons of ingot steel. It is also envisaged to promote exports of ferro-manganese provided the quality and price are satisfactory. The development programme of the industry has accordingly been made as follows :—

	1955-56	1960-61
Number of plants	-	9
Installed capacity	-	171,800 tons.
Production	Nil	160,000 "
Domestic consumption	23,000 tons	60,000 "
Exports	Nil	100,000 "

The initiative for production of ferro-manganese in India has been taken by two private firms, two new plants—one of Ferro-Alloys Corporation Ltd's electric smelting plant at Garividi (Andhra) and another of Electro-Metallurgical Works Private Ltd at Dandeli—having recently been installed with an over-all capacity of 42,000 tons and going into production. With a view to accelerate development in future it is anticipated that the State will increasingly establish new undertakings in the Public Sector, for which the National Industrial Development Corporation has been commissioned to take up exploratory work at the appropriate stage.

Manganese production and exports.

The pioneering efforts in locating manganese deposits and developing gradually an export trade for the mineral had been taken by several private firms. In course of mining, these private firms incurred grave risks and the profits that trickled down to them through the devious channels of the export trade had probably been a poor recompense and had been more than absorbed in the slump that followed boom years and in the transport bottlenecks. Nevertheless the following statistics of production and export will reveal an interesting story of progress :

Manganese production and exports

Year	*Production (Tons 000 Omitted)*	*Value (Rs Lakhs)*	*Exports (Tons 000 Omitted)*	*Value (Rs Lakhs)*
Period I : 1942-46				
1942 ..	757	180	599	205
1943 ..	595	138	712	238
1944 ..	371	86	152	51
1945 ..	210	38	171	58
1946 ..	253	-	435	168

Year	*Production (Tons* :000. *omitted)*	*Value (Rs Lakhs.)*	*Exports (Tons*: 000 *omitted)*	*Value (Rs Lakhs.)*
Period II (1950-56)				
1950	883	848	-	-
1951	1,292	1,785	1,125	1,569
1952	1,462	2,245	1,440	2,178
1953	1,902	2,948	1,568	2,423
1954	1,414	1,954	990	1,292
1955	-	-	921	1,072

It will appear from the above Table that the production and export of manganese ore has passed through periods of boom as well as slump—its worst period being just after the end of the Second World War, when export demands slackened and serious difficulties were experienced by mine-owners and shippers due to the chaotic state of affairs in respect of mineral policy of the Government and the absence of adequate transport facilities from the mines to the port. Affairs changed for the better as soon as the transport bottle-neck was removed and the mine-owners could look to a reasonable measure of security in regard to the concessions held by them. During the quinquennium 1951-52 to 1955-56, the porspects of manganese exports brightened up once again—there being considerable demand for Indian ores of the first grade from U.S.A., Japan, United Kingdom and France. It was in 1953-54 that the peak position was reached—exports of manganese ores rising to as much as 1,568,000 tons valued at Rs 24.23 crores, and its percentage share of total exports from India rising during the year to as high as 4.6% from the usual level of 2%. The declared value of manganese ore per ton has also been as high as Rs 224-3-0 per ton in September 1953 as compared to Rs 55-0-8 per ton in June 1948. The quantum of exports reached during the year was actually higher than the target of 15 lakh tons fixed for 1960-61 under the Second Five Year Plan, and it is a common ex-

perience of the Trade that the volume of exports could have been much higher but for the inadequacy of wagon supplies and facilities at the ports which set the limiting factor to our export potential.

It will thus appear that the existing trade mechanism consisting of the Indian shippers, traders and mineowners rendered a good account of themselves in building up the manganese mining and export industry. Between themselves they worked out a fairly efficient organisation for handling the ores from the mines to the ports, distributing the overseas demand to various mines suiting the requirements of the export specifications and drawing on them for supplies either at the rail-head or at the ports. An elaborate mechanism of trade analysis was also worked out without any assistance from the government whatsoever, which worked well commercially and inspired confidence with the overseas buyers. It also worked well for the mine-owners, who could depend on the shippers for the sale of ores of diverse qualities without getting involved into the technicalities of the situation. It was thus that a mass of valuable experience was gathered and efficiency built up not only on the dressing and processing of ores but also in improving the mining methods in the mines themselves and introducing in certain cases up-to-date plants and machinery for beneficiation of low grade ores.

Change in Government Policy

It was in october 1953 that the quota system was first introduced for export from the Calcutta Port, and policies have been generally announced on a half-yearly basis for the export of mineral ores from the different ports, the restrictions imposed being largely determined by the problem of transporting ores from railheads to the Ports or availability of wagons. It is indeed significant that the volume of exports considerably declined from 15.68 lakh tons in 1953-54 to 9.90 and 9.21 lakh tons in 1954-55 and 1955-56 respectively.

Apart from quota restrictions, there has been a further set-back in the general outlook of the trade as a result of the

Industrial policy resolution of April 30, 1956 which decided to extend the scope of the public sector from coal and natural oil to other minerals including manganese, and reserving all future development and exploitation exclusively for the State. In the matter of coal the State has not yet moved to take over the export trade from the private channels, whereas in the matter of manganese the State Trading Corporation (registered under the Indian Companies' Act on 18th May 1956) is at present engaged in canalising the export of manganese ore in a progressively increasing manner through its own organisation. Theoretically there is still full "co-existence" in the manganese trade—the State Trading Corporation having permitted for itself quotas within a ceiling of only 1/3rd of the total quantity of manganese ore allowed for export, while the shippers and mineowners are generally allowed quotas to the extent of 2/3rds of their previous performances in the "basic periods". To the Trade this limited co-existence appears to be a mere stop-gap arrangement prior to complete change-over, and it is quite natural that they are not in a position to enter into any long term contracts with overseas buyers on a firm basis. The result is that the quantum of Indian manganese exports cannot be ensured, nor can there be any assurance against any undue or wide fluctuations in prices unless the State Trading Corporation enters the field with a firm policy or the private traders are allowed a definite sphere to move on its own initiative, momentum and responsibility.

The State Trading Corporation has asked all shippers to act as a "homogenous organisation" and allow the Corporation to draw a discount ranging between 6% and 23% (and more if prices of manganese rise above Rs 230) on the F.O.B. price, excluding duty, realised. This scheme of procurement and sales evidently means that while the Corporation takes up the task of finding overseas buyers at a rather high charge, the mineowners and the shippers are to bear all the risks and responsibilities involved in the shipment of ores. The result is a tussle and probably a general lack of confidence in handling the situation which is already charged with uncertainties.

Growing World Competition

The export duty on manganese ore together with the higher freight rates charged by foreign shipping have substantially increased the over-all costs of manganese exports to the consuming countries, and this together with the disruption of the old channels of trade and their consequent inability to enter into firm and long-term contracts with overseas buyers are having their adverse effects on the export trade. There is also increased competition from the U.S. S.R and South Africa in the import trade of United Kingdom where India has lost substantial grounds in 1956 as the following Table will indicate—

Manganese Imports in United Kingdom

	Jan-Nov,1955	*Jan-Nov*,1956
	Tons	*Tons*
Total Imports	388,660	424,156
India -	118,594	82,254
U.S.S.R -	109,576	146,439
South America -	34,937	57,441

Similarly in U.S.A which has been till now the best market for Indian manganese exports, there has been a growing competition from South Africa, Brazil and North Chile, as the following Table will indicate—

Manganese Imports in U.S.A.

Jan-Nov 1956

	Short tons (*Lakhs*)
Total Imports ..	31,28
India ..	12,28
South Africa ..	4.00
Cuba ..	1.40
Brazil ..	1.60

The State Trading Corporation is of course alive to the situation, and looking into the long-term contracts for manganese exports entered into by the Corporation as on 1st May 1957, it would appear that efforts are being made to improve the prospects as far as practicable—

Manganese contracts by S.T.C

Country	*Quantity* (*Tons*)	*Value* (*Rs*)
Japan -	85,100 -	1,54,31,266
Holland -	67,500 -	1,51,11,087
U.S.A -	87,521 -	65,94,357
Italy -	22,000 -	57,18,478
U.K. -	62,000 -	1,05,99,612
France -	40,521 -	65,63,860
Norway	1,000 -	1,28,250
Total	365,642	7,01,46,910

In the highly competitive market for manganese India will have to offer better quality goods at relatively cheaper prices and according to a fixed time schedule. The need is therefore to concentrate all our energies in streamlining and mechanising mining operations and removing all the bottle-necks of transport such as movement of wagons and handling of ores at the ports. All these require a clear division of function and responsibilities, and re-organisation of the entire structure of the export trade including the working of the State Trading Corporation. It is indeed a happy augury that there has recently been a general "tidying up of the procedures" in the State Trading Corporation, coupled with the over-all attempt to secure the whole-hearted cooperation of all Indian exporters, irrespective of whether they are private

shippers sponsored by the State Trading Corporation or those doing export on their own account. The question of the export duty is also being reviewed and it has been realised that the existing procedure is cumbrous and dilatory and acting as serious handicap on the promotion of exports. It is of the utmost urgency that the export position of manganese should be improved for the very success of the Second Five Year Plan, and that a better-coordination should be effected between the public sector and the private mining industry including the existing trade channels.

May 1, 1957

Indian Manufacture and Production

CHAPTER X

The Romance of "Bengal Ruby Mica"

The Mica industry of India is of considerable strategic significance, the mineral forming an almost indispensable item for use in the electrical industries throughout the world and Indian exports constituting as much as over 80% of the world's supply of better quality sheet mica and upto 80% of the mica splittings used in the manufacture of micanite.

Uses of Mica—Mica is the name applied to a group of complex alumina-silicates of potash, iron, magnesia, etc. Its most striking property is the ease with which it can be split along the cleavage planes into extremely thin films. The thickness of these thin sheets may be even less than one-thousandth part of an inch, and the splitting may be done by a woman or a child working with a sharp pointed knife. When free from extraneous strains, mica is transparent and colourless in thin sheets, resilient and tough, chemically very stable, resistent to high temperature and a non-conductor of heat and electricity.

Its remarkable insulating properties make mica invaluable to the electric industry. It is used for commutator insulation, armature insulation, transformers, electric heaters, rheostats, condensers, radio tubes, fuse boxes, lamp sockets, sparking plugs, and washers etc. Small thin films or splittings cemented together are built up into sheets and sold as *micanite*. The larger sizes of mica are also used for stove and furnace windows, gas lamp chimneys and shades etc.

Ground Mica, made from waste, is used in the manufacture of patent roofing, wall paper, automobile tyres, moulded insulators, as a filler in rubber goods etc. and for fancy paints and lubrication.

The resonating qualities of mica makes it an important ingredient in telecommunication. A large quantity of high quality block mica is annually used in the condensers of radios and the inconoscopes of television apparatus.

Even in this atomic age, mica holds a paramount position for the simple reason that without it not a single electric machine would perhaps operate. It has a unique combination of physical, chemical, thermal and dielectric properties, making the mineral strategically important and almost irreplaceable by any natural or synthetic product, especially in the electrical industry.

Varieties of Mica—The principal micas of commercial importance are *Muscovite* and *Phlogopite*, both of which are silicates of potash and alumina, the latter containing magnesia as well. Phlogopite is somewhat softer than and not so resilient as muscovite, but can stand rather high temperatures (as high as 9000° centigrade). For some limited purposes phlogopite is more suitable than muscovite, but apart from these limited uses, muscovite is the mica in general use in the electrical industry and Bihar muscovite comprises about 91% of the total world production of mica.

Occurrences of Mica—India is the foremost producer of mica, contributing more than 80% of the total world supply of the material. Other principal producers are Brazil, Madagascar, Canada, U. S. A. and Tanganyika. It has been reported that large deposits of high grade mica have been discovered in Australia.

The principal Indian deposits lie in Bihar, Rajasthan and Nellore, and new deposits have recently been discovered in Travancore, Mysore, Orissa as also in Nepal. The Bihar belt is the oldest and most important of the mica producing areas in India—the mica industry having been in existence for more than 85 years and expanding enormously to its present proportions after the first world war. From this mica belt, which extends for some 90 miles from the eastern side of Gaya district across Hazaribagh into Monghyr and Bhagalpur districts and with a width of up to 20 miles, comes over 85% of the world's supply of better quality sheet mica, and up to 80% of mica splittings used in the manufacture of micanite. More than 700 mines are scattered over this area, and produce the famous *Bengal Ruby mica* known through out the world as the best mica for electrical purposes.

The Madras mines lie mainly in the Nellore district, and are scattered over a belt measuring roughly sixty miles by eight to ten miles. Madras produces some ruby mica of good quality—the greater portion of the mica being green coloured and generally obtaining a lower price than Bengal Ruby Mica.

The Rajputana mines lie chiefly in Ajmere-Merwara and partly in Mewar, Tonk, Joypur and Shahpura. The mica obtained is of the ruby variety mostly, but much of it is buckled and does not command the same price as the Bihar Mica. Mica from Rajputana finds its way into the hands of dealers in Bihar who process the same in Giridih and Kodarma for the foreign market

Muscovite mica is found in veins associated with pegmatite rock. The vein commonly consists of a core of quartz and an outer layer of pegmatite—the mineral being distributed in irregularly scattered pockets, "like plums in the pudding." The distribution of mica does not obey any known rule, and it is not certain that a pegmatite containing an economically workable quality of mica in one section will continue to yield such mica or indeed any mica in another or deeper section. The pegmatite vein itself may pinch out suddenly, and the most careful search may reveal no continuation!

The question of the ultimate reserves of this valuable mineral has often been dwelt upon both in India and abroad, mainly in the U. S. A. Without detailed geophysical prospecting of the area, it has not been possible to establish the depth of known mica-bearing pegmatites or find their extension when they have petered out in course of mining. The lowest depth of one of the mines in the Kodarma field indicate working at 1,000 ft. below surface, and this together with the known geological data indicate the existence of mica deposits good enough for another 50 to 60 years for the industry.

Processing of Mica—Mica is found in the pegmatite vein in the form of what are known as "books" of mica. These are crystals of mica and comprise the minerals in the crude form. For preliminary treatment, the "books" are rifted

into slabs, varying from eight to thirty *mils* in thickness, and the worst flaws are then cut away. This work is usually done with sickles and the mica at this stage is described as *sickle-dressed block.*

After sickle dressing, the mica goes for *grading* according to size. Finally mica passes to the *sorting* department—the most important stage of processing. The principal qualities upon which sorting depends are clearness, hardness, flatness, colour, and the size and number of "air" inclusions and "vegetable" and mineral stains. The different degrees of these qualities are not capable of exact measurement and it takes years of experience to make a good sorter. Besides possessing the capacity to classify mica, the sorter must be an expert with the knife and be well-acquainted with the value of the different qualities of mica. As a matter of fact it is this speciality that gives Indian labour a peculiar advantage and almost a monopolistic position as compared with other mica producing areas.

After the sorting stage, the mica is in three forms—Block Mica, Chillas and Waste.

Block Mica is the dressed, graded and qualified product, varying in thickness from eight to thirty mils. The superior quality of the Block Mica and the bigger sizes of the inferior qualities are largely exported as such.

The Chillas are thin sheets of mica, less than eight *mils* thick, removed in the course of processing and qualifying mica. With the Block which is not exported as such, they undergo further processing into splittings, wrappers, condenser films, condenser plates, washers and discs.

In the Mica industry, there are some 350 lease-holders from the government, and more than 550 licensed dealers. The practice of the miners varies as to the extent to which they process the mica before disposing of it. There are some who go through the entire process including mining and exporting the finished product. Others sell the mica in the crude form, without any processing at all. Still there are others who sell at various stages in between, in accordance with their financial and working capacities. In addition to the miners, there has thus grown up a group of

dealers between the miners and the foreign market. Some of these middlemen buy the crude mica, dress it partly and sell it to other dealers, who finish the processing with their expert knowledge about the market requirements and export the mica.

The very nature of mica mining and processing indicates that it is not amenable to any large-scale mechanisation or stream-lined production, and that a specialised type of knowledge and experience counts predominantly in making the mining and processing a commercial success. It has already been indicated that in the mica field, there are some 600 to 700 mines coming under the regulations of the Indian Mines Act, with an average working depth at some 500' ft. About 14 of these mines produce 30% of the total mica of all qualities. As regards high quality mica, about 25% comes from 11 mines and the remaining 75% is obtained from smaller miners and *Upparchalla workings*. The number of workers engaged in the industry is about 50,000 in mining and processing, and another 50,000 as home-splitters.

Improvement in mining methods—There is a good deal of wasteful mining practices in mica—the anxiety of the miners being to win as much mica as possible with the cheapest investment. Many of the mines had been open cuts, "others were little better than rabbit warrens, tortuous holes and tunnels which followed the mica from book to book." Machinery was rarely used and a mine was abandoned as soon as it became impossible to deal by baling with water which entered the mine. The technique of mining has no doubt improved when the regulations of the Indian Mines Act were enforced, and the requirements of the trade made it profitable to work in a systematic and sound manner. All the larger mines have now become "mechanised," costs have been reduced, and mines are being constantly reopened which had long been abandoned.

The outstanding necessity of the mica mining industry has been the introduction of cheap electrical power. With the installation of the D. V. C. grid in the mica belt, this long-felt want has been removed, and it has now been

possible to make wide use of compressed air, facilitate ventilation and lighting—underground and overground and add to the comforts of the miner and thus enhance his efficiency. With accessibility improved by new roads, mechanisation, electricity, amenities for labour in the shape of modern housing, health and other facilities, there is no reason why the mica industry should not attain a pride of place in the "mixed" economy of India.

Mica production and exports—The current consumption of mica in India is rather limited, being of the order of 10,000 lbs. a year, as against the production of some 437,000 cwts. in 1956. It is mainly an export industry and the comparative figures of production and export of mica, indicated below will tell its own tale—

Year	*Production (Quantity in '000 cwts)*	*Exports (Quantity in '000 cwts)*
1953 ..	245 ..	245
1954 ..	335 ..	335
1955 ..	419 ..	419
1956 ..	437 ..	426

The value obtained for the exports when compared with the prices paid for the imported articles in which mica constitutes the most important ingredient, varying from giant electric generators to the smallest electrical apparatus, reveals colossal difference.

In the Mica industry, it is accordingly necessary to improve the consumption potential within the country. The principal consumers are the railways, electric supply undertakings, and the iron and steel industry. With the development of the electrical industries envisaged in the second five year plan, this consumption is likely to increase substantially. The installed capacity for transformers, motors and fans envisaged at the end of the second plan

period and the estimated requirements of "insulating materials" for their manufacture have been estimated as follows for 1960-61—

Items	*Installed capacity*	*Insulating materials required—Tons.*
Transformers KVA ..	1.5 million	720
Motors, H.P. ..	600,000	75
Fans ..	600,000	70

It should therefore be clear that the overall requirements of insulating materials including sheet mica, micanite, steatite, insulating paints and varnishes etc. should be of the order of 865 tons per year, which indeed represent a considerable improvement over the existing position if realised.

Micanite is manufactured at present in India in very limited quantities, and the bulk of our requirements are supplemented by imports. It is accordingly a good indication that a modern factory, India Mica and Micanite Industries Ltd is being set up in Jhumri-Telaya (Hazaribagh-Dt) in the private sector, and that the Government-owned Heavy Electricals (Private) Ltd at Bhopal contemplate manufacturing micanite on an adequate scale to meet the Indian requirements under the Second Five-Year Plan as also build up our export potential.

The export position of mica requires a good deal of looking up, and the recent setting up of the Mica Export Promotion Council is accordingly a very timely measure—particularly in relation to the requirements of foreign exchange for implementing the objectives of the Second Five-Year Plan. The exports of mica in 1955-56 were valued at Rs. 8.37 crores as against Rs. 6.59 crores in 1954-55 and Rs. 8 crores in 1953-54. Though the prospects have improproved, the situation needs careful nursing, and it should be borne in mind that the U.S.A. is our best purchaser in this regard, taking more than 50% of our exports. The

U. S. A. Government started stock-piling mica since 1952 and since January 1955 while the purchases by U. S. A. of mica from Brazil have increased, and the purchase price of Brazilian mica has also improved by 25% on an average, no such improvement has been recorded in the Indian export trade. The Mica Advisory Committee had made a number of suggestions for improving the position which requires careful investigation. A matter of satisfaction in the matter of grades and specifications is that the I.S.I. specifications for grading and classification of mica have been accepted by the International Standards Organisation. This is likely to inspire confidence about the quality of micas exported and ensure a stabilising influence.

June 1, 1956,
Indian Manufacture and Production,

CHAPTER XI

Copper Mining in Singhbhum

Copper has been well known in India from very ancient times. Many centuries ago copper was smelted in considerable quantities in Chotanagpur, the "old workings" being mainly confined to the veins of "solid" sulphide varying in thickness from one inch to as much as two feet occasionally found near the surface and oxidised. This ancient smelting industry has long died out and it is only in recent years that copper smelting has been revived by modern methods in the Singhbhum district in the Damodar Valley.

In southern Chotanagpur, says Dr.Dunn, a copper-bearing belt, some 80 miles in length and marked out by "old workings", commences at Duarparam on the Bamini river in the Kera district, Singhbhum, and strikes in an easterly direction through Kharswan and Seraikella states into Dhalbhum sub-division, where it curves to the south-east through the Rakha Mines and Mosabani, ending to the south-east of Bahargora. The poor character of the deposits prospected and installation of expensive plants before the deposits were proved accounted for unsuccessful results in working on modern lines during the last quarter of the 19th century. Subsequently the Geological Survey of India carried out extensive drilling operations during 1906-08 all along this copper belt, and on their proving the existence of substantial deposits of copper ores the Cape Copper Company under the management of John Taylor & Sons took over the property known as the Rakha Mines and developed its workings. At the end of August 1918, the ore reserves of Rakha Mines amounted to as much as 407,000 short tons of an average assay value of 3.8% copper. A Power House, Concentration Plant, Sintering Plant and furnaces were erected and a refinery completed during 1919-20. During the next two decades, copper mining in Damodar Valley progressed steadily, and with the installation of a rolling mill for the production of yellow metal or brass sheet in 1930, the outlines of an

integrated unit for the production of copper were more or less completed.

Indian demand for copper

The fact however remains that in spite of the adoption of up-to-date mining and processing methods, India is deficient in her resources of copper. While the total Indian demand has been estimated at approximately 40,000 tons, the annual production of the Indian Copper Corporation Ltd is near about 8,000 tons only. The demand for copper is moreover growing steadily thanks to electrification plans and the rapid development of industries, its various uses in India being roughly estimated as follows :—

Uses	*Tons*
Utensils & Hollow wares ..	8,000
Electrical cables & wares ...	12,000 to 15,000
Defence, Railways & other misc-establishments ..	5,000 to . 7,000
Totol demand	25,000 to 30,000

During the period 1951-56, the average annual output of the Indian Copper Corporation Ltd, the sole producing unit in India, had been as follows :—

Year	*Tons*
1951	7,083
1952	6,079
1953	4,920
1954 ..	7,161
1955	7,281
1956 ..	7,628

As the Indian production fell far short of demand, the gap had to be met from imports, the figures of awhich for the same period being as follows :—

Year	*Imports (Tons)*
1951-52	5,798
1952-53	20,590
1953-54 ..	8,532
1954-55 ..	26,979
1955-56 ..	18,122

The Indian Copper Corporation Ltd is no doubt putting considerable efforts towards stepping up its production and has launched an extensive programme of prospecting and development subject to the results of the explor ıtion proving to be satisfactory. There are however two kinds of obstacles placed in its way—firstly, there are labour troubles—the three months' labour strike for example in 1953 having considerably slowed down production and adding moreover to the cost of production in a more or less permanent manner by as much as 13%. There has been a steep rise in wages, which was rather crippling in its effect in view of the steep decline in the world prices of copper and the keen competition created by imports. Secondly, there has been a dispute with the Government of Bihar about the mining leases of the properties held by the Company, which unfortunately formed the subject matter of protracted litigation. This saddled the Company with an element of uncertainty about its future workings, particularly when a good deal of new investment of funds is required for development.

Problem of new deposits

But the essential problem about increasing copper production in India is to find new deposits. It has been indicated in the Second Five Year Plan that if sufficient reserves are available the Union Government might consider setting up a plant in the Public Sector with a capacity of 10,000 tons per year. The copper deposits in India however

occur in widely separated districts such as Andaman islands, Assam, West Bengal, Bihar, Bombay, Madhya Prodesh, Hyderabad, Kashmir, Madras, Mysore, Punjab, Rajputana, Uttar Pradesh, Nepal, Bhutan and Sikkim. The two most promising sites are however in Damodar Valley—the Singhbhum Copper belt which is being worked by the Indian Copper Corporation, and the Baraganda occurrences in the Giridih sub-division of the Hazaribagh district in Bihar. The other promising site in India is the Khetri Mines in Rajasthan which however require further detailed prospecting. The Second Five Year Plan accordingly suggested detailed mapping and prospecting of the copper deposits of Khetri, Daribe (Rajasthan) as also detailed investigations of the old workings of Guni in the Kurnool district of Andhra. The Indian Bureau of Mines was also prospecting for copper at Rungpo in Sikkim, carrying out drilling operations upto a depth of 14,000 ft with a programme to continue it further up to 20,000 ft. Detailed surveys are also in progress in Uttar Pradesh and Bihar for locating radio-active minerals along with deposits of copper ore and working out advantageous by-products. Till however these prospecting operations are completed and sufficient reserves of copper ore along with associated minerals are located for making the schemes commercially workable, it will be difficult to undertake planning for the establishment of a new unit for production of copper. It is therefore no wonder that the Planners in India were not able to fix any target for copper production.

Economics of copper mining

The economics of copper mining therefore predominantly depend on three main features—(*a*) Firstly, there is the question of availability of copper ore in workable depths and the content of copper in the ore. According to world standards, the Indian copper ores so far exploited can only be classified as low grade owing to its low contents of copper, and moreover no advantageous by-products could be worked so far due to its non-association with precious metals like other countries. The prospects will obviously change if

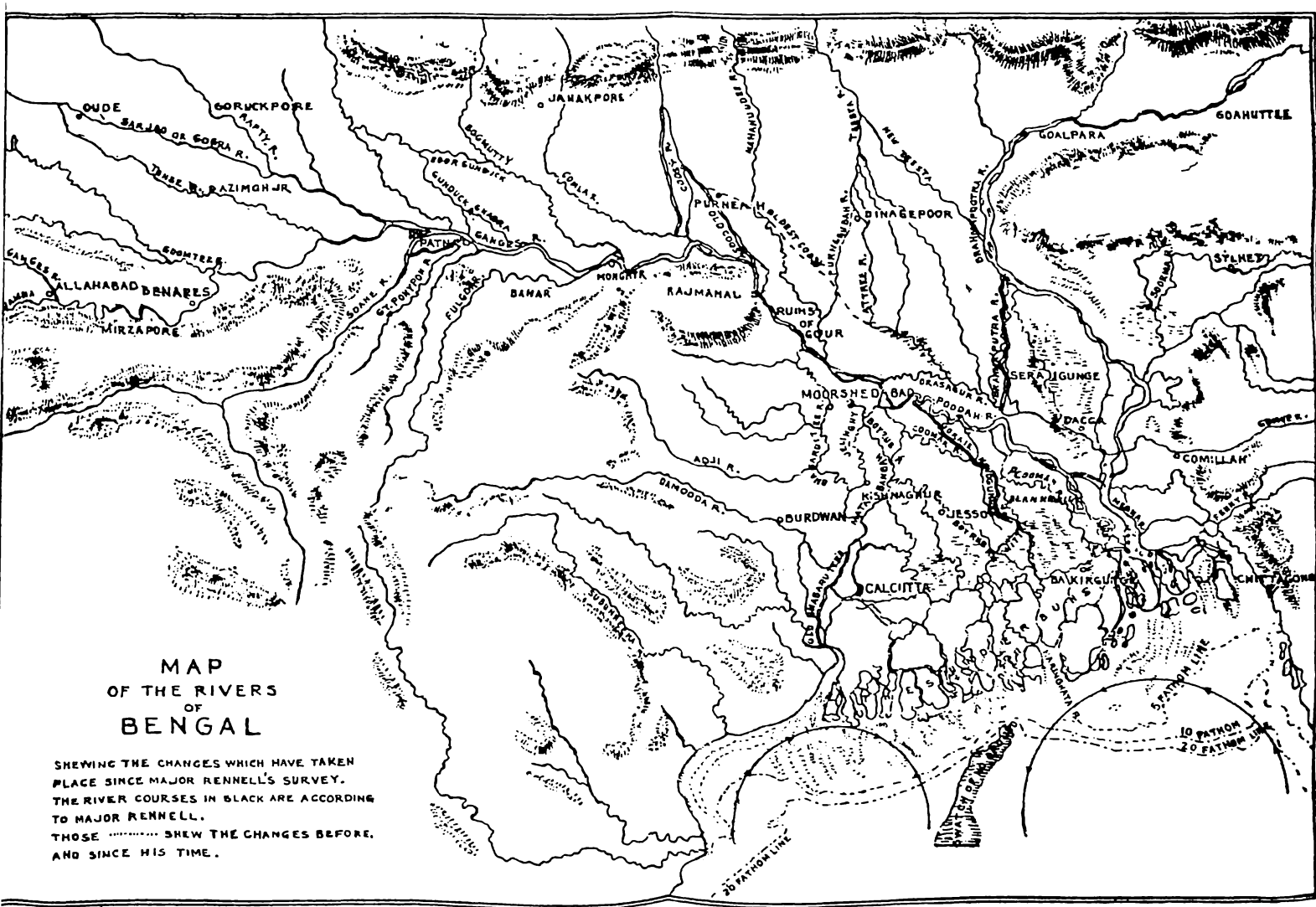
large deposits of copper ore in association with beryl or other radio-active minerals could be located either in Hazaribagh district of Bihar or the Garhwal district of Uttar Pradesh. (*b*) Secondly, the local price structure in India bears a close relationship with that of imported copper. Over the last few years world prices of copper passed through wide fluctuations, from £ 135/- per ton in 1947 to £ 435/- per ton in 1956, since when prices had been declining almost steadily coming down to £ 267/- in December 1956 and £ 191/- a ton in September 1957. These wide fluctuations had evidently a disturbing effect on the Indian producing units, and it could possibly have disastrous effects if world prices fell below the level of Indian cost of production at present "maintained somewhere about midway between the highest and lowest costs of copper producing countries in other parts of the world"—to quote from the annual report of the Chairman of the Indian Copper Corporation. (*c*) Thirdly, there is the danger of inflating the level of costs in the industry by a higher wages level and heavier tax burdens, which if carried beyond reasonable proportions might result in disaster for this precarious industry as a whole.

Prospects for smaller units.

The Singhbhum Copper belt has not yet been fully prospected, and while the Indian Copper Corporation has done sound work in selected areas and around "old workings", there might be some scope for smaller companies as pointed out by Dr. Dunn more than a decade ago to prospect other parts of the copper belt for copper ores and utilise the smelter of the Indian Copper Corporation. Dr. Dunn suggested that small deposits or pockets of richer ore, capable of being hand-picked, might repay mining and despatch to Maubhandar by individual prospectors or groups of prospectors. Secondly, the copper at present being produced in India is fire refined with a purity of approx. 99.35% cu, and this is being used in the manufacture of brass and copper sheets and mainly in the utensil

industry. The prospects of this branch of production are limited, as its field is being gradually encroached upon by aluminium, stainless steel and plastics. In view of the fact that the demand for tough pitch high conductivity copper is gradually growing along with industrialisation in the country, the obvious line of expansion of the copper producing units is towards the production of "electrolytic copper". In the interests of the growing needs of her electrical industries, India requires to be self-sufficient in this branch of producion and dispense with costly imports which are eating away our slender reserves of foreign exchange.

December 1, 1958,
Indian Manufacture and Production



MAP
OF THE RIVERS
OF
BENGAL

SHEWING THE CHANGES WHICH HAVE TAKEN PLACE SINCE MAJOR RENNELL'S SURVEY. THE RIVER COURSES IN BLACK ARE ACCORDING TO MAJOR RENNELL. THOSE ..... SHEW THE CHANGES BEFORE, AND SINCE HIS TIME.

N. BASAK (JBU. 41): 355.

COPIED FROM THE PAPER "ON RECENT CHANGES IN THE DELTA OF THE GANGES" READ BY JAMES FERGUSSON F.R.S. BEFORE THE GEOLOGICAL SOCIETY OF LONDON IN 1863:

CHAPTER XII

Banking in Bengal

A Study in Problems and Possibilities.

The Problem.

In a recent message to the Press His Excellency the Governor of Bengal remarked that the proper solution of the unemployment problem lies in an improvement in the general economic and financial condition of the province which again depends on a healthy interaction of trade, commerce, industry and agriculture. Of all the Indian provinces, the problem of unemployment is acutest in Bengal and of late there has been no dearth of palliatives prescribed by our leaders of thought and experimented upon by the people in authority. The essential merit of the statement issued by His Excellency lies in the fact that here is an attempt to go to the fundamentals of the problem and appraise the real nature of the problem that confronted us to-day. We should realise in all seriousness that the enormous magnitude of the unemployment problem in Bengal is but an index of the extent of maladjustment that unfortunately exists between the different branches of our economic activities. It is not within the scope of this paper to discuss the merits of the different schemes introduced by the Government of Bengal within recent years. Suffice it to say that, however well-intentioned each of these schemes might individually be, there appears to be no co-ordination of government policy in the matter and, what is worse, that essential drive which is necessary to solve a problem of this magnitude is lacking. The problem of unemployment is inextricably bound up with the general economic prosperity of a country, and we have to-day come to such a pass that the entire machinery of the government should be whole heartedly directed towards its healthy solution.

An idea of the economic maladjustment in Bengal may be gathered from the character of our foreign trade, commerce and industry. Our foreign trade is truly "foreign" in character. It would be interesting indeed had an enquiry been instituted to ascertain the part played by the children of the soil in the import and export trade of Bengal. As regards inland trade and commerce the silent and steady penetration of people from the other parts of India in the remotest parts of the mofussil is an important economic development within the last few decades. In industry, excepting a few chemical industries and cotton mills, our effective share is practically nil. As a matter of fact the whole atmosphere around our trade, indusry and commerce is artificial. To record an economic fact is not to introduce provincialism in this all-important question. Provincialism and all its implications involves the philosophy of negation and fails to do full justice to the remarkably adventurous and enterprising spirit evinced by the people from other parts of India in developing the trade and commerce of Bengal. A better approach to this problem is to emphasise the fact that our people has been continually receding into the background and to devise ways and means so as to provide a timely stimulus to recapture the lost ground so far as our trade, industry and commerce is concerned.

An important aspect of this economic maladjustment is revealed by the Report on the Maritime Trade of Bengal for 1934-35 published only recently. Within the last few years the maritime trade of Bengal has been developing certain prejudicial tendencies, one of which is the continuous decrease of our export trade since 1930-31. It is interesting to record that whereas the export trade of Bombay has registered an improvement of something like 48% in 1934-35 over that of 1930-31, that of Bengal has actually declined by 5%. Another significant development is that a considerable proportion of our import trade comes through Bombay which means that we have to pay additional values for them. This partially explains the fact that so far as Bengal is concerned, trade recovery is still a matter

of the realm of possiblities. But the problem in Bengal is not merely to attain "recovery' in the technical sense of the term ; we have to recover our trade, commerce and industry from its artificial moorings and restore it to its normal character. To achieve this desideratum we shall have to direct our attention to the agencies, *viz.*, the Banking companies that predominantly determine the course of trade and industry in a country. For the unhealthy diversion of our trade and commerce and the insignificant part played by us in industrial development, the fundamental reason will be found in our insufficient banking development.

Two Classes of Banks

From the implications of the problem we can now enter into a discussion about the banking structure that obtains in Bengal at the present moment. Joint-stock banking companies operating in Bengal may be broadly classified into two main categories—those that are members of the Reserve Bank and those that are not. The foreign "Exchange Banks" with their head offices at London or some other foreign centre and big Indian Joint-stock banks operating in Calcutta but with their head offices situated outside the province, fall under the first category. It is they who constitute the money-market proper. Under the second category are the numerous small banking companies and loan offices, the dividing line between which is difficult to find out. It is they who constitute the banking problem for Bengal, as,at their present stage, they cannot be brought within the ambit of the Reserve Bank system ; and at the same time create a multiplicity of problems connected with the financng of our trade, commerce and agriculture.

Banks coming under the first category command vast resources and within themselves practically monopolise the major financial operations connected with large-scale trade and commerce in this part of the country. It is difficult to estimate the proportion of their assets and liabilities that may definitely be ascribed to their operations in Bengal, as there is no compelling authority requiring them to maintain

and publish separate figures. In his evidence before the Hilton-Young Commission (1926) Sir Norman Murray quoted some figures in order to show what proportion of different kinds of deposits and advances of the Imperial Bank of India belonged to the Bengal Circle in March 1925. The figures are as follows :—

Business.	*Bengal Circle (In lakh rupees.)*	*All India (In lakh rupees.)*
Current account deposits ..	15,44	27,17
Fixed deposits ..	12,56	24,93
Bills discounted	7,10	14,66
Cash credits	11,10	27,63
Overdrafts	5,37	9,01
Loans ..	2,56	20,14

It would appear from these interesting figures that in March 1925 the Bengal Circle was responsible for more than 50% of the aggregate current and fixed deposits and bills and overdrafts of the Imperial Bank of India and so far as Cash credits and Loans were concerned, the respective percentages had been 40% and 13% only. The Bengal Banking Committee were also supplied with similar figures by the Imperial Bank for the quinquennium ended 31st December 1929 on the basis of which they notice a similar tendency and conclude as follows :—

"The aggregate deposits are slightly less in 1923 than 1925, whereas the aggregate advances have very much increased. It follows therefore that the resources of Bengal are being employed in other parts of India to a greater extent than before."

What light can be thrown on the working of the other banking companies operating in Bengal ? It is unfortunate that no figures are available which can enable us to make a definit estimate in this respect. We may however attempt an approximate estimate if we bear in mind the proportion

of the total business done by the Imperial Bank of India which is ascribable to the resources of Bengal and apply the same to that of other banking companies. Almost the identical business conditions guide the operations of all the banks under this category, including the Indian business of the "Exchange Banks". In the case of the Indian joint-stock banks, we can safely rely on the percentages of the Imperial Bank to furnish the absolute minimum of Bengal business, as both have branches throughout India and look to Bengal as the most important source of revenue.

To take up the Foreign "Exchange" banks first. It is well known how the Central Banking Committee, in spite of their best endeavours, failed to obtain any detailed figures relating to the total business done by them in India. Their balance-sheets do not furnish any indication in this respect, and the only figures that are available to us are contained in a consolidated statement about their total deposits and cash balances in India published in the "Statistical Tables relating to Banks in India." Nevertheless we can gather some idea from the following table :—

Year.	*Number of Exchange Banks.*	*Total Deposits in Indiu.* (*In thousand rupees.*)
930 ..	18	68,11,44
931 ..	17	67,47,26
932 ..	18	73,06,56
933 ..	18	70,78,42

There is no reason to suppose that the "Exchange banks" should be attracting deposits in Bengal which is, in any way, less proportionate of All-India business than the Imperial Bank of India. We can therefore safely assume that at least not less than 50% of their deposits (that is to say, something like Rs. 35 crores) is definitely ascribable to the resources of Bengal.

Of the Indian joint-stock banks operating in Calcutta, the Central Bank of India, which has been conducting business here on a vast scale, easily fills up the premier

position. The Allahabad Bank, in spite of its affiliation to the P. & O. Banking Corporation, may be included under this category. Including the Bank of India and the Punjab National Bank, we find the total deposits of the Indian joint-stock banks as follows :—

Total Deposits (In thousand rupees)

Bank.	1931.	1932.	1933.
Allahabad Bank ..	9,94,46	10,81,59	10,85,54
Central Bank ..	15,36,62	20,28,96	22,36,61
Bank of India ..	12,95,47	15,07,65	14,49,82
Punjab National ..	4,03,09	4,31,67	4,55,75
Total.	42,29,64	50,49,87	51,67,32

The figures of the Imperial Bank of India are not included in this list. The total deposits of this bank, excluding "public deposits" in 1933-34, exceeded Rs. 74 crores. We would therefore find that the total All-India deposits of this Big Five of Indian banking exceeded Rs. 125 crores in 1933-34. There is no reason to suppose that the Bengal business of the Imperial Bank of India is to-day in any way less considerable than that obtaining in 1925 or 1929. Nor is there any reason to suppose that the other banks should be conducting a less proportionate business in Bengal. At least one of them, *viz.*, the Central Bank of India, finds it profitable enough to open out a network of branches in the moffusil within the last few years. To attribute 50% of their deposits to Bengal would by all tokens be an underestimate. Nevertheless after making due allowance for all possible margins of error, we can definitely attribute Rs. 50 crores worth of their deposits to the resources of Bengal. If we now add up the Bengal deposits (on our estimate) of the "Exchange Banks," the figure amounts to something like Rs. 85 crores. The question that now naturally arises in one's mind is—how much of this amount is available to us for the succour of our trade, commerce and industry ? If we consider the foreign character of these banking institu-

tions and the preponderance of commercial and trade interest in their clientele which by no stretch of imagination can be described as conducive to indigenous trade, commerce and industry, we can very well imagine the magnitude of the problem that they constitute in our commercial world.

It is unfortunate that they constitute no less a problem in our banking world. Instead of lending a helping hand to our small banking companies, the bigger banks occasionlly take a rather unfair advantage of their vantage ground. The attempts of the Calcutta Clearing Banks' Association in refusing clearing facilities to our smaller banks is an instance in point. More serious perhaps is the recent branch banking policy of the Central Bank of India which is carrying competition to the moffusil as well.

Smaller Joint-stock Banks of Bengal.

How do the smaller joint-stock banks of Bengal stand in comparison with the "Big Five" of Indian Banking? The enormity of the difference will be evident from the following comparative table, composed of the paid-up capital and reserves, and deposits of two of our three "scheduled" banks and of two big banks, for the year 1933-34.

Bank.	*Paid-up Capital & Reserves.* (*In thousand rupees.*)	*Deposits.* (*In thousand rupees.*)
Central Bank of India ..	2,38,13	22,36,61
Bank of India ..	2,01,50	14,49,82
Bengal Central ..	4,81	40,05
Comilla Union ..	3,54	26,76

We need not go in for any detailed comparison, for this is useless if our banking companies individually are considered. Even at the present moment our banks are to

be judged not by the existing position but by their immense possibilities. This point needs be elaborated at some length.

The greatest point that is in our favour to-day is that Bengal has the largest number of joint-stock banking companies, and that if we include the loan companies in the list our total is greater than the number of all other provinces put together. In 1930-31 the total number of banking and loan companies was 1,069 with a paid-up capital of Rs. 9,73 lakhs. According to certain replies given by the Government of Bengal in the winter session of the Bengal Legislative Council this number has declined to 1,045. At any rate the total paid up capital of all our loan offices and banks may be roughly estimated at Rs. 9 crores. The figures of their deposits and reserve fund are not available. In 1928-29 the Provincial Banking Committee made an average estimate of reserve fund and deposits to be something like 7 times that of the paid-up capital. On the basis of this computation we may make a rough estimate of this item to be in the neighbourhood of Rs. 60 crores. After making due allowance for any possiple margin of error, it is permissible for us to arrive at a figure of Rs. 65 crores to represent the total working fund of the 1,045 banking and loan companies of Bengal. This at any rate compares favourably with the working fund of all the banks falling under the first category.

What then is the reason of the inefficiency of banking service in the province and the insignificant role played by our banking institutions ? The reason is not far to seek. The trouble is that we have got too many small banks and what is worse, instead of following a concerted policy through some bankers' association they indulge in unhealthy rivalries among themselves. Their resources being extremely limited our small banks confine themselves generally to the leavings of the business of the "Exchange" banks and the bigger Indian joint-stock banks. Branch banking is comparatively undeveloped and as a result the remittance business cannot be conducted by them. Within recent years a few of the smaller banks have begun starting branches in various parts of the moffusil and naturally have

come into conflict with the branches of bigger banks. In this respect the recent policy of the Central Bank of India of starting branches in exactly those places where the branches of our banks were well established has a sinister implication. The tendency is there to create a monopoly of this service and at the same time stifle effectively the development of branch banking in Bengal.

The main classes of business that are left to our banks are therefore those of discounting Hundis, opening of cash credits and granting loans against gold and ornaments and stock exchange shares. Advance against stocks of agricultural produce is rarely given largely because this is more or less an uncharted field and most of the banks have not necessary equipment for this sort of finance. In the competition with the bigger banks our banks cannot naturally expect to secure first class business even in these lines. A commercial bank cannot indulge in speculative ventures and its margin of profits being low on individual items of business, it has to depend on a large volume of business for its main source of profit. Here again our banks are at a disadvantage, their operations being conducted on too small a scale. With this prospect of securing very little profits from investment of funds, there has been moreover an unhealthy rivalry among our banks to secure deposits at uneconomic rates (not unoften 7 to 8%).

A good deal of the blame for the present state of affairs rests on the fact that we have taken to banking in this part of India in a thoroughly desultory fashion. The logic of the situation requires a strong and well-co-ordinated amalgamation movement. Had there been only, say, five big banks with the working fund of 1,045 smaller banks and loan offices which we possess to-day, Bengal could have more than held her own in the banking world and along with that the prospect of our trade, commerce and industry would have considerably improved. On the other hand, however, we have to witness year by year the distressing spectacle of an increasing number of bank flotations on a ludicrously small scale. The following figures will throw some light in this direction :

Year.	*No. of banks registered.*	*Authorised capital.* (*In thousand rupees.*)
1926-27 ..	31	28,20
1927-28 ..	39	42,30
1928-29 ..	54	64,40
1929-30 ..	72	25,67,28
1930-31 ..	82	3,48,80

It would thus appear that up to the year 1928-29 the average authorised capital of the newly floated companies was barely Rs. 1 lakh, and even that is an overestimate of the real position if we take into account the fact that the paid-up capital of a company is much less than the subscribed and authorised capital. The figures of the subsequent two years do not indicate an improvement, as the amount of the authorised capital is only disproportionately high as compared with the paid-up capital. The tendency of small-scale bank flotations appears to have accentuated within the last half decade as well. In 1934-35 for example, altogether 21 banks were registered and their average authorised capital do not once again exceed Rs. 1 lakh. Five of them had an authorised capital of Rs. 20,000 only ; we find another five were started under Managing Agents, one of which has already gone into liquidation ! Verily we have reached the nemesis of bank promotions !

Bank Failures.

An inevitable concomitant of this senseless increase in the number of bank flotations has been that the number of bank failures has also increased within the last few years. The "Statistical Tables relating to Banks in India" for 1933-34 indicates a danger-spot of our banking world when it says that "among the Indian provinces Bengal easily heads the list so far as the number of bank failures is concerned." High infant mortality is a serious affair and it is instructive to note that a majority of our bank failures is due to

inexperience and uneconomic business methods. Not a few are also due to the speculative ventures of dishonest bank promoters. The following statistics will reveal the seriousness of the situation.

Year.	*No. of Loan offices going into liquidation.*	*No. of Banks going in to liquidation.*
1928-29 ..	1	1
1929-30 ..	*Nil*	1
1930-31 ..	*Nil*	8
1931-32 ..	7	1
1932-33 ..	2	5
1933-34	5	11
1934-35	6	9
Total ..	21	36

Is it not time for us to cry a halt to this senseless banking "development" and evolve some constructive lines along which the banking structure of the province can be remodelled and strengthened ? It is about a year that the Reserve Bank has been instituted. The machinery of this all-important institution cannot be utilised to the full advantage of the credit structure of the province unless and until our banks are "scheduled" to it. Under Section 42 (6) of the Reserve Bank of India Act, a member bank requires a minimum aggregate value of Rs.5 lakhs as its paid-up capital and reserves. Only three of our 1,045 banks just satisfies this modest requirement at the present moment and the failure of one of our scheduled banks a year ago must indeed be viewed with considerable anxiety

The Problem of Loan Companies.

An interesting fact that is revealed by the statistics of bank failures is that the loan companies of Bengal show comparatively greater vitality. Being primarily agricultural

banks and their loans advanced being mainly against mortgages on land they should have been the worst sufferers from the economic depression. It is therefore surprising that the actual number of failures among them should have been so few. A partial explanation of this phenomenon is to be found in the fact that a good number of them has been carrying out a precarious existence by taking advantage of Section 153 of the Indian Companies Act. At any rate one reason for their strong vitality is that, generally speaking, theirs is a sounder position and represent an aspect of the credit economy of the province which has not yet been successfully taken up by other credit institutions. It is unfortunate that even this precarious existence is not likely to continue any more, as reports received from the moffusil go to show that a crash is likely to happen in the near future if ameliorative steps are not taken by the Government to increase their resisting power. The immensity of the problem can be well realised if we take into account the total number of the loan companies operating in Bengal and their total working fund. The following are the figures for 1928-29, the latest data available :—

Number of Loan Companies	..	7,82	
Total paid-up capital	..	80,72	(In thousand rupees)
Total Deposits	..	6,60,42	,,
Total working fund including reserves	..	7,92,48	,,

It is unfortunate that the figures for the later years are not available ; even for the year 1928-29 the Provincial Banking Committee, in spite of their best endeavours, were unable to secure full particulars of their working and thus failed to present a complete picture of this interesting development of financing institutions. We can nevertheless assess their comparative importance in the credit structure of the province if we take into consideration the total working fund of the entire co-operative credit movement

in Bengal for the same year, *viz.*, 1928-29. The figures are as follows :—

Co-operative Societies.	*Total No.*	*Working Capital including deposits and reserve fund.* (*In thousand rupees.*)
Agricultural credit	16,930	4,21,19
Non-agricultural credit	410	2,25,53

A comparative estimate of their activities would lead to the essential fact that, so far as the credit requirements of the moffusil were concerned, the loan companies did not play a less important part than the co-operative credit societies. The former did not enjoy Government patronage at any time of their long and chequered history ; and they had to suffer severe handicaps in the absence of a proper apex bank. In spite of these inherent difficulties, the loan companies were able to secure unprecedented popularity and patronage from the enterprising middle classes of Bengal. What is the reason ?

The banking system of a country is determined by local circumstances, partly economic and partly historical ; and when a constructive policy towards this all-important question is to be decided upon, it must take full account of the historical background without being led away by an abstract formula or theory. It is therefore proper for us to note that the loan companies of Bengal in their attempts at providing land-mortgage banking represent a special feature which is the reflex of certain historical and economic facts. The Permanent Settlement made land a valuable form of investment and Act VII of 1860, granting the privilege of limited liability to joint-stock enterprises, furnished the intelligentsia of Bengal with a great opportunity of developing a special class of banking insitutions. As a matter of fact the earliest loan office was founded in 1865, just half a decade after the Joint-stock Companies Act of 1860. Since then quite a good number have been started, catering to the needs of the land-

owning classes—the zeminders, patnidars, dar-patnidars and permanent tenureholders. The ryots' needs were also being increasingly served as their rights to land came to be defined as a result of the Tenancy Acts after 1885. In her traditional way therefore Bengal found a way of providing long-term credit to the rural population.

As a rule these loan companies followed a very cautious policy as regards investment, an evidence of which is to be found in the remarkably low number of failures. During the entire period 1914-29 the number of failures was only 17. On the other hand they did show a remarkable rapidity of growth, the number of floatations in 1929 alone being 164 loan offices. The fundamental defect of their "banking methods" was that they did not realise the necessity of maintaining even a small proportion of their investments in a liquid form, predominantly engrossed as they had been in long-term finance. They did also make the common mistake of investing all their funds in land ; in their craze for profits and big dividends even the entire reserve fund was also similarly invested. Another source of weakness had been the dangerous practice of granting long-term loans with short-time deposits. Their position therefore became pitiable when all their investments became frozen due to the unprecedented decline in agricultural prices and the consequent fall in land values. Being thus caught in the economic depression the loan companies have even now been making heroic efforts to extricate themselves out of an apparently impossible situation. The endeavours that they have been putting forth during the last few years in order to carry out an existnece however precarious and the ready response that has been forthcoming from the depositors in agreeing to the creditor's agreement under Section 153 of the Companies' Act, should indeed form a brilliant chapter of the banking history of the province. It is not too much to say that but for this generous response from the much-maligned Bengalee middle class, Bengal would have witnessed a first class financial collapse during the early years of the present Economic Crisis.

Loan companies and Government policy.

The most painful part of the story is however that furnished by Government policy in this all-important matter. Long before the economic crisis was in operation, both the provincial and the Central Banking Committees made a survey of the then existing position, scented danger and counselled the Government to take effective steps so that an impending crisis might be averted. Both the Committees had been constrained to admit that the loan companies established for themselves a very important position in the economic life of the province and that both for the sake of banking development and the promotion of indigenous trade and commerce, these institutions should be remodelled, improved and consolidated. In India however the supreme law is to let matters drift and in the case of Bengal it was no exception. What is worse, if any one with an unbaissed frame of mind watches the trend of Government policy in the matter during the last few years, he will not fail to notice a perceptible change from an attitude of indifference to that of positive hostility.

During the discussion stage of the Agricultural Debtors Bill at the last winter session of the Bengal Legislative Council the Government has stoutly opposed all attempts to exclude the joint-stock banks and loan companies from the operation of the Bill whereas the scheduled banks and the co-operative credit societies have been exempted. Somehow or other the Government of Bengal has been led to believe that their self-imposed mission of relieving the indebtedness of the agricultural debtors will not be successful unless and until the drive against the "money-lenders" is complete. In Government parlance the loan companies and the joint-stock banks are nothing but "money-lenders" pure and simple! One only wonders why the co-operative credit societies have also been exempted from the operation of the Agricultural Debtors Bill. Or, perhaps this affords a clue to the mysteries of Government policy in this regard. Just like the loan companies the co-operative credit societies of Bengal had also been put to severe strain by the economic

depression ; the alarming growth of their overdues has been a source of constant anxiety. Sometime in December, 1934, the Government of Bengal appointed Mr. Darling, then in charge of the Rural Credit Department of the Reserve Bank of India, to enquire into the working of the co-operative credit societies and the loan companies. As a result of Mr. Darling's enquiry report the Government have been introducing a series of measures to improve the position of the co-operative credit societies. As regards loan companies, it is not known what have been the actual recommendations of Mr. Darling, since his report has not been published at all. Asked as to what steps the Government propose to take in order to remodel the loan companies on approved lines, the Government most callously replied in the last winter session of the legislative council to the effect that the condition of the loan companies would improve along with the improvement of the general economic condition of the province ! This is indeed *laissez faire* with vengeance. Considering the unseemly anxiety of the Government to shelve Mr. Darling's report and the cold shoulder turned over to the loan companies, one feels tempted to conclude that the Government have come to look upon the loan companies as the serious rivals of the co-operative credit societies in the moffusil and that in their recent scheme of re-organisation the loan companies would operate as serious handicaps. If this be the attitude of the Government there cannot be a worse misconception about the realities of the situation in the moffusil.

Conclusion.

From the above review of the banking position in Bengal at the present moment certain conclusions appear to be irresistible.

Firstly, the peculiar problem that is presented to us by the multiplicity of smaller banking institutions is amenable to solution only through a well-co-ordinated amalgamation movement. As a matter of fact our smaller banks contain within themselves the possibilities of big developments. Banking growth in other countries came from the establish-

ment of small local institutions which later grew in size. And as competition among themselves became acute they found safety and strength through amalgamation. At least this is the lesson that we gather grom the history of the amalgamation movement of banking in Great Britain. It cannot indeed be denied that the provisions of Section 42 (6) of the Reserve Bank of India Act operate as an inducement to our smaller banks to increase their size and if necessary amalgamate with other companies in order to qualify for the membership of the Reserve Bank. Then again some joint-stock banks and loan companies will get an additional inducement to become a "scheduled" bank in order to escape from the provisions of the Bengal Agricultural Debtors Bill. Something more is however necessary in order to foster a strong amalgamation movement. In view of the special circumstances obtaining in Bengal we shall have to take the help of special legislation as well. The Companies Act, for example, may be amended so as to include a provision to the effect that no bank should be allowed to be registered unless its minimum paid-up capital is, say, Rs. 50,000. All small banks which do not satisfy this requirement should be allowed an opportunity to raise their capital to the prescribed minimum within a period of not more than two years, failing which they will either have to wind up their business or secure the statutory minimum by a process of amalgamation, facilities for which should be provided. The Reserve Bank of India is another important institution which can render valuable help and guidance in this direction. But constituted as it is to-day, how far can we expect it to help ? The Central Banking Committee in recommending power to grant licence to banks by the Reserve Bank stressed the need for a policy of encouragement towards expansion of banking in areas where there is need for it and discouraging the multiplication of banking institutions beyond the needs of business in particular localities. It is doubtful how far, in the special circumstances in Bengal, the Reserve Bank will be able to follow the proper policy in this regard much against the wishes of its member banks. At least for some yars to come a power like this should be vested in the Government

of Bengal who alone are in a position to assess the needs of the province correctly and follow a courageous policy without let or hindrance.

Secondly, the Indian Companies Act should be amended in such a manner as to tackle more adequately the problem of banking regulation. This is indeed an All-India problem and it is reassuring to note that a measure like this is at present engaging the attention of the Government of India.

Thirdly, in order to regulate banking competition along healthy channels, the Government of Bengal should be empowered to compel the banks having the domicile elsewhere to maintain and publish separate accounts of their total business done in Bengal. This is necessary so that the Government may take measures thought to be necessary from time to time to protect the indigenous banks from unfair competition.

Fourthly, it is urgently necessary that the operations of the Bengal loan companies should be regulated by a special Act so that they may be redeemed of some of their undesirable features. The Provincial Banking Committee made a a thorough investigation into this urgent problem and made important recommendations. Unfortunately however our Government which have hitherto evinced a rather undue desire for a Moneylenders Act or an Agricultural Debtors Act, have been lamentably inactive in devising measures for the *provision* of rural credit. Effective measures should also be taken so as to revitalise those loan companies whose assets though frozen for the time being are still of a satisfactory charactor. The suggestion of the Central Banking Committee for a Financing Corporation with suitable debentures is well worth trying in this direction.

Lastly, much can be done by non-official agencies to improve the prospects of our banking companies and inaugurate a healthy amalgamation movement. The strong cohesion and affinity of interest evinced by the Foreign "Exchange' banks through the services of the Exchange Banks' Association should prove an eye-opener in this direction. Much of the ills of our banking world can easily be ascribed to the disorganised character of the banking structure

and the lack of a proper machinery to focus public attention on the matter. The deplorable Government apathy in the problem of our joint-stock banks and loan companies can easily be removed if a Bengalee Joint-Stock Banks' Association and a Loan Offices' Association take up their case in right earnest. How long will the individualist temperament of Bengal and her people stand in the way of an effective Bankers' Association ?

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CHAPTER XIII

A Plea for Banking Legislation

As early as 1913 a gifted economist like Mr. J. M. Keynes pointed out a dangerspot of our banking world when he wrote : "In the case of the smaller banks, dealing as they are with clients to whom banking is a new field and in a country where hoarding is still dominant, the cash balances seem, from available indications, to be hopelessly inadequate ; and it is hard to doubt that in the next bad times, they will go down like ninepins". The inadequacy of the cash reserves was a peculiarity not merely of the smaller banks ; it was a malpractice of which some of the bigger banks could equally be accused as guilty. As a matter of fact when the Cassandra-like prophesy of Mr. Keynes came out to be too true and a series of bank failures occurred during the succeeding years, it was not only the smaller banks that went down like 'ninepins' ; on most occasions it was a big bank that showed the way. The history of bank failures in India has not yet been studied with that amount of seriousness which it deserves and even the Central Banking Enquiry Committee did not investigate the question for reasons best known to themselves. Nevertheless it may be interesting to make a brief reference to the series of bank failures during the War and post-war years as it forms an essential preliminary to a correct appraisal of the needs of banking legislation.

As many as 55 banks went into liquidation in the course of a single year 1913-14, 11 failed in 1915, 13 in 1916, and 16 in 1918. It has been computed that the failures of the years 1913-18 accounted for the disappearance of more than 34 percent of the total trade capital of the Indian Joint-Stock banks. For a few years after the crisis the Indian Joint Stock Banks appear to have followed a more cautious policy so far as the cash balances were concerned, the average percentage of cash reserves to deposits having risen from 20 percent in 1910 to 21 percent during 1913-20. Since 1920 however the Joint-Stock banks have been again allo-

wing their cash balances to be lowered to a dangerous extent.. In 1926, for example, the banks in Class A reduced their cash balances to only 15.3 percent of their deposit liabilities and those in Class B had cash balances to the extent of only 13.3 percent in 1921 and 12.9 percent in 1924. Coming to more specific instances, the cash balances of a big bank like the Central Bank of India amounted to only 13.13 percent of its deposits in 1926 and that of the Punjab National Bank fell as low as 7.8 percent of its deposits. This position is really dangerous in India where banking habit has not yet been considerably developed and compares very unfavourably with banking practice in Great Britain where the average percentage of cash in hand and money at call and short notice to the total liabilities of the Joint-Stock banks during 1920-28 was in the neighbourhood of 21 per cent. It is therefore no wonder that apart from any other considerations, the dangerous practice of keeping extremely low cash reserves accounted for the heavy crop of bank failures during the decade 1920-1930. The following figures of bank mortality during 1921-30 should therefore prove interesting :

Year	*No. of Companies*	*Subscribed Capital* Rs.	*Paid-up capital* Rs.
1921	7	75,80,000	1,25,000
1922	15	27,25,000	3,29,000
1923	20	9,92,36,000	4,65,47,000
1924	18	26,46,000	11,23,000
1925	17	25,41,000	18,75,000
1926	14	7,05,000	3,98,000
1927	16	6,83,000	3,10,000
1928	13	31,65,000	23,11,000
1929	11	24,99,000	8,18,000
1930	12	46,55,000	40,59,000

It would appear that altogether 161 banks failed during the decade and that barring the spectacular failure of the Alliance Bank of Simla in 1923 the incidence of mortality has generally been limited to smaller banks. In the present undeveloped state of modern banking in India can we afford to have this rate of bank mortality? A bank failure is a serious affair not only for the direct loss sustained by depositors and shareholders. It indirectly inflicts a permanent injury to industrial and commercial development by administering a rude shock to public confidence and acting as a set-back to habits of investment. In a country like India it amounts to a more or less permanent diversion of working capital from Indian banks to foreign banking institutions which are already well-established in the country. The promoters of banking companies in Bengal within recent years have had to fight their way against heavy odds and many of the difficulties experienced by them may be traced to the narvousness caused by the spectacular crash of the Bengal National Bank in 1926.

What are the causes of the failure? An analysis of the factors governing banking operations in India leads to the following conclusions in the matter. First of all, there is the dangerous practice already referred to *viz.*, slender percentage of cash to deposit liabilities which the Indian Joint-Stock banks have reverted to during the decade 1921-'30. Secondly there is the unbusinesslike rate of interest offered in order to attract deposits, of which the smaller banks are particularly guilty. Thirdly, the promoters of banks hardly realised that banking is a highly technical affair and that in the successful conduct of a banking company, able managers and directors who possess the required knowledge of banking business and practice are absolutely essential. On the other hand it is almost a universal experience that there is a general lack of proper supervision by the Board of Directors. Fourthly, it has been conclusively proved that fraudulent dealings on the part of some of the directors and managers brought down the ruin of many banks. Fifthly, as early as 1913 Mr. Keynes noticed the absence of a proper proportion

between the authorised and subscribed capital, and between the subscribed and paid-up capital of most of the Indian Joint-Stock banks. This is a malpractice which can be attributed to many of the smaller banks even to-day and is undoubtedly a potent factor in bringing about crashes. Sixthly, the investing public as well as the depositors in this country are easily misled by the window-dressing of balance-sheets and the payment of high dividends even from capital. The alertness of the public is undoubtedly a great safeguard against banking mismanagement but this is a thing which can only grow slowly and has to be cultivated by careful educative propaganda. Lastly, uptil now there had been a lamentable lack of co-operation among the banks themselves and instances are not rare when Indian banks in distress failed to secure any help from other well-placed banks in time. The absence of a Central Bank had been a great handicap in this direction as it is the only kind of institution which is in a position to bring about co-ordination of banking policy.

It is a truism to say that sound banking in India as elsewhere depends not merely on good laws but also on good bankers. It will not do, however, to forget that there is a correlation between good laws and good bankers. Just as without efficient and honest bank managers, the best of the banking laws are bound to prove futile, good bankers are also prone to misbehave without the salutary effect of banking legislation. There is, however, a class of thinkers who most vehemently oppose any proposal for State intervention in banking matters and it was the External Capital Committee that summed up their position in the best possible manner. The Committee approvingly notes the argument against banking legislation to the effect that "the sense of responsibility of banks and bank directors would be lessened and that it would lead to loss of efficiency" in banking operations. According to them the best basis for sound and permanent advance lay in competiton, publicity and the encouragement of private enterprise. The whole argument advanced in this tenor is that of the vested interests created by the strong foreign banking

institutions and is on that ground alone suspect. Nevertheless it cannot be denied that this is the only ultimate condition of successful banking development in India. Even a staunch believer in *laissez faire*, however, makes allowance for the principle of protection to infant industries. Banking in India is still infant, and wherever age can be proved against it, it has become "atrophied" so that there must be a policy of careful nurture before these can be exposed to the risks of free competition. A case can therefore be easily made out for State intervention.

The present defects in the management and organisation of banking are remediable by three kinds of measures. Firstly, the Reserve Bank of India already established is best fitted to take the matter in hand and it is for this institution as the Bankers' Bank to follow a policy of co-operation and co-ordination. To take up only one aspect *viz.*, the provision under Section 42 of the Reserve Bank of India Act, as regards the cash reserves of the scheduled banks. The section provides that every "scheduled bank" shall maintain with the Reserve Bank a balance the amount of which shall not at the close of business on any day be less than five per cent of the demand liabilities and two per cent of the time liabilities of such bank in India. The concentration of banking reserves that will follow from this will certainly impart a degree of security to the banking system which was hardly feasible in the earlier days. In hundred other ways the Reserve Bank is in a position to strenghten the solidarity of our banking structure.

Secondly, a number of safeguards may easily be provided in the memorandum and articles of association of the different banking companies according to their respective requirements subject to the approval of the Registrar of Joint-Stock Companies.

Thirdly, it will have to be realised that there are certain matters which can be best met by special legislation affecting banking companies. In the United States of America, Canada and other countries there are special banking laws. In Great Britain, however, apart from the Companies' Act there is no special legislation affecting banking business

and we in India in framing our Companies' Act took this as the model without caring to consider that conditions in India are radically different from those in Great Britain. In framing our paper currency legislation on the model of the Bank Charter Act (1844) of Great Britain we have already paid a serious penalty in the shape of inelasticity of currency and seasonal stringency. The experience is not otherwise in the matter of banking policy. In England what is not specifically provided in legislation is supplied by tradition, convention and case-law that have grown up as the result of experience of generations. The time has therefore certainly arrived when we should realise that in matters of economic policy generally Great Britain is for us the worst example to follow. A considerable portion of the blame for inadequate banking development in this country must be laid at the door of defective legislation specially when we have no salutary tradition or convention to stand upon.

The Central Banking Committee made a review of the position under the existing Companies' Act and to their credit realised that the Indian Companies' Act touches only the fringe of the problem of banking legislation. They have therefore been constrained to admit that in the special circumstances of India there is the need for a special Bank Act which would not only comprise the existing regulations embodied in the Indian Companies' Act but would also include certain modifications and additional provisions regulating the organisation and functioning of banks in the light of the experience gathered from bank failures. The suggestions that have been made by the Banking Committee for additional provisions in the Bank Act come under the following heads :

(a) *Organisation*—Under this heading suggestions have been made for a stricter definition of banking, the formation of a Bankers' Association of which every "Bank" must be a member in order to qualify for its functions, licensing of banks by the Reserve Bank of India in order to ensure systemetic development and extension of jointstock banking, the power to the Registrar of Joint-Stock Compa-

nies to refuse the registration to a bank if the articles of association do not prohibit activities other than banking or provide against the organisation of the bank under the managing agency system, or to refuse permission for commencing business to a bank whose paid-up capital is below Rs. 50,000 and not less than 50% of its subscribed capital, the authorised capital not being double the subscribed capital, etc.

(b) *Management*—Until the *reserve fund* equals the paid-up capital an amount equal to at least 2½% of the bank's paid-up capital should be taken to the Reserve Fund before distribution of dividends; the Articles of Association of a banking company should also provide for the regulation of loans *e.g.*, prohibition of loans on the security of a bank's own stock, limitation as regards loans to directors, managers and members of the staff, limitation as to the borrowing power of directors, prohibition of advances to the firm of auditors of the bank etc.

(c) *Audit and Inspection*—There should be a specific provision in the law rendering officers or auditors of a bank liable for omission to state material facts in their reports and the presentation of the accounts of a bank, the form the balance-sheet of a bank should be revised and improved so as to give more information, etc.

(*d*) *Liquidation and Amalgamation*—the banking Act should permit a temporary moratorium on the recommendation of the Reserve Bank to prevent untimely and compulsory liquidation of a bank which is in difficulties; in the case of voluntary liquidation of a bank the appointment of a liquidator should be made by or with the approval of the Reserve Bank; the Reserve bank should also lend its advice and cooperation in cases of amalgamation or reconstruction of banks. There should be some arrangement under which the Indian creditors of a non-Indian Bank taken into liquidation should have a prior claim on its assets in India and should also share in the general distribution of its assets outside India should there be a shortage in assets held in India.

There is no denying the fact that in the special circumstances of India banking legislation in some such lines is absolutely essential. Rightly enough the Central Banking Committee have taken as their model the banking laws of Canada and U.S.A. and many of their recommendations embody salutary principles gathered from the experience of bank failures in India. It appears, however, that in a few particulars the Committee have failed to stress the right direction in which banking in India should proceed atleast for some years to come. Within the last few decades the foreign banking institutions (the "Exchange Banks") operating in this country have become serious rivals of the Indian Joint-Stock Banks in the matter of the attraction of deposits and the financing of trade. It had been brought to the notice of the Committee that unless legislative provision is made to regulate their operations in the direction of serving national interests much danger was to be apprehended from that quarter. It would appear that the recommendations of the Committee are rather halting in the matter. Almost all the advanced countries of the world contain special provisions against the operations of foreign banks and there is no reason why we should hesitate to impose restrictions on their working if such expedients are found to be in the national interest even if it involves "commercial discrimination."

The Central Banking Committee have also failed to emphasise adequately the pressing need of Bank amalgamation in this country. The main problem is that presented by the multiplicity of smaller banking institutions and by the host of indigenous bankers throughout the country. The only sure way of building up the solidarity of the banking system is to encourage a movement for Bank amalgamations and for the absorption of indigenous bankers. Smaller banks particularly predominate in Bengal and Madras and unless proper steps are taken to foster a strong amalgamation movement it is very likely that these will go to the wall under presure of competition from foreign banking institutions and banks of extra-provincial origin. Already adverse forces are arrayed against them and it is interesting to remember that one of the grounds on which the European Chambers of

Commerce based their demand for a banking enquiry was the "mushroom growth of smaller banks". It is for us, however, to realise that the Bengal Loan offices and the small local banking institutions contain within themselves the possibilities of big develpments. Banking growth in other countries of the world came from the estiblishment of small local institutions, whih later grew in size and found safety and strength through their amalgamations when competition become acute. This is also the lesson that we gather from the history of bank amalgamation in England. It is therefore imperative that the State in this country should take steps so as to prevent unfair competition from foreign banks and thus allow and encourage the smaller institutions to grow. The Travancore Banking Committee makes an interesting suggestion in this direction. It suggests that the minimum paid-up capital of a bank should be Rs.50,000 and that a small bank which does not satisfy this requisition should be allowed an opportunity to raise its capital to the minimum requirement within a period of not more than two years, failing which it will have either to wind up its business or secure the statutory minimum by a process of amalgamation, facilities for which should be provided. The Bengal Committee also made similar suggestions for a State policy of encouragement to smaller banks and loan offices. The Central Banking Committee in recommending power to grant licence to banks by the Reserve Bank stresses the need for a policy of encouraging expansion of banking in areas where there is need for it and discouraging the multiplication of banking institutions beyond the needs of business in particular localities. In theory there cannot be any objection to the proposal but it is doubtful how far this suggestion is likely to pe carried out in practice if we consider the limitations under which the Reserve Bank will necessarily act. A better proposal is perhaps to vest the Government of a province with the power to grant licence to banks setting down the conditions under which they will have to operate.

May 27, 1935

Forward

CHAPTER XIV

Co-operative Marketing of Jute :

"A long line of commission men, produce merchants, jobbers, hucksters, retailers and what not simply passing goods from hand to hand like a bucket brigade at a fire is not only inefficient and wasteful, but is very costly. In these days a hydrant and a line of hose are wanted."—*"State of Massachussets Report."*.

"Is it possible to bring the whole system of marketing jute into the hands of a co-operative marketing organisation ? This formed item No.28 of the questionaire of the Jute Enquiry Committee (1933-34). "No. A fiasco, Government should not touch business," was the impatient reply from our "Fibre Expert," Mr. F. Smith. It is not known what amount of expert knowledge and experience of a co-operative marketing organisation is claimed by the Fibre Expert to the Government of Bengal so as to enable him to tender evidence in the manner he did. The answer is however typical of the attitude taken by people at the helm of affairs of public policy in this unfortunate country. In deciding important questions of economic policy government have not as a rule shown much evidence of well-thought-out planning nor has their been any great anxiety on their part to come to grips with the real problems affecting the struggling millions. Either there has been a lack of proper equipment in the matter (as a result of which for exmaple a Fibre Expert or an Agricultural Engineer is required to decide important questions affecting administrative policy) or the presence of a preconceived bias prevents them from approaching a problem in its true perspective. It is indeed to be regretted that the proper scientific approach is not usually forthcoming.

Co-operative Jute Sale Societies :

By uttering the word "fiasco" our "Fibre Expert" perhaps meant that the starting of the Co-operative Jute Sale societies by the Government of Bengal in 1927 proved

in the long run to be an utter failure and that the government should not have been well advised to start them again. Yet it may be pertinent to enquire about the facts leading to the closing down of the Co-operative Jute Sale Societies in 1930. It had been a common complaint by the members of the Jute Enquiry Committee that Government treated all reports of enquiries into the working of the Jute Sale Societies as strictly confidential and that the real truth about them had been kept shut out from the public. The societies did establish a good reputation for their mark through their common selling agency *viz.*, The Calcutta Wholesale Society. Almost all of them appointed highly paid European or Armenian managers with experience of Jute and acquired suitable go-downs and presses. Some of them, for example, the Chandpur Sale and Supply Society, were in affluent circumstances and competed on more than equal terms with the usual "middlemen" marketing system. The working capital of each co-operative sale society consisted partly of share capital and partly of cash credit advances from the Co-operative Central Bank and the Provincial Co-operative Bank. Jute was pruchased outright from the ryot either directly or through "Beparis' paid and financed by the society, their work being checked by supervisors appointed for the purpose. As regards the disposal of their purchases, the Societies delivered jute directly to a Calcutta Mill or to an Export Firm, the sales having been effected in the meantime through the Co-operative Wholesale Society, their Calcutta agent. The provincial Bank freely discounted their bills in respect of these consignments. This is a rough picture of the working of the co-operative Jute Sale societies in Bengal during 1927-30. The movement was fraught with so great potentialities that it is still a mystery why the Government all on a sudden took it into their brain to close them down altogether even if it be assumed that some of them became top-heavy and unprofitable due to internal mismanagement "Co-operative organisations" writes a Government of Bengal memorandum (1926) "would be of great assistance to cultivators in marketing their produce and providing

easy credit. Where such organisations exist, they have to a large extent obviated the necessity of accepting "Dadans" and of making enforced sales at unremunerative rates to creditors. Organisation is the key to commercial success, but agriculture is the least organised of all industries, and the only organisation that exists is that built up by the middlemen for securing the largest profits for themselves. The numerous intermediaries between the producer and the consumer owe their existence to the lack of organisation among the producers for the joint -sale of their produce and among consumers for the joint purchase of their requirements." This is an excellent summing up of the pitable condition of the Bengal ryot and the Government of Bengal in giving a start to the Co-operative Jute Sale Societies did indeed hit upon a right method of improving the economic condition of the peasant population. Why then, this desertion particularly at a time when the economic blizard was having its full sway and the distress of the Bengal peasant was at its height ?

Causes of The Breakdown :

Out political wizards and economic experts have been unable to probe into the secrets of a Governmen mind. Various suggestions have been made as to the possible causes of the breakdown of the Co-operative Jute Sale Societies in Bengal. Among these the following may be mentioned. First of all, the uncertainty of the price of jute was indeed a big factor. When a society begins its work on the basis of a cash purchase of supplies it is certainly difficult for it to continue its existence for any length of time if the price of jute begins to decline and does not show any upward turn. It was this mistake of cash purchases that proved a source of great embarassment to many societies and when it was too late to mend no helping hand was offered to save them from utter ruin. Secondly, the Societies had to compete with well-organised rivals having practically unlimited resources in money and influence. Thirdly, the management of the Societies in certain cases

was topheavy and too costly and this proved an unbearable burden when the administration was run by inexperienced officers. A co-operative marketing society requires managing ability of a special type and unfortunately the sponsors of the movement did not pay adequate attention to this pressing need for trained hands in the line. Lastly it is well to remember that in the later stage there was hardly any co-operative principle in these societies which developed into more or less ordinary jute concerns doing speculative business, but without any expert control. As an eminent authority on jute points out in his evidence before the Jute Enquiry Committee, "the failure of that organisation should therefore not be regarded as the failure of co-operative principle in jute."

Many of the defects from which the Jute Sale Societies suffered were remediable by legislation. If for example the production of jute was regulated by a forecast of demand, the price of jute could be so fixed as to leave a reasonable profit to the grower and a safe margin for the societies. It would have been a great help indeed to these societies had the Government shown some concern at that time for the restriction of jute even by propaganda. Then again the fact of unfair competition with the "middle-men" system was easily amenable to legislation. Even as late as 1930 Bengal Banking Enquiry Committee suggested that "the working of these societies requires a careful examination and scrutiny by experts, and the defects in their organisations and methods of working should be set right." The Govrnment of Bengal however did not take the trouble of a laborious enquiry in the matter so as to put the societies again into sound working order ; On the other hand they preferred the line of least resistance and closed them altogether. The boldness and imagination that led the Government to launch a constructive movement in favour of the rural population in 1926 appears to have left them altogether in 1930 when the economic depression and the phenomenal decline of agricultural prices had got a stranglehold of the rural areas of Bengal.

Co-operative Failures in U. S. A.

Are these defects in the initial stages of a movement which was essentially experimental in nature so serious and unique as to be hopeless about its future ? I have before me a report of the Federal Trade Commission (1928) which enquired into the working of co-operative marketing societies in U. S. A. It appears from the report that even in a highly developed country like U. S. A. where co-operative marketing movement is more than half a century old, there were a number of co-operative failures during 1920-28, and that the experiences were not far different from ours. The report shows that the failures were due primarily to one or more of the following causes :—

(1) Organisation mistakes such as failure to study the needs for an organisation and the problems to be met, creation of an organisation out of proportion to the business to be handled, organisation extravagance in the matter of equipment needed, promotional expense and initial salaries paid ;

(2) Mismanagement, due to lack of understanding of local conditions, marketing problems, financial requirements, and inexperienced officers and managers ;

(3) Lack of membership support due to dissatisfaction with results obtained, loss of interest and failure of the association to establish local points of contact with members, all of which result in insufficient volume of business ;

(4) Economic conditions such as price declines and falling off in demand either in domestic or foreign markets ;

(5) Internal dissensions due to selfish motives and the playing of politics on the part of officials.

As the result of their enquiry the Federal Trade Commission indicates that the success of a co-operative marketing organisation depends upon (a) a recognised need for such

organisation ; (b) an honest, capable and efficient management ; (c) a sound financing and marketing policy ; and (d) an informed and loyal membership. They particularly stressed the need for a proper financing policy and that "co-operative marketing associations in general are handicapped to a considerable extent by lack of adequate permanent and temporary capital." What however we should note is that the Federal Trade Commission did no at all lose heart at the co-operative failures. On the other hand they conclude with an encouraging tone that "from the experience of those co-operative associations that have been operating over a period of years, it is possible through the application of the co-operative principle to the marketing of some farm products to operate as economically and make as good or better return to producers for their product by this method as through the old established types of marketing." It is certainly reassuring for us to find that even in a country where the "merchant system" of marketing can be called the most efficient in the world, an official enquiry holds the view emphatically that co-operative marketing is able to hold its own—if not more than its own in competition.

American Agricultural Policy :

What attitude did the Government of U. S. A. take towards co-operative marketing ? Did they sit tight over the report of the Federal Trade Commission and like the Government of Bengal "let loose the forces of demand and supply" to take their natural course ? In a country where agricultural interests are fairly vocal it is indeed hazardous to adopt such a happy-go-lucky attitude. In the summer of 1929 the Congress had to declare itself in active support of the co-operative marketing movement and pass the Agricultural Marketing Act. A government agency, the Federal Farm Board was formally constituted "to promote a farmer-owned and farmer-controlled marketing system—to help the small-scale agricultural producers keep up with the industrial procession." The Board is empowered to

(a) promote education in co-operative marketing, (b) encourage the formation and development of co-operative associations, (c) keep advised as to the home and foreign markets, (d) investigate over-production and advise on its prevention, and (e) investigate technical improvements in agriculture and marketing. As regards finance, the Board is entrusted with a revolving fund of $500,000,00 dollars to be used for these specified purposes. Loans may be made to co-operatve societies for (i) marketing ; (ii) construction or acquisition of marketing facilities for storing, processing etc. ; (iii) formation of clearing-house associations in co-operative form with a view to "effect the economic distribution of the commodity and minimise waste and loss in marketing." (iv) propaganda for increased membership ; and (v) advances to members on goods delivered. The rate of interest on these loans are not to exceed 4 per cent. Besides the authority to start a "stabilisation corporation," the Board is further authorised to enter into agreements "for the insurance of co-operative associations against loss through price declines" where coverage is not available from private agencies and other circumstances justify this step.

Co-operative Marketing and small Holdings :

American marketing policy as represented by the Act of 1929 is a recognition of the salutary principle that so far as the agriculturists are concerned the better system of marketing is based on the co-operative idea. Co-operative marketing is particularly suited to a country of small holdings and it is more necessary in a country of small holders than it is where farms are large. The smaller a consignment for sale, the more hands does it have to pass through before it meets the export trader or the large wholesale merchant and the more is the number of middlemen involved in the business. The greater therefore is the loss suffered by the ryot. Then again one of the main reasons of the failure of rural credit policy in India is to be found in the inability of the ryot to provide good security against cheap credits. It is only co-operative marketing

that will enable the produce of the country to be used as security for the provision of cheap credits in the rural areas. It is indeed ordinary common sense to say that unless the ryot can make the loan to him productive by realising better prices for his products any state policy of agricultural credit is bound to prove futile. It is therefore no wonder to find that the overdues in the rural credit societies of Bengal during 1932-33 had mounted upto Rs. 346.59 lakhs or 80.9 per cent of the total. Yet the co-operative department of the Government of Bengal assures us that the movement they represent is inherently strong and sound and that there is no cause for alarm in the near future. As a matter of fact it is certainly high time for them to realise that a movement that does not show any clear line of advance for the last two decades and which can at best claim an extremely one-sided and disproportionate growth of credit co-operation, is anything but sound and must develop along marketing lines if it is to be of real utility to the rural population.

There were indeed mistakes in the past, but that is no reason why the Government should lack boldness and imagination and refrain from pursuing a vigorous and constructive agricultural policy. It has been estimated that whereas the average yearly value of total marketable crops in Bengal for the decade 1920-30 amounted to Rs. 72.415 crores the total value of marketable crops for 1930-31 was Rs. 52.05, crores, 1931-32 Rs. 41.49 crores, and that for 1932-33 the amount was only Rs. 32.71 crores. This gives us a fair idea of the nature of the agricultural depression we are in and the stalemate that has necessarily occurred. In years of plenty we could afford the expensive services of midlemen ; can we afford them now ? The Government had indeed wasted a number of valuable years during which they could easily build up a network of co-operative marketing societies by enunciating a constructive policy and the following it up energetically.

Conclusion :

It is however never too late to mend. It appears that only recently the Government of India have taken up

the question of agricultural marketing and that the Government of Bengal have also followed suit by appointng marketing officers and promising marketing surveys. It is indeed a pity that the co-operative department does not come in the picture at all. Organised marketing is no doubt an improvement upon the existing situation but where is the guarantee that the agricultural producers will secure a proportionate benefit from the new marketing policy ? A Press report of May 10 flashes the news that the Government of India have received from almost all the provincial governments schemes of rural uplift for which Rs. one crore and thirteen lakhs will be spent out of the surplus of central revenues for 1934-35. It may be remembered that Sir James Grigg in his budget speech this year announced this amount to be spent on the amelioration of the condition of the rural population and that in a further statement he wanted some 15 lakhs to be earmarked for a stimulus to the co-operative movement. It might be interesting to know beforehand what was the scheme of rural uplift submitted by the Government of Bengal and how did the Co-operative department propose to utilise the amount earmarked for them. The sum to be spent is indeed considerable, Bengal being allotted Rs. 19,25.000, and though this cannot in itself be sufficient for any scheme for rural uplift in Bengal, a good start can at least be made. It is to be hoped that this amount will not be diverted towards that ludicrous attempt at fighting Bengal's rural indebtedness (amounting to more more than 100 crores) by guaranteeing Rs. 13 lakhs worth of debentures of newly started co-operative land mortgage banks. Let the Government of Bengal create a permanent Agricultural Board with an eye to the consitution of Federal Farm Board of U. S. A. making co-operative marketing its special charge and see that the various departments follow a concerted and well-co-ordiated policy towards rural development.

June 1, 1935,

Financial Times

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CHAPTER XV

Conclusion

At the turn of the century, the Swadeshi movement of Bengal provided the people with a tremendous stimulus to take to industrial development and bring about the much needed economic regeneration of the country. It was Calcutta which served as the radiating centre for this revolutionary urge which witnessed the starting of the Bengal National Bank Ltd., Co-operative Hindusthan Bank, Hindusthan Co-operative Insurance Society, Banga Luxmi Cotton Mills, Bengal Chemical and Pharmaceutical Company Ltd., Bengal Canning and Condiment Company Ltd., Colour Printing and Hollow Wares Ltd., Bengal Potteries Ltd., Prabartak Jute Mills Ltd., Eastern Steam Navigation Company etc., to name only a few amidst numerous joint-stock and private enterprises interested in banking, industry, shipping, insurance, trade and commerce. Inspired with a pioneering zeal and enterprise, people developed coal, iron ore, manganese, mica, copper and the allied mines and minerals, while others took to scientific agriculture or mixed farming, or interested themselves in Tea gardens or cultivation of cash crops like cotton, tobacco or jute. Capital formation also took place side by side on a rather mass scale, and it may be interesting to note that the new floatation of Tata Iron and Steel Company in 1907 for an equity capital of Rs. 2,20,00,000/- was more than fully subscribed and paid for in no time, virtually on the crest of the wave of enthusiasm generated by the Swadeshi movement.

A remarkable feature of this new economic upsurge during the first quarter of the 20th century was that the movement for industrial regeneration was entirely spontaneous and based on private enterprise, the State with its over-weening policy of laissez faire remaining carefully aloof and indifferent, if not positively hostile. The "settled fact" of the first partition of Bengal was unsettled at the Delhi Durbar of 1912, and in spite of the first world war and its aftermath the wave of

enthusiasm continued, strengthening the economic fabric by starting new industries and enterprises and distributing its proceeds which percolated into the different strata of the society. The Government which initially remained apathetic was compelled by the exigencies of the War to take note of the changing environment and appoint the Industrial Commission under the Chairmanship of Sir Thomas Holland which submitted its report in 1917. Surveys of industrial progress were carried out from time to time through the Indian Fiscal Commission and the Tariff Board and the arms of "Discriminating Protection" were extended to several industries including that of Iron and Steel.

It was thus that the industrial growth in the Calcutta region and its hinterland took its shape, the progress of which was maintained and accelerated till the period of National Planning began after Independence. The economic system as a matter of fact, evinced a strong resilience and made speedier progress in spite of the fact that the second quarter of the 20th century in Eastern India was crowded with a series of misadventures. There were for example the bank failures following as a chain reaction the failure of the Bengal National Bank in 1926 due to causes partly economic and partly political, the Great Economic Depression of the Thirties and the decline of agricultural prices, winding up of Co-operative Jute Sale Societies in Bengal by Government during 1929-30, and the quasi-political drive against "money-lenders" under the Bengal Money Lenders' Act and the Bengal Agricultural Debters' Act, which sounded the death-knell of all loan offices and smaller banks. Then came the Second World War of 1939-45, the "Denial Policy" of the government with its terrible sequel of the Bengal famine of 1943-44, the Great Calcutta Killings of 1946-47 and lastly the second partition of Bengal in 1947 as an offshoot of Independence.

It is indeed a peculiar feature of post-Independence Bengal that this pace of Industrial growth has slowed down, and that there is no noticeable upsurge towards industrial development either, in spite of the enthusiasm generated by the dawn of freedom. The reason is perhaps not far to seek. Under the First Partition, a dynamic leadership arose inspiring the people with a romantic fervour which turned their resources and

energies spontaneously along constructive channels and imparted life into the new economic frame-work. To-day under the Industrial Policy resolution of 1948, the Union Government plays a selective role, and from the very start sites for new industries, whether under the public or private sectors, are selected with an eye to a "better spread" of regional distribution irrespective of the costs involved. The industrial programmes under the First, Second and Third Five-Year Plans also prescribe the limits of private initiative and enterprise, and naturally the growth potential of the eastern region could not be satisfied in full.

In a socialistic pattern of society, the State takes upon itself the responsibility of industrial development and chalks out the lines of economic progress. How far and to what extent has this responsibility been discharged to the full satisfaction of the needs of the truncated state of Bengal ? The question raises three very important issues—Firstly, there is the question of re-adjustment of the boundaries of the State of Bengal, taking careful note of her special needs arising out of partition. As we know, the representatives of the State took up the matter with the Boundary Commission set up by the Constitution, but in spite of best efforts no appreciable re-adjustment could be obtained in its favour. Secondly, as a component member of the Indian Union, the State of Bengal is the natural and accredited representative of the millions of people displaced in its eastern part left in Pakistan. This responsibility must now be discharged and as such the only alternative left for the State is to have an extension of the the Industrial complex of the Calcutta region along the banks of the Hooghly River upto Haldia and the sea-face, develop the surrounding country side including the Sundarbans by reclaiming swamps, clearing jungles, digging up over-flow canals and putting up embankments where-ever necessary against Salt. water. This involves that the Ganges Barrage at Farraka should be completed as early as possible so that the State Government may take in hand an extensive planning of the region with the co-operation of the Planning Commission, C.M.P.O. and similar other special agencies set up for the purpose. The State Government should also ensure that the industrial planning of Dandakaranya is integrated with that of West Bengal, so that maximum results may be obtained for the welfare of the people for whom this is meant.

Lastly, the fundamental and basic question still persists. Success of all planning involves that there should be a co-relation between wealth and welfare, as it is on this co-relation alone that the delicate plant of cultural and social growth can flourish. Let us all hope that twilight in the delta will end soon into a beautiful dawn.

Selected References

Chapter I

1. History of the rivers in the Gangetic Delta 1750-1918—*C. A. Williams.* Bengal Secretariat Press (1919).
2. Indian shipping, a history of the sea-borne trade and maritime activity of the Indians from the earliest times—R. K. Mukherjee (Longmans, 1912).
3. Recent changes in the Delta of the Ganges—J. Fergusson (1863).
4. Surveys of Bengal by J. Rennel—Edited by Major Hirst (Bengal Secretariat Book Depot, 1917).
5. On Yuan Chwang's travels in India—Th. Waters.
6. Ancient system of Irrigation in Bengal and its application to modern problems. *Sir William Wilcocks* (Calcutta University, 1930).
7. Techno-Economic Survey of West Bengal—National Council of Applied Economic Research, New Delhi.
8. Development of Dandakaranya—National Council of Applied Economic Research, New Delhi (1963).

Chapter II, III & IV.

1. Census of India 1951
   Vol VI Part I-A Report
   Part I-C General Report by A. Mitra.
   Part III and IV—Report with census tables on Calcutta city and Calcutta Industrial area.

2. Calcutta Metropolitan Planning Organisation—Annual report for 1962-63.
3. Rivers of the Bengal Delta—S. C. Mazumder (1941).

Chapter V.

1. Taxation Enquiry Report, 1924-25, Government of India (1926) 20 Irrigation Commission Report, 1901-02, Government of India.

Chapter VI.

1. Programmes of Industrial Development 1951-56, Planning Commission, Government of India.
2. Mineral Resources of the Damodar Valley and adjacent regions, G.S.I. (1950).

Chapter VII.

1. Report of the Indian Coalfields Committee, 1946, Government of India Press.
2. Memoirs of the Geological Survey of India, Vol. LXXVIII—J. A. Dunn : Economic geology and Mineral resources of Bihar province.
3. A report on the coal reserves and resources of the Kotaldih, Damra, Gobindapur, Chota Dhemo, Gangutia, Kuldih and Boldih concessions in the Raneegunje Coalfield, Burdwan district, Bengal—Sir Cyril S. Fox (1950).
4. Mineral Resources of the Damodar Valley and adjacent regions—G. S. I. (1950).

Chapter VIII.

1. Records of the G. S. I. Vol. LXXVI—Bulletins of economic minerals No. 8—Clay : H. Crookshank (1941).

2. The working and refining of Indian Keolin with special reference to a Singhbhum deposit—F. B. Kerridge (Transactions of the Mining and Geological Institute of India XXIV Pt. 3—1930).

Chapter IX.

1. Programme of Industrial Development 1951-56, Planning Commission, Government of India.
2. Memoirs of G. S. I. Vol. LXXVIII—J. A. Dunn.
3. Mineral Resources of the Damodar Valley and adjacent regions—G. S. I. (1950).

Chapter X & XI

1. Report of the Mica Enquiry Committee 1944-45, Government of India Press (1949).
2. Mineral Resources of the Damodar Valley and adjacent regions—G. S. I. (1950).
3. Memoirs of the G. S. I. Vol. LXXVIII—J. A. Dunn.

Chapter XII, XIII & XIV.

1, Report of the Royal Commission on Indian Currency and Finance (1926).
2. Provincial Banking Enquiry Report (1926), Bengal Government Press.
3. Indian Central Banking Enquiry Committee Report Vols. I & II (1931
Government of India, Central Publication Branch.
4 Report of the Land Revenue Commission, Bengal Vols. I & II, Bengal Government Press (1940).
5. Bengal Jute Enquiry Committee Report, 1932, Vol. I—Report, Vol. II—Evidence (Bengal Secretariat Press).

2. [illegible] making and [illegible] firing of Indian Kaolin with [illegible] deposit [illegible] R. [illegible] (Transactions of the Mining and Geological [illegible] of India XXIV [illegible] 1949).

Chapter X.

1. [illegible] Development 1951-56, Planning Commission, Government of India.
2. [illegible] G. S. I. [illegible] XXVIII [illegible] J. A. Dunn.
3. [illegible] Resources of the Damodar Valley and [illegible] regions [illegible] G. S. I. (1950).

Chapter X & XI

1. Report of the Mica Enquiry Committee 1944-45, Government of India Press (1946).
2. Mineral Resources of [illegible] Damodar Valley and adjacent regions [illegible] G. S. I. (1950).
3. Memoirs of the G. S. I. Vol. LXXVIII [illegible] J. A. Dunn.

Chapter XII, XIII & XIV.

1. [illegible] the Royal Commission on Indian Currency and Finance (1926).
2. [illegible] Building [illegible] (192[illegible]) [illegible]

[illegible]

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