REPORT

1960-61

सत्यमेव जयते

MINISTRY OF STEEL, MINES AND FUEL

(Department of Mines & Fuel)

Report 1960-61 of Ministry of
Steel, Mines & Fuel (Department of
Mines & Fuel).

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E R R A T A

1. Contents page. Against Chapter V, read "Geological" for "Geologcal".
2. Page 5 line 2. Read "items" for "item".
3. Page 13 line 3. Read "Price" for "Prime".
4. Page 17 para 57. Insert full stop after "plants" in line 14.
5. Page 23 chapter heading. Read "MINERALS" for "MINERA".
6. Page 33 Table. In column 2 the figure against Panna is 490.
7. Page 35 para 6 line 2. Read "88.33" for "88:33".
8. Page 39 para 9 lines 10 and 11. Read "Kinnerasani" for "Kinnnerasani".

CONTENTS

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INTRODUCTION

The Ministry of Steel, Mines and Fuel which was constituted on the 17th April, 1957, consists of two Departments—the Department of Iron and Steel and the Department of Mines and Fuel. This report covers the activities of the Department of Mines and Fuel, which as its name indicates, is concerned with the policies, programmes, and regulation of minerals and mining, and for fuels including coal and lignite, petroleum and natural gas.

2. A detailed list of subjects which are at present handled in the Department of Mines and Fuel is given in Appendix I.

CHAPTER I

COAL

Control over production, distribution, movement and prices of coal was continued during the year 1960.

2. **Overall Production.**—The year under report being the last year of the Second Plan, it would be appropriate to make an assessment of the actual achievement against the target envisaged for coal production. The target set for the industry was the attainment of a rate of production of 60 million tons in the last quarter of the last year of the Second Plan period. As against this the industry as a whole has already achieved an annual rate of production of just over 60 million tons. Out of the two undertakings in the public sector, the Singareni Collieries Company has already reached its prescribed target of 3 million tons a year and the other, the National Coal Development Corporation Ltd., has attained a rate of production of 12·48 million tons a year as against the target rate of 13·5 million tons set for it. The private sector has achieved its target, the current rate of production being about 45 million tons a year.

3. **Transport position.**—The transport position during 1960 was better than in the previous year. The daily average loading in West Bengal/Bihar fields was about 4,308 wagons in 1960 as against 4,004 wagons in 1959. In the outlying fields, the daily average loading rose from 1,006 wagons in 1959 to 1,110 in 1960. However, owing to the rising demand from steel plants and other important industries, occasional shortages were reported by low priority consumers due to inadequate movement. Efforts were made, to the extent practicable, to meet the situation by special allotment of wagons and, by movement of block rakes.

4. **Export.**—The export of coal during 1960 amounted to about 1·37 million metric tons as against 1·45 million metric tons in 1959.

5. Of the target of 22 million tons of additional production fixed for the II Plan, the National Coal Development Corporation and the Singareni group of collieries comprising the public sector, were allocated 10·5 million tons and 1·5 million tons respectively; the balance, 10 million tons, was assigned to the private sector.

PUBLIC SECTOR

NATIONAL COAL DEVELOPMENT CORPORATION

6. The 10·5 million tons target of additional production envisaged an increase of 0·5 million tons in the output from the 11 old collieries

while the new collieries were expected to yield 10 million tons. This target of 10·5 million tons when added to the level of production in the then existing State Collieries in 1955, *viz.* 3 million tons, meant that the National Coal Development Corporation was to achieve a rate of production of 13·5 million tons in the last quarter of the Plan. Against this target, the level reached in January 1961 was 12·48 million tons.

7. The position in regard to the various mines during the year was as follows:—

Old State Collieries:

The old State Collieries which had already exceeded their target of additional production of 0·5 million tons, as stated in the report for 1959-60 produced 3,04,027 tons during January 1961 or in other words reached level of production of 3·6 million tons

New Mines:

(i) *Korba* (*Madhya Pradesh*).—Commercial production started on the 1st April, 1958 and the maximum rate reached so far is 78,040 tons per month, as compared to the target of 1·16 lakh tons a month. This target, however, was based on the estimated demand of the Korba Power House for coal from the open cast quarry, which expectation did not materialise. Production consequently had to be restricted.

(ii) *Kathara* (*Bihar*).—This colliery went into commercial production on the 1st June, 1959. The target of 1,25,000 tons a month was attained in January, 1961.

(iii) *Gidi 'A'* (*Bihar*).—This colliery went into commercial production from the 1st April, 1960, with a target of 1,25,000 tons a month. The target was exceeded in January 1961 when a production of 1,27,053 tons was achieved.

Construction of a railway bridge over the river Damodar has since been completed by the Eastern Railway and the colliery is now linked by rail.

(iv) *Saunda* (*Bihar*).—This mine went into commercial production on the 1st July, 1959. Highest output reached was 81,937 tons during the month of January 1961 as against the target of 1,00,000 tons a month. Work on the permanent loading arrangement is in progress at this colliery. There should be no difficulty about Saunda reaching its full target, as soon as the loading arrangements are completed and requisite supply of wagons is assured.

(v) *Bachra (Bihar).*—Bachra went into commercial production from the 1st April, 1960 with a target of 50,000 tons per month. The rate of production reached was 17,100 tons in the month of January 1961. Mining conditions encountered in this colliery are exceptionally difficult and have hampered production so far. Most of these difficulties have now been overcome and an increase in output is expected.

(vi) *New Bhurkunda II (Bihar).*—The new mine at Bhurkunda, which is an extension of the old State Colliery of the same name, went into commercial production on 1-10-58. The highest level of production reached was 1,17,807 tons in the month of January 1961 from the combined mine. This is one of the largest mines of the Corporation and it has already exceeded its target of 1,00,000 tons a month.

(vii) *New Kurasia (Modhya Pradesh).*—The new Kurasia Project which is also an extension of the old State Colliery of Kurasia, went into commercial production on the 1st October 1959. The target of 1,00,000 tons was exceeded in the month of January 1961. The remodelling of the railway yard at Kurasia is still in progress and is expected to be completed shortly.

(viii) *Korea (Madhya Pradesh).*—The annual target of production from this colliery under the current Plan is only 0·25 million tons, the ultimate target being 0·55 million tons per annum by 1963-64. Coal has been exposed in the open cast mine and the development of the inclines in the underground mines is proceeding. Korea attained an output of 25,055 tons in January 1961, thereby exceeding its current plan target. The railway line has, however, yet to be linked. According to the present programme this would be completed by end of March, 1961.

(ix) *Gidi 'C' (Bihar).*—The output from this mine started very recently and in January 1961, 40,004 tons of coal was raised as against the target of 34,000 tons.

(x) *Sayal D (Bihar).*—This colliery achieved a rate of production of 18,698 tons in the month of January 1961, compared to the target of 45,000 tons.

The main difficulty in this colliery has been that the Railway siding could not be provided in time. Loading in the temporary siding of Saunda, at a distance of about four

miles has, therefore, been resorted to. The temporary siding has a limited wagon capacity and this, together with the distances to be covered, resulted in restricting the output. The railway siding is, however, expected to be completed shortly, when a substantial increase in production can be expected.

(xi) *Bisrampur (Madhya Pradesh).*—Originally this project was included in the Second Plan but later it had to be relegated to the III Plan, because the Bijuri-Karanji Railway line was not likely to be ready within the current Plan period. The project is intended to yield 2·7 million tons of coal per annum, partly from open cast and partly from underground mines. Work on the project is in progress.

(xii) *South Balanda (Orissa).*—This project too is essentially a third Plan project, though it is likely that it will reach a rate of output of 0·15 million tons before the current Plan period is over. There was a production of 3,900 tons in January, 1961.

8. **Giridih Group of Collieries (Bihar).**—Special mention may be made here of the Giridih Group of Collieries. This group comprise the Kurhurbaree and Serampore Collieries. These are two of the oldest collieries of the Corporation, and as a result of working for more than 70 years, reserves have been depleted and have now reached a stage when further raising is difficult and expensive. To add to the difficulties, early in October 1959, the Kolimaran Pit of the Kurhurbaree colliery was suddenly flooded and had to be temporarily abandoned. A few days later, the deep pit of the Serampore Colliery was similarly affected. Some of the other pits, *e.g.* the Jubilee Pit, were also threatened by inundation, but with constant pumping further flooding was avoided. The Kolimaran Pit has since been restored to production but the deep pit has yet to be fully recovered. It is expected that production will be resumed during 1961. The Government of India have decided that in spite of the losses which may be incurred, the Giridih Group of collieries should continue to be worked. This decision has been taken in view of the current high demand in the country for coking coal and the particularly superior quality of coal mined here.

9. **Korba Enterprises with Soviet Collaboration.**—Under the Indo-Soviet 500 million Rouble Credit Agreement of November, 1957, and the subsidiary contracts entered into by the National Coal Development Corporation with M/s. Techno-export under this Agreement,

the latter were to draw up detailed project reports for the following item in the Korba Project:—

(1) a quarry to produce 1 million tons per annum from the Jatraj seam, at Manikpur;

(2) necessary underground workings to produce 1½ million tons per annum from the Ghordewa coal seam;

(3) A Central Workshop; and

(4) a coal washing and dressing Plant.

The project reports in respect of the Manikpur Quarry, the workshop and the washery have been received and considered by the Corporation. The project reports for the two underground mines, Banki and Surakachar were received by the Corporation in November 1960 and January 1961 respectively. After examination by the Corporation these reports are expected to be submitted to Government by April, 1961.

As for the three project reports already received by the Corporation, the position is briefly as follows:—

(1) **Korba Opencast.**—The project report furnished was for an output of 2 million tons per annum whereas in the contract the output mentioned was only 1 million tons, with provision for a potential production capacity upto 2 million tons. The Russian experts have, therefore, been requested to modify the report to provide for the output indicated in the contract. A decision on the implementation of the project will be taken only after conclusion of the negotiations, regarding the price of coal to be paid by the M.P. Electricity Board. The main consideration for the Corporation is to secure a price for this coal which will ensure a small margin of profit over and above their operational cost.

(2) **Korba coal washing and dressing plant.**—The project report furnished was technically sound, but the Corporation decided not to proceed with the implementation of the project because the economics of the washery were not attractive, mainly on account of the poor washability characteristics of the coal. Further, the M.P. Electricity Board have informed the Corporation that the middlings that would be produced by the washery would not be needed by the Korba Thermal Power Station. Keeping these factors in mind, the Corporation have decided not to go ahead with this project.

(3) **Korba workshop.**—The Project report was found to be technically acceptable, but it was felt that substantial economies were possible, particularly in the expenditure on civil works. The Soviet experts have accordingly been requested by the Corporation to revise the project report with a view to effecting possible

economies. The next stage *i.e.* preparation of the working drawings will be taken up with the Soviet experts on hearing from them further.

10. The following additional prospecting, mining and other rights in land were acquired during the year under the relevant provisions of the Coal Bearing Areas (Acquisition and Development) Act, 1957:—

(a) prospecting rights over 36,507·20 acres;

(b) mining rights over 3,874·42 acres; and

(c) all rights over 6,703·14 acres.

11. **Coal Washery at Kargali.**—In order to supply high quality coking coal to the Bhilai and Rourkela steel plants, a coal washery costing approximately Rs. 2·46 crores with an annual optimum capacity for producing 1·6 million tons of washed coal was set up at Kargali in November, 1958. Despite certain operational difficulties, the Kargali Washery is steadily increasing its output of washed coal. Production of washed coal during 1960 amounted to 8,52,427 tons against 7,02,806 tons during 1959.

12. **Training.**—Five Training Schools are at present functioning under the National Coal Development Corporation. These institutions are located at Talcher, Kargali, Kurasia, Giridih and Bhurkunda collieries, and are intended to meet the Corporation's requirement of Junior Technical personnel.

13. Three apprentice graduate mining engineers of the National Coal Development Corporation are receiving training under the scheme of the National Coal Board in the U.K. Seven such engineers have already returned to the Corporation after receiving the requisite training. Arrangements for similar training of eleven engineers are under way.

14. Three Colliery managers of the Corporation who were sent to the U.K. for intensive practical training in mechanisation at the University of Sheffield under the auspices of the U.K. National Coal Board, completed their training in 1960 and have returned to the Corporation.

15. Ten apprentice mining engineers of the Corporation have been sent for practical training in coal mines in France for a period of 8 months under the Indo-French Technical Cooperation Programme. Four Electrical and Mechanical Engineers have been sent for practical training in coal mining in West Germany for a period of one year.

16. Three Junior Technical Assistants of the Corporation have been selected for practical training in drilling, maintenance and repair of machines, etc. in Australia for a period of 22 weeks under the Colombo Plan.

One Assistant Mechanical Engineer of the Corporation has been approved for intensive practical training in heavy repairs and maintenance of scrapper conveyors, in U.K. under the Colombo Plan.

17. **Power requirements for Second Plan Projects**

(a) *Bihar region.*—The position regarding power supply for the projects in Bihar has been satisfactory.

(b) *Madhya Pradesh Region.*—The M.P. Electricity Board have initiated work on the 132 K.V. transmission line from Korba Thermal Power Station to the Kurasia Colliery and the project is expected to be completed by the third quarter of 1961. Meanwhile, in order to meet the requirements of the Corporation for commissioning the 15 cu. yd. dragline at Kurasia three 1000 KVA diesel generating sets have been acquired by the Corporation, of which two have already been installed at Kurasia.

(c) *Orissa Region.*—Power from Hirakud for South Balanda mine will be available shortly in Orissa.

18. **Power requirements for Third Plan Projects:**

Bihar, M.P. and Orissa Regions.—The estimated requirements of power for the Third Plan period have been intimated to the respective Electricity Boards of the States of Bihar, Madhya Pradesh, Bengal, Orissa and Maharashtra and also to the Central Water and Power Commission.

19. **Railway sidings.**—Railway sidings have been completed for all the Second Plan projects except for the collieries of Sayal and Gidi C. In Sayal, however, a temporary siding has been provided at some distance from the colliery, and coal is being conveyed to that point by means of a conveyor belt. The Gidi C siding is expected to be completed in early 1961.

20. **Machinery and equipment.**—The open cast mines employ heavy earth moving machinery such as shovels, dumpers, dozers, blast hole drills etc. In order to modernise the open cast mines further, the National Coal Development Corporation has acquired a Dragline and a few more have been ordered. Similarly, large scale mechanisation has been effected in the new underground mines where coal cutting machines, loaders, conveyors etc. have been installed. The total foreign exchange releases made to the

National Coal Development Corporation for the purchase of machinery and equipment upto 31st December 1960 amount to Rs. 21·69 crores. All orders for the procurement of plant and machinery for the Second Plan period have been placed and about 90 per cent of the machinery has already been received, while another 5 per cent is expected to be received by the end of the financial year.

21. **Central Workshop at Barkakhana.**—As stated in the report for 1959-60, a Central Workshop involving a capital investment of Rs. 130 lakhs and a recurring annual expenditure of Rs. 20 lakhs had been approved. Work on the Project commenced early in 1960. 5 out of 12 sheds have already been erected. In one of these, the structural shop has been commissioned and the steel fabrication for the other sheds is in progress in this shop. Fabrication of loading point jobs for the collieries has also been taken up in the structural shop. Installation of equipment in the other 4 sheds erected, namely, the machine shop, the engine shop, the foundry and the smithy shops, is in progress. These are expected to go into production by end of March, 1961. The construction of the remaining 7 sheds is also expected to be completed by that time.

The Central Workshop, when completed, will not only handle major repairs and overhauls, but will also manufacture spare parts of the order of Rs. 35 lakhs a year apart from fabricating steel and structurals of an annual value of Rs. 25 lakhs. Retreading of tyres of heavy earthmoving machinery will also be taken up.

22. A scheme for the construction of a Central Stores which will be an adjunct to the Central Workshop is under consideration.

23. Workshop facilities for ordinary maintenance and running repairs, both for the opencast and the underground machinery, are available in each of the collieries/groups of collieries.

24. **Civil Construction.**—The Civil Construction Department of the Corporation was strengthened during the year 1959-60 in order to speed up the programme of construction of residential as well as office buildings, permanent loading systems through bunkers and chutes, as also the system of communications. During the year 1959-60, work orders were placed for buildings of the value of Rs. 3·1 crores. In addition, work orders have been issued for further constructions of the value of Rs. 2·69 crores. The Civil Construction Department has also taken up the construction of bunkers, and loading arrangements at Bhurkunda, Saunda and Gidi of the total value of Rs. 32 lakhs. Construction of roads in collieries and subsidiary items of construction work of the value of Rs. 7·5 lakhs have also been undertaken. Attention has also been given to water

supply schemes. A detailed scheme for water supply to the Karanpura group of colleries estimated to cost Rs. 80 lakhs, is under consideration. Preliminary work is also being done on a similar water supply scheme for Bokaro-Kargali and Kathara, estimated to cost over a crore of rupees. Since April, 1959, work of a total value of about Rs. 1·75 crores has been completed. A scheme for the building of a township to accommodate the staff of the Central Workshop as well as the Central Stores at Barkakhana is under the consideration of Government.

25. **Labour Relations.**—Labour relations have, on the whole, continued to be satisfactory during the year under review. Apart from a few lightning strikes resorted to for short periods, which were duly resolved, there was no cessation of work till the end of 1960.

26. The two tier system of negotiations has been introduced in most collieries. Under this procedure, there is a meeting at the colliery level once every fortnight between the management and representatives of the recognized unions, while, to deal with matters in respect of which no settlement or decision is possible at the colliery level, discussions are arranged at headquarters as often as necessary. With the introduction of this system, very few disputes have been referred to the Conciliation Officer as compared with the past.

27. The Corporation has also introduced a grievance procedure on the model suggested by the Tripartite Labour Conference. Grievances relating to individuals or groups of individuals are taken up under this procedure first at colliery level and later, if necessary, at the headquarters level

28. A worker management participation council has been constituated in Argada Colliery and has been functioning there for about a year. A similar Council has been formed in the Kathara Colliery.

29. The introduction of the two tier system and the grievance procedure, has established still better relations between the management and labour.

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30. **Labour—Amenities.**

(a) *Miners' Quarters.*—The total number of miners' quarters constructed upto the end of March, 1960 was 2,834. Another 359 quarters have since been completed. These, with the 2,307 miners' quarters already constructed in previous years make a total of 5,500 completed quarters. 1,450 miners' quarters from out of the civil

construction programme for 1959-60, are under construction and are expected to be completed shortly. The construction programme for 1960-61 provided for the construction of an additional 5,142 quarters.

31. The total strength of workers employed by the Corporation is 39,114. A considerable number of these workers come from the neighbouring villages and as such do not require quarters. Again, in a large number of cases, both husband and wife work in the collieries. In view of the above, it is estimated that not more than 20,000 workers' families would need residential accommodation. After completion of the construction programme for 1960-61, over 50 per cent of the families will have been provided with quarters.

32. **Medical facilities.**—Besides a dispensary at the head-quarters, the Corporation runs seventeen hospitals and eleven subsidiary sectional dispensaries. The hospital at Giridih is equipped with an X-Ray Plant. Arrangements have been made with the Coal Mines Welfare Commissioner for installation of two more X-Ray plants—one at Kurasia and the other at Talcher.

33. **III Plan Coal Schemes.**—A target of 17 million tons of additional production has been fixed for the N.C.D.C. The Singareni Collieries have been assigned 3 million tons of additional production, while the balance of the III Plan target-production will be by the private sector. The Corporation has undertaken a programme of drilling in the coalfields which they propose to exploit during the III Plan. The coalfields earmarked for intensive prospecting and drilling extend from Raniganj in West Bengal to Pench-Kanhan in Madhya Pradesh and Kamptee in Maharashtra. In addition to this programme, three specific III Plan projects have been taken in hand and initial work on these projects is being carried out. The projects are the South Balanda mine in Orissa, with an output of one million tons, Korea mine in Madhya Pradesh with an output of 0·55 million tons and the Bisrampur mine, also in Madhya Pradesh, with an output of 2·7 million tons. Brief details in respect of these projects have already been given in this report.

34. **Experts.**—To facilitate the execution of its development schemes in the III Plan, the National Coal Development Corporation would be requiring the services of foreign experts/firms of consultants in the following fields:—

1. Technique of underground mining;
2. Technique of open cast mining;
3. Layout and management of workshops; and
4. Coal washeries and other coal preparation installations.

Certain offers of assistance in this regard have been received from U.S.A., U.K., France and West Germany and a decision in regard to these is expected to be taken shortly.

35. **Reorganisation of the NCDC.**—The reorganisation of the Corporation with a view to enable it to cope with the increased demand for coal that will be placed on it during the III Plan period is under consideration. In this connection, a report containing recommendations has been furnished by the Managing Director, NCDC, after his visit to the U.K., France and West Germany and these are presently under the consideration of the Board of Directors.

36. During 1960, eleven meetings of the Board of Directors of the National Coal Development Corporation were held. The fourth annual general meeting of the Corporation was held on the 28th December, 1960.

37. During the financial year 1959-60, the Corporation made a net profit of Rs. 20,97,969/-.

SINGARENI COLLIERIES

38. The production of coal from the Singareni Collieries (Andhra Pradesh) during 1955 was 15,26,570 tons. The yearwise expansion programme envisaged was as follows:—

(Figures in lakh tons)

1956-57	1957-58	1958-59	1959-60	1960-61	1961-62
18·00	20·00	21·60	23·60	26·85	30·00

The total capital cost of the expansion programme was estimated at Rs. 757·56 lakhs. Funds to the extent of Rs. 415 lakhs were required during the current Plan period. This expenditure of Rs. 415 lakhs was to be financed by the Central Government under the terms of a Tripartite Agreement between the Government of India, the Government of Andhra Pradesh and the Singareni Collieries Company. Under the provisions of the Agreement, Rs. 120 lakhs were to be provided as equity capital, thereby making the Central Government a 40 per cent shareholder in the revised capital structure of the Company, and Rs. 295 lakhs by way of loan to the Company. The entire sum of Rs. 415 lakhs has already been advanced to the Singareni Collieries.

On the basis of the Production in December 1960, the target rate of an output of 3 million tons annually has already been achieved.

PRIVATE SECTOR

39. The private sector collieries were producing about 34 million tons a year at the commencement of the II Plan and their target at the end of the Plan was an additional 10 million tons a year. As against this, the rate of production achieved by them in January, 1961 was about 45 million tons which means that they have already attained their target rate of production.

40. Provision of adequate railway sidings and pilot and depot capacities for the private sector collieries continued to receive the attention of Government. Notwithstanding the tight foreign exchange position, essential import requirements of spare parts and equipment for collieries were met with as far as possible. Steps were taken to ensure necessary supplies of controlled commodities such as iron, steel and cement, to the industry.

41. **Amalgamation of collieries.**—The Committee set up by the Government in August 1958 to promote voluntary amalgamation of collieries and adjustment of boundaries, approved, during the year, 8 more proposals, which covered 18 collieries with a total monthly production of 64,000 tons of coal. This has brought the total number of proposals approved so far to 30. Actual amalgamation has taken place in 16 cases, involving 32 collieries.

42. It has been decided to defer, for the time being, the introduction of legislation providing for compulsory amalgamation of collieries as the process of such amalgamation may cause physical hold-ups, which would be to the detriment of the scale and tempo of the production efforts needed during the Third Plan.

COAL BOARD

43. The Coal Board continued to discharge the functions entrusted to it under the Coal Mines (Conservation & Safety) Act, 1952, viz., the execution of measures for the conservation of coal and for the promotion of safety in coal mines. Work relating to drawal and analysis of samples of coal from collieries/seams in the Bengal/Bihar field with a view to bringing the existing gradings uptodate, recorded satisfactory progress during the year.

(17)

44. It was mentioned in the report for the year 1959-60, that Government had accepted the recommendation made by the Coal Prime Revision Committee regarding the grant of financial assistance by the Coal Board to collieries which are specially handicapped by one or other of the adverse factors specified by the Committee, and that a procedure for the grant of subsidy was being formulated. A scheme of special assistance in pursuance of this recommendation has since been introduced from 1st September 1960. For the present, the following adverse factors have been declared by the Government as qualifying for assistance:—

(i) gassy nature of coal mines;

(ii) depth of shafts;

(iii) inclination of seams;

(iv) high pumping cost;

(v) thinness of seams; and

(vi) high transportation cost from pit head to rail head.

45. The rates of assistance for each of these adverse factors have been specified and a Special Assistance Committee has been set up under the Coal Board to screen the applications submitted by collieries for grant of assistance and to recommend the amount of assistance to be sanctioned in each case. It is expected that the applications so far received by the Board would be considered and disposed of before the end of the current financial year.

46. **The Central Sand Stowing Schemes.**—With a view to stepping up the level of stowing operations in the Jharia and the Raniganj coalfields, consistently with the plans for increased output of coal under the Third Plan, Government have decided that the Coal Board should construct four bicable aerial ropeways in the Jharia field and three bicable ropeways in the Jambad-Kajora area of the Raniganj coalfield. Each of these 7 ropeways will have a carrying capacity of 1·5 million tons of sand per annum. Sand will be extracted from the river Damodar in the case of Jharia field, and from the rivers Damodar and Adjoy in the case of the Raniganj field, and will be transported by the aerial ropeways to central sand dumps for subsequent distribution to collieries. The collieries to which sand will be supplied under the central schemes, have been selected with due regard to the urgency of stowing operations, the quality of coal, etc.

47. Tender action in respect of one ropeway in the Jharia field and the three ropeways in the Raniganj field has already been taken. Similar action in respect of two more ropeways in Jharia, is in hand. Surveys and investigations to establish the technical feasibility of the fourth ropeway in Jharia and preparation of a project report for that ropeway, are in progress. With a view to synchronising the stowing operations under the central schemes with the production of coal under the Third Plan, it is Government's intention that all the seven ropeways should be erected and fully commissioned by March, 1963.

48. **Pegging of the production of metallurgical coal.**—The scheme of pegging of the production of metallurgical coal by fixing ceillings for individual collieries, which was adopted in 1952, was continued during the year 1960. The production of metallurgical coal (selected grades and grades I & II) was pegged at the levels indicated below from 1952 onwards.

Year	Pegged level of production			Total (million tons)	Actual Production (million tons)
	Selected Grades (million tons)	Grades I and II			
1952 . . .	7·9				
1953 . . .	7·4	Grades I & II	6·4	13·8	13·7
1954 . . .	7·4	Do.	6·4	13·8	13·6
1955 . . .	7·32	Grade I .	3·95	14·32	13·4
		Grade II .	3·05		
1956 . . .	7·7	Grade I .	4·2	15·0	13·8
		Grade II .	3·1		
1957 . . .	8·0	Grade I .	5·0	16·7	15·08
		Grade II .	3·7		
1958 . . .	9·0	Grade I .	5·5	18·2	15·158
		Grade II .	3·7		
1959 . . .	9·0	Grade I .	6·0	18·7	14·566
		Grade II .	3·7		
1960 . . .	9·0	Grade I .	6·5	19·2	12·16 (Figure for the first 10 months only)
		Grade II .	3·7		

49. **Coal prices.**—It was mentioned in the report for the year 1959-60 that the recommendations made by the Coal Price Revision Committee in regard to hard coke were under examination by the Government. The Committee's recommendation was that control over distribution and prices of hard coke should be discontinued. This recommendation was carefully considered by the Government in the light of the possible repercussion of total decontrol. and the conclusion arrived at was that it would be advisable to resort to progressive relaxation of control rather than effect total decontrol forthwith. Accordingly, a system of "ceiling" prices was introduced for hard coke with effect from 26th April 1960. Government also decided that, simultaneously with the introduction of the system of "ceiling" prices, there should be a progressive relaxation in the control over distribution of hard coke. As a first step in this direction, consumers have been given freedom to select cokeries of their choice and to enter into contractual arrangements for supplies, such arrangements being accepted and formally approved by the Coal Controller so long as they do not conflict with the requirements of rationalised transport.

50. The prices of coal produced by collieries in Bengal, Bihar, Madhya Pradesh, Maharashtra and Orissa were increased by 87 nP. per ton during the year, in order to compensate the industry for the full incidence of (a) the grant of enhanced dearness allowance to colliery workers in terms of the provisions of the Labour Appellate Award (50 nP. per ton of coal); (b) implementation of the Mines Amendment Act, 1960 (25 nP. per ton of coal); and (c) implementation of the Award of the Arbitrator (Colliery Disputes) (12 nP. per ton of coal). In the case of collieries in Andhra Pradesh and Assam (excluding the Khasi Hills area), the increase sanctioned was 75 nP. and 25 nP. per ton respectively, as (a) the Arbitrator's Award is not applicable in the case of Andhra Pradesh and (b) as that Award, as well as the Labour Appellate Award, were not applicable to collieries in Assam.

51. With a view to improving the quality of coking coals supplied to consumers, collieries producing the Selected Grades and Grade I of coking coals were authorised to receive the following further amounts in addition to the statutory prices:

	Further amounts admissible over and above the statutory price.
In the case of Selected Grade A	
(i) If the ash content is less than 14 percent .	A sum of Re. 1/- per ton.
(ii) If the ash content is 14 percent or more but is less than 14·5 percent.	A sum of Re. 0·50 per ton.

	Further amounts admissible over and above the statutory price.
In the case of Selected Grade B	
If the ash content exceeds 15 per cent but is less than 16 per cent.	A sum of Re. 0·50 per ton.
In the case of Grade I	
If the ash content exceeds 17 per cent but is less than 18 per cent.	A sum of Re. 0·50 per ton.

COAL COUNCIL OF INDIA

52. The Coal Council met in May 1960 and again in November 1960 and reviewed the target for production of coal in the Third Plan. The Council agreed that the industrial development of the country called for a production of 97 million tons of coal during the Third Plan period. It also approved the allocation of the target between the public sector and private sector. The Council, however, observed that coal interests, both in the public and the private sectors, should so organise production that at no stage coal became a limiting factor in the economic development and the industrial advancement of the country.

53. As the reserves of good quality coal are limited, the Council recognised the need for the speedy setting up of washeries to beneficiate both coking and non-coking coal. With the setting up of these washeries the disposal of large quantities of middlings, which these washeries will yield, will need attention. The Council, accordingly, recommended that a Committee should make an assessment of the total quantity of middlings that would be available and link the utilisation of such middlings with the power generation programme so as to ensure that the middlings are consumed in thermal power stations at or near the washeries.

54. The Council also recommended to the Council of Scientific & Industrial Research to appoint a Committee to go into the question of feasibility of underground gasification of coal for generation of power, to locate suitable areas where this could be tried out on a commercial scale, and to indicate the economics of the proposal.

Both the above Committees have since been constituted.

55. The Council reviewed the activities of the Geological Survey of India and the Indian Bureau of Mines in regard to coal prospecting for the Third Plan and recommended measures for accelerating the exploration programme.

56. The problem of movement of coal in the Third Plan would be of considerable magnitude. With a view to relieving strain on the Railways, the Council decided to examine the possibility of adopting alternative modes of transport other than railways, such as road transport, pipelines, water ways and coastal shipping.

57. The Council also reviewed the progress of work done by its Committees. The Committee on Assessment of Resources has taken up first the assessment of three main coalfields, namely, Jharia, Raniganj and Bokaro and this work is expected to be completed by the end of 1961. In the interest of conservation of good quality coal of West Bengal and Bihar and for easing the difficult transport position, the Committee on Production and Preparation has recommended that the outlying coalfields should be developed to the maximum extent possible. It has also recommended the production of high grade coals by exploiting seams at greater depth. The Committee on Requirements and Utilisation has considered allied problems and made recommendation regarding the underground gasification of coal and suggested measures for effecting economy in the use of coking coal for the steel plants Consequent on the finalisation of the fieldwise programme of production of coal in the Third Plan, the Committee on Transportation is assessing the transport requirements for movement of coal. It is also examining the question of new railway lines required for the purpose.

58. **Fuel Efficiency Committee.**—With a view to achieving economy and efficiency in the use of coal, the Committee recommended revision of the schedules in regard to the type, size and quality of coal for different consumer priorities. These recommendations have been accepted by Government and are being implemented. In the light of the scrutiny of the further factual data that has become available, as well as the experience gained from the field studies, the Committee is now engaged on rationalising the grades and size requirements of coal. Among other measures in the field of fuel economy, the Committee has recommended greater use of inferior grades of coal, and economy in the use of superior grades which are in short supply.

THE THIRD FIVE YEAR PLAN

59. The target for coal production by the end of the Third Plan has been fixed at 97 million tons. This target represents an increase of 37 million tons over the target of 60 million tons set for the Second Plan. With a view to assessing the capacity of the private sector to raise additional coal in the Third Plan, the expansion proposals put forward by the individual collieries were examined by a Working Group consisting of the representatives of the Government and the private sector in the Coal Industry. This capacity

has been assessed at about 17 million tons and the target for the private sector has been fixed at this figure. The balance of 20 million tons of additional production has been assigned to the public sector. Out of this, 17 million tons will be the share of the N.C.D.C. and 3 million tons that of the Singareni Collieries. These allocations are not rigid but subject to adjustments keeping in view the basic objective of ensuring the total production planned for.

60. While in the Second Plan a sizeable contribution towards the additional production required could be obtained from the existing workings, mostly in the private sector, the order of increase indicated in the Third Plan will call for the opening of a number of new mines in virgin areas. During the last 2-3 years of the Second Plan, a good deal of prospecting work has been done by the Geological Survey of India, the Indian Bureau of Mines and the National Coal Development Corporation itself to obtain a general idea of the reserves of coal and its quality in the new areas proposed to be developed. Further intensive drilling will be required in some areas before preparation of detailed plans can be undertaken.

61. The transport requirements for the movement of coal in the Third Plan have been assessed. A number of new lines will be required for linking up new coalfields to be developed in the Third Plan, details of which are being drawn up.

62. **Coal Washeries.**—Closely linked with the coal production programme is the programme for establishing washeries for beneficiation of coking coal and blendable coal for use by the steel plants. The additional washing capacity required for washing metallurgical coal during the Third Plan has been estimated at 13·9 million tons and plans for setting up of this capacity are being formulated.

63. The need for washing non-coking coal for use by the Railways has been felt. An examination of the question of installing washeries to beneficiate non-coking coal has been taken in hand.

CHAPTER II

LIGNITE

The Integrated Neyveli Lignite Project envisages the mining of 3·5 million tons of lignite per annum, out of which 1·5 million tons are to be utilised in a thermal power station with an installed capacity of 250 MW, about half a million tons on the production of 1,52,000 tons of Urea fertilizer, with a Nitrogen content of 70,000 tons per annum and the remaining quantity of about 1·5 million tons to be briquetted and carbonised, to yield about 3,80,000 tons of carbonised briquettes, for use as domestic and industrial fuel.

2. The Neyveli Lignite Corporation Limited continued to manage the affairs of the Project during 1960-61.

3. The third annual report of the Corporation for the period from 1st April, 1958 to 31st March, 1959 was presented to the Lok Sabha on 25th February, 1960 and to the Rajya Sabha on 26th February 1960. The Fourth Annual General Meeting of the Corporation was held on 20th December, 1960 and the fourth annual report for the period from 1st April, 1959 to 31st March 1960 will be placed before Parliament shortly.

4. The Integrated Project recorded further progress during 1960-61. The stages reached by the various component schemes of the Integrated Project are indicated in the following paragraphs:—

5. **Mining Scheme.**—Earthmoving operations, which started in May 1957, were continued with the help of the conventional mining machinery as well as the specialised items of machinery, consisting of the two 350-litre bucket wheel excavators, spreader and the requisite belt conveyors. After overcoming the initial difficulties, such as the determination of right type of cutting teeth to be used and fluctuations in voltage, it was possible to commence regular operation of the small bucket wheel excavators from January, 1960. The total volume of overburden excavated since the commencement of earthmoving operations up to the end of December, 1960, was 15·65 million cubic yards, as against a total volume of 27 million cubic yards to be removed from the mine before exposing the lignite for mining 3·5 million tons per annum. In the present working area, excavation has reached a depth of 130 feet in some places.

6. Work on the erection of the first 700-litre bucket wheel excavator was completed and the machine was put on trial operations

in September, 1960. After the performance test by Messrs. Powell Duffryn Technical Services, lately the Mining Consultants, the machine was taken over by the Corporation and is in operation since October, 1960. Almost all the components of the second 700-litre excavator have been received and the erection work is in progress. It is expected that this machine would start trial working by end of March, 1961.

7. Under the scheme for the ground water control, 38 pumpwells were drilled. 29 wells, fitted with pumps, are ready for operation.

8. The mine is expected to commence production of lignite by August-September, 1961, so as to supply adequate quantities of lignite required for the first 50 MW Unit of 250 MW thermal power station. It will be sufficient if, by then, only about 20 million cubic yards of overburden is removed. Full production of lignite at the targeted output of 3·5 million tons per annum will be attained in stages thereafter to synchronise with the commissioning of the other lignite-consuming units of the Integrated Project.

9. **Scheme for the generation of Power.**—The thermal power station, which is being set up under the Indo-Soviet 500 million Rouble Credit Agreement of the 9th November, 1957, will have five generating sets of 50 MW each. Formal sanction for the establishment of the Power Station at a cost of Rs. 21·72 crores was issued in December, 1959. Most of the working drawings, part of the steel requirements and components of the first unit of the power station have been received from the Soviet suppliers. Civil works connected with the power station are in full swing. According to present expectations, the first Unit of the power station would be commissioned by September, 1961 and the entire power station by the end of 1962.

10. **Scheme for the production of Fertilizers.**—Government sanctioned in October, 1959, the setting up of a Fertilizer Plant at Neyveli for the production of 1,52,000 tons of Urea, with a Nitrogen content of 70,000 tons per annum, at an estimated cost of Rs. 26·10 crores. Contracts for the supply of equipment and machinery for the plants were concluded with Messrs. Pintsch-Bamag Linde, German firms, and Messrs. Ansaldo, an Italian firm. Preparation of civil engineering drawings in respect of the plant has been undertaken and civil works connected with certain items, in respect of which drawings had been finalised, are in progress. Work on the extension of the railway siding to the site of the Fertilizer Plant is also in progress. According to present expectations, the plant would start production of Urea by the middle of 1963.

11. **Scheme for Briquetting and Carbonisation.**—On the basis of global tenders received by the Corporation and the need to phase the foreign exchange expenditure suitably, the matter is under consideration. Meanwhile, lands required for the scheme are being acquired.

12. **Clay Washing Plant.**—Government sanctioned the establishment of a clay washing plant at Neyveli at a cost of Rs. 14·30 lakhs. A contract for the supply of the Plant has been concluded with Messrs. Dorr Oliver (India), Bombay. Civil works would commence shortly.

13. **Total cost of the Integrated Project.**—The original estimated cost of the Integrated Project, as included in the Second Five Year Plan, was Rs. 68·90 crores. With the conclusion of the contracts for the supply of plant and machinery for the thermal power station, fertilizer plant and the clay washing plant and having regard to the estimated cost of the Briquetting and Carbonisation Plant, the total cost of the Project is likely to go up to Rs. 94 crores.

14. **Recruitment and Training.**—Recruitment and training of technical staff required for the Project proceeded satisfactorily. Training of the operating crews for the large bucket wheel excavators and spreader remained in progress. Necessary training is being provided in brazing of the teeth of excavators as also in vulcanising of belts. Three civil engineers of the Corporation were deputed in September, 1958, for training in the latest method of opencast mining in the Institute of Opencast Mining at Freiburg in the German Democratic Republic, under the scholarship scheme of that Government for a period of 3 years. 18 officials of the Lignite Corporation and 3 officers of the Central Water and Power Commission returned from U.S.S.R. in August, 1960, after undergoing training for a period of nine months in the operation and maintenance of the thermal power station. The first batch of personnel selected for training in the design, erection, operation and maintenance of Urea producing plants left for Italy and West Germany during the second week of June, 1960, for training in the works of Messrs. Ansaldo and Pintsch-Bamag-Linde, the suppliers of the plant and machinery for the fertiliser unit. The technical staff required for the fertiliser scheme are being trained in batches in the Sindri Fertilizers and Chemicals Limited as well. An Assistant Executive Engineer and two Laboratory Assistants are undergoing training in briquetting and carbonisation of lignite in Australia under the Colombo Plan. Similar training was arranged for three other officials in Germany under the United Nations Programme. The Accounts staff required for the Corporation are being trained at Hindustan Aircraft Limited, Bangalore.

15. **General.**—Out of 26,750 acres of land required for the project, a total of 11,398 acres was acquired up to the end of December, 1960. Rehabilitation of displaced persons went on side by side with the acquisition. Up to the end of December, 1960, 3,090 acres of forest area had been cleared and house sites allotted to 982 families. However, only 502 displaced families moved to the three rehabilitation colonies of New Kooraipettai, M. Parur and Karamangudi. Agricultural lands to the extent of 786 acres were allotted to the displaced persons up to the end of December, 1960. Civic amenities, such as formation of roads, provision of drinking water and street lighting, were also provided in the rehabilitation colonies.

16. During 1960-61, the Corporation undertook construction of residential and non-residential buildings in the Neyveli township at a cost of Rs. 3:46 crores. Out of 5,507 quarters targeted to be completed by the end of March, 1961, 5,226 had been taken up by the end of December, 1960, of which 2,747 have been completed. Work on some of the non-residential buildings such as Main Police Station, Reading Room, Central Post and Telegraphs Office and Hostel for Bachelor Employees was completed, while work relating to Auditorium, Visitors' Hostel and Nurses' quarters in General Hospital was nearing completion.

17. The Corporation provided various amenities to their employees during the year. Medical benefit rules for the employees were framed. The Employees Co-operative Stores continued to cater satisfactorily to the household requirements of the Project staff. During the year, 4 additional branches of the Stores were opened. The Stores opened a Dairy Farm during the year. The Health staff continued to pay special attention to the environmental hygiene of the colony. A dispensary was opened in the Township. One more Medical Officer joined duty, bringing the total number to 4 Medical Officers, excluding the Chief Medical Officer. Hindi classes continued being conducted by the Corporation for the benefit of the employees. One more elementary school was opened in the Township, bringing the total number to 3. Two Nursery schools were also opened.

18. **Palana Lignite.**—The Committee of Experts, which was constituted by the Government of India in 1958, to study the available data on the Palana Lignite deposits with a view to finding out the feasibility and economic viability of mining the lignite there by improved methods, submitted its report in August, 1959. A copy of the report was furnished to the Government of Rajasthan, conveying the Government of India's acceptance of most of the recommendations contained therein with the suggestion that the project be got included in the State's Third Five Year Plan. The State Government are taking necessary steps to implement the scheme during the Third Plan period.

CHAPTER III

MINES AND MINERALS

Production of important minerals.—The following are the figures of production of some of the important minerals during the years 1958, 1959 and 1960.

Minerals	Unit of quantity	1958	1959	1960
Iron ore	Tonnes	6,129,706	7,982,000	10,596,000
Manganese ore	Tonnes	1,276,095	1,187,433	1,150,000
Copper ore	Tonnes	411,471	403,711	448,000
Lead concentrates	Tonnes	5,341	6,488	6,245
Zinc concentrates	Tonnes	71,391	9,978	9,787
Gold	Kilograms	5,291	5,144	4,995

Iron ore.—The production of iron ore has shown an upward trend. This was due to the increasing demand within the country for consumption in steel plants as well as increased external demand. Capacity has already been installed to achieve the target of 12·5 million tons annually determined for the II Five Year Plan.

Manganese ore.—The fall in production is mainly due to lack of external demand. However, as the export trade appears to be gradually picking up and the demand for manganese ore in the indigenous ferromanganese industry is showing an upward trend, the production of manganese ore can be expected to rise in the future. Installed capacity in the country will permit production of the II Plan target of 2·5 million tons when demand of this order develops.

Copper ore.—The higher output of copper ore during the year was due to the expansion of the milling and crushing capacities of the plants at Mosaboni Copper Mines as well as due to the installation of a new grinding section.

Lead concentrates and Zinc concentrates.—The production of lead and zinc concentrates was considerably affected during the first quarter of 1960 due to alterations in the mills at the Zawar Mines. Production in 1961 is however, expected to increase considerably when the mining and milling capacities of the Zawar Mines are expanded, arrangements for which are in train.

Gold.—The fall in the output of gold was due to mechanical difficulties in two of the mines. The serious rock bursts in Mysore mine in June, 1960 and labour difficulties also hampered production to some extent. Grade of ore was also a contributory factor during the period. Efforts are already under way to prove larger reserves of ore in other horizons.

2. **Mineral Advisory Board.**—The eighth meeting of the Mineral Advisory Board was held at Bhopal on the 3rd August, 1960. Among the important items discussed at the meeting were the Report of the Mineral Beneficiation Committee, proposals for amendments to the Mines and Minerals (Regulation and Development) Act, 1957 and the Mineral Concession Rules, 1949.

3. The third meeting of the Mica Sub-committee of the Mineral Advisory Board was held at Jaipur on the 24th April, 1960.

4. **National Mineral Development Corporation Ltd.**—The National Mineral Development Corporation Ltd. was set up on the 15th November 1958, with an authorised capital of Rs. 15 crores to undertake the exploitation of minerals in the public sector, excluding oil and natural gas and coal. The Board of Management of the Corporation consists of 13 directors, of whom two are non-officials. During the year, the Board held 12 meetings. The first Annual General Meeting was held on 15th December, 1959 and the second Annual General Meeting is proposed to be held towards the end of March, 1961.

5. The Corporation has been entrusted with two projects for the present, the Kiriburu Iron Ore Project and the Panna Diamond Project.

6. **Kiriburu Iron Ore Project.**—This Project envisages the development of the Kiriburu Iron Ore Mines in Bonai Range of Keonjhar and Singhbhum Districts in Orissa and Bihar. The project has been undertaken for the supply to Japan of approximately two million tons of iron ore per annum on a long term basis from 1964 onwards, under an agreement reached between the Governments of India and Japan in March, 1958. This project is incidentally a part of a development project which envisages the construction of a railway line from the mine to Vishakapatnam and the expansion of port and harbour facilities at Vishakapatnam. A loan of 20 million U.S. Dollars has been secured from the U.S. President's Asian Development Fund for the execution of the project. The Government of Japan have also undertaken to provide yen credit equivalent to 8 million U.S. dollars for purchase of machinery and other materials from Japan.

7. Government have already sanctioned the scheme of mining on the basis of a Project Report submitted by the Japan Consulting Institute who are the consultants for the Project. The Project authorities have made substantial progress in the arrangements for commencing mining operations in early 1963. The base camp at the project site was completed in November, 1960 with 49 pucca quarters and other hutments. An eight mile road from the nearest town and marketing place of Barbil has been constructed. Other link roads have also been laid. The project has been connected by trunk telephone lines and a 25-line internal telephone exchange has been established. Work has been started departmentally as well as through contractors, to remove the over-burden estimated at 2,00,000 cubic metres for opening up the mining faces. Arrangements have been made with the Directorate General of Supplies and Disposals for inviting global tenders for supply of machinery and equipment. Contracts have been awarded for civil works relating to construction and installation of machinery for crushing plants, screening plant etc. and for water supply scheme. Survey has been completed for the township comprising an area of 200 acres with six hundred residential units. Arrangements have been made for obtaining power supply by April, 1961 and meanwhile electricity is being produced by diesel generating sets. The construction of a building for the training institute has been completed for training the technical personnel required for the project. Amenities such as elementary schools, hospital, bus service to the nearest railway station, co-operative society for supply of milk and foodgrains have been provided for the benefit of the employees.

8. **Panna Diamond Project.**—The Corporation has secured an area of 26·74 sq. miles under prospecting licence from the Madhya Pradesh Government. Prospecting operations were started in April, 1960 and are continuing. It is proposed to mechanise the operations as soon as the necessary machinery and equipment, for which orders have been placed, become available. The results obtained so far have been fairly encouraging. A detailed scheme for exploitation will be drawn up after the prospecting operations are completed. It is also proposed to undertake prospecting in additional areas.

9. The Chairman of the Corporation and the Chief Engineer of the Project visited the diamond mines in Tanganyika in August, 1960 to study the working of mechanised mining.

10. **Budget.**—A sum of Rs. 40·53 lakhs was invested by Government in the share capital of the Corporation during 1959-60. The Revised Estimates for 1960-61 are Rs. 150 lakhs and the Budget Estimates for 1961-62 are Rs. 400 lakhs, out of which Rs. 200 lakhs will be in the form of a loan and the balance for investment in the share capital.

11. **Orissa Mining Corporation Ltd.**—The Orissa Mining Corporation Ltd. was set up in May 1956 as a joint venture of the Central and Orissa State Governments, with an authorised capital of Rs. 50 lakhs, which is held in equal proportion between the two Governments. The paid up capital is Rs. 15 lakhs.

12. The Corporation is managed by a Board of Directors of seven, of which, the Chairman and three directors are appointed by the President and the remaining three by the Government of Orissa. The Fourth Annual General Meeting of the Corporation was held on the 31st December 1960. The profit and loss account shows a net profit of Rs. 15,724 for 1959-60 after making provision for taxation.

13. The Corporation started working two mines in June-July, 1957 and a third mine was started in January, 1960. The production of iron ore from these mines is shown below:—

1957-58	..	32,224 tons
1958-59	..	47,450 tons
1959-60	..	48,803 tons
1960-61 upto Dec. 1960	..	47,631 tons

14. The Corporation has been granted further mining leases for iron and manganese in Bonai area and prospecting licences for iron ore, manganese and chromite. Prospecting operations are being organised. Chromite production is expected to commence during next year (1961-62). A programme of development by the Corporation during the Third Plan period has been drawn up. The minimum programme envisages a target of 8 lakh tons of iron ore, 25,000 tons of chromite and 20,000 tons of manganese by the end of the Third Plan. There are also possibilities of acquiring more leases and raising the targeted production.

15. The Corporation has secured from the State Trading Corporation, a contract for 50,000 tons of iron ore on F.A.S. Calcutta basis for disposal of its Sakradihi ore.

16. The Budget Estimates for 1961-62 envisages investment of Rs. 6 lakhs by the Government of India in the share-capital of the corporation.

17. **Sikkim Mining Corporation.**—The Sikkim Mining Corporation was set up on the 27th February, 1960 by a proclamation of the Sikkim Darbar for developing the deposits of copper, lead, zinc and other minerals in Bhotang and other places in Sikkim. The authorised capital of the Corporation is Rs. 1 crore divided into 1 lakh fully paid up shares of Rs. 100 each of which 51 per cent of the shares will be held by the Sikkim Darbar and 49 by the Government of India, with option for purchase of further shares by the Sikkim

Darbar. The Corporation is managed by a Board of Directors of five including the Chairman. The Chairman and one of the directors are nominated by the Government of Sikkim and the remaining three directors are nominated by the Government of India. During the year, the Board held five meetings.

18. The Government of India have so far invested Rs. 4·9 lakhs in the share capital of the Corporation. It is proposed to invest an additional sum of Rs. 2·45 lakhs in the share capital during 1960-61. The Budget Estimates for 1961-62 are Rs. 13·965 lakhs out of which Rs. 10·29 lakhs will be for purchase of shares and Rs. 3·675 lakhs by way of loan.

19. On the basis of a Project Report prepared by the Indian Bureau of Mines, the Corporation has commenced work for the exploitation of the copper-lead-zinc deposits in Bhotang. The production at the rate of 100 tons of ore per day and processed upto the stage of marketable concentrates, is expected to start from December, 1961. The Corporation has already completed the preliminary arrangements in this connection. Necessary mining lease has been obtained and aluminium structures have been erected for residence and office purposes pending finalisation of the plan for township. Tenders have been invited for machinery and plant and orders have been placed for some of the items.

20. **Modification of Mining Leases.**—The Controller of Mining Leases had been appointed in 1956 to modify the mining leases granted prior to 25th October, 1949 so as to bring them into conformity with the provisions of the existing Act and Rules. The Controller received 445 cases for registration during the year, bringing the total number of cases registered upto December, 1960 to 2,750. Out of these, final orders have been passed on 1,169 cases. 1,290 cases were filed as these did not call for any modification. The number of cases pending for disposal as on 31st December 1960 was 291.

21. **Khetri-Daribo Copper Projects.**—Arrangements are being made to take up the exploitation of Copper deposits in Khetri and Daribo which lie in the Jhunjhunu and Alwar Districts of the State of Rajasthan. These projects have been included in the Third Five Year Plan. The Projects envisage production of copper of an approximate quantity of 11,500 tons per annum, 10,000 tons from Khetri and 1,500 tons from Daribo. The Indian Bureau of Mines have already proved through drilling and exploratory mining, enough reserves of ores to sustain the production mentioned above. There is prospect of further ore reserves being proved. Enquiries have been addressed to reputed firms in India and abroad for consultancy services for exploitation of

the Khetri deposits which envisages mining, milling, smelting and electrolytic refining. It is expected that the project report for Khetri would be available in 1961 and actual production of metal would commence by the end of 1963. In the case of Daribo, a project report is proposed to be prepared by the Indian Bureau of Mines for mining and ore-dressing with a view to start production of concentrates from 1963.

22. **Beneficiation of Low Grade Manganese Ores.**—The scheme for setting up manganese beneficiation plants in different parts of the country has been included in the Third Five Year Plan. Pilot plants tests are already under way in the National Metallurgical Laboratory in Jamshedpur and in the Laboratory of the Indian Bureau of Mines at Nagpur. A sum of Rs. 14·52 lakhs has been provided during the current financial year for this purpose. Based on the results obtained in the pilot plant experiments, a project report for setting up beneficiation plants is expected to be prepared by the end of December, 1962. Low grade ores have no markets at present but beneficiation will make them marketable resulting in the avoidance of the present wastage and also in conserving mineral wealth of the country.

23. **Bailadila Iron Ore Project.**—This is another scheme included in the Third Five Year Plan. The Project envisages the development and working of the iron ore deposits in Bailadila in Madhya Pradesh. It has been undertaken in pursuance of an agreement reached between the Governments of India and Japan in March, 1960 for supply to Japan iron ore of approximately 4 million tons per annum from the year 1966 for a period of 15 years, in the first instance. Japan has agreed to make available Yen credit of an equivalent of Rs. 10 crores for the purchase of machinery and plants for the project from abroad. The Indian Bureau of Mines is at present carrying out exploratory work in the area and a mining scheme will be prepared after this is completed. A project report is expected to become available by December, 1962 for commencing production from the latter half of 1965.

24. **Utilisation of Iron Ore Fines Committee.**—A committee was set up in June, 1960 to study the problem of utilisation of iron ore fines in all its aspects. The first meeting of the Committee was held on 20th July, 1960, when it was decided to collect necessary data in this connection and to carry out some tests. This is being done and the Committee will meet again as soon as enough data and test results become available.

25. The Mineral Concession Rules, 1960, promulgated under the Mines and Minerals (R & D) Act 1957 came into force with effect from the 26th November 1960.

26. **Review Applications.**—During the year 1960, 201 applications were received under Rule 57 of the Mineral Concession Rules, 1949, for review of the orders passed by the State Governments, as against 221 applications in 1959. 204 applications were decided as against 245 applications decided during 1959. The figure of 204 includes applications received prior to 1st January 1960 and decided during this period

Chapter IV

INDIAN BUREAU OF MINES

The Indian Bureau of Mines continued its work relating to the inspection of mines, mineral exploration and beneficiation, research and analysis, compilation and publication of mineral statistics and advising Government and private agencies in regard to various matters pertaining to the mining industry.

2. **Mines Control and Conservation of Minerals.**—During the period under review, 577 mines were inspected in various states as against 511 mines inspected during 1959, with a view to ensuring the systematic development of mineral deposits, the elimination of avoidable waste, and promotion of improved methods of mining.

3. **Mineral Beneficiation and Technology.**—Apart from analytical work on a large number of samples, qualitative and quantitative determination of constituents of ores and minerals was carried out. Experiments on beneficiation on the following low grade ores were also conducted:

1. Manganese ore from Chorbaoli Forest, Bombay.
2. Chrome ore from Powni, Nagpur.
3. Graphite from Chikhlar mines, Betul District, M. P.
4. Graphite from Bombyar, Uri Tehsil, Kashmir.
5. Manganese ore from Garividi, Andhra Pradesh.
6. Barytes from a firm in Vijayawada, Andhra Pradesh.
7. Sillimanite-graphite-quartz schist from Mannahali, Gopalpura, Mysore.
8. Kyanite from Mysore.
9. Manganese ore from Supa Petha, South Kanara, Mysore.
10. Pyrites from Amjore, Bihar.

A field laboratory for analytical work was set up at Khetri. The installation of a pilot plant for beneficiation of low grade copper ore at Daribo and another for beneficiation of low grade manganese ore at Nagpur has practically been completed. A new method for complexometric titration of lead and zinc in polymetallic ores was standardised. Research reports on the scattering factors for carbon, nitrogen, oxygen, chlorine, bromine, iodine, potassium, sodium, hydrogen,

phosphorus, copper, sulphur, cobalt and manganese atoms were prepared.

4. **Mineral Economics.**—Compilation and interpretation of mineral statistics, collection and dissemination of mineral information and scrutiny of mineral concession cases were carried out. Various periodical returns and notices received under the Minerals Conservation & Development Rules, 1958 were compiled and processed, and various measures were taken to ensure timely submission of these returns. The annual publication "Mineral Production in India 1958" (English Edition), "Mineral Production in India 1956" (Hindi Edition) and the publication "Base Metals in India" were published.

5. **Mineral Exploration (Prospecting, Mining and Drilling).**—Detailed exploration for the following minerals at the places marked against each was carried out during the period under review:—

1. COAL	(*a*) Korba M. P.
	(*b*) Bisrampur, M. P.
	(*c*) Chirimiri, M. P.
	(*d*) Sohagpur, M. P.
	(*e*) Sonhat, M. P.
	(*f*) East Bokaro, Bihar.
	(*g*) Karanpura, Bihar.
	(*h*) Talcher, Orissa.
2. COPPER. .	(*a*) Daribo, Rajasthan.
	(*b*) Pratapgarh, Rajasthan.
	(*c*) Khetri, Rajasthan.
	(*d*) Kolihan Rajasthan.
	(*e*) Gani, Andhra Pradesh.
3. LIMESTONE .	Morni Hill, Punjab.
4. WOLFRAM . .	Degana, Rajasthan.
5. DIAMOND . .	Panna, M. P.
6. LIGNITE . .	Nichahma, Kashmir.
7. PYRITES . .	Amjore, Bihar.
8. IRON ORE . .	(*a*) Kiriburu, Orissa.
	(*b*) Gandhiburu Orissa.
9. MAGNESITE .	Almora, U. P.
10. APATITE . .	Singhbhum, Bihar.

The drilling carried out so far with respect to various minerals and the reserves proved are indicated below:—

Area	Total drilling upto the end of 1960 (in metres)	Reserves proved so far
A. COAL		
1. Korba	73,218	337 million tonnes
2. Bisrampur (Blocks I, II & A)	20,591 (operation in blocks II & A completed)	99 Do.
3. Chirimiri	18,154	65 Do.
4. Kotma	24,733	53 Do.
5. Bijuri	9,018	16 Do.
6. Gohirani	229	..
7. Sonhat	5,843	17 Do.
8. Gidi	3,818 (operations completed)	16 Do.
9. Bhurkunda	16,233	28 Do.
10. South Bhurkunda	4,014	..
11. Chordhara	15,802	63 Do.
12. Bachra	852 (operations completed)	..
13. Pinderkom Ganeshpur	4,479 (operations completed)	41 Do.
14. East Bokaro	40,533	351 Do.
15. Talcher	14,843	280 Do.
16. Giridih	3,828 (operations completed)	17 Do.
17. Chanu -Rikba	97	..
B. COPPER		
1. Daribo	3,986	..
2. Pratapgarh	440	..
3. Kolihan	801	..
4. Khetri	7,007	28·4 million tons of 0·8% Cu or 9·2 million tons of 1·5% Cu or 2·6 million tons of 2·5% Cu
5. Gani	1,419	..

Area	Total drilling upto the end of 1960 (in metres)	Reserves proved so far.
C. PYRITES		
Amjore	4,639	75·8 million tons (assaying 38 to 40 % sulphur)
D. IRON ORE		
1. Kiriburu	1,782 (operations completed).	66·16 million tons of 63·35% Fe
2. Gandhiburu	771 (operations completed)	22·08 million tons of 62·35% Fe
E. MAGNESITE		
Almora	1,571 (investigation completed)	*3·4 million tons of average and low grade.
F. LIMESTONE		
Morni Hills	349	..
G. WOLFRAM		
Degana	585	..
H. DIAMOND		
Panna	192	..
I. LIGNITE		
Nichahma	197	..

*This figure indicates the reserves proved in Agar-Girichina Sector. Reserves proved in other sectors are under compilation.

6. All sections of the Indian Bureau of Mines except a portion of the Workshop & Central Stores and Laboratory were shifted to Nagpur. The shifting of these latter will also be completed as soon as the building under construction at Nagpur is ready. A regional office of the Indian Bureau of Mines was opened at Jammu.

7. The operations for proving reserves of coal in the existing areas will be continued and, in addition, other Blocks will also be taken up.

8. Proving operations at Daribo, Khetri, Gani, Pratapgarh, Kolihan, Morni Hills, Degana, Nichahma, Bailadila and Singhbhum already in hand, will be continued during the year 1961-62. Fresh investigations for proving copper at Rakha and Jodhawas Akwali section of Khetri copper district, for gold at Ramagiri, for gypsum at Baramula, for pyrites at Taradevi, for silver at Uchich, for iron ore at

Sasangda, for asbestos in Rajasthan and for important occurrences of bauxite in the country are expected to be taken up during 1961-62.

9. The estimates of expenditure relating to the Standing Charges of the Indian Bureau of Mines were reviewed. The Bureau is an expanding organisation and has to keep pace with the progressively increasing demands on indigenous mineral resources of the country. There is, therefore, hardly any scope for reduction of expenditure in the Standing Charges of the Bureau.

CHAPTER V

GEOLOGICAL SURVEY OF INDIA

Arrangements were made for further strengthening the various existing units and setting up of new units to cope with the increasing volume of work.

2. The new schemes launched by the Geological Survey of India, such as the training of University Staff to improve the standard of field training in the Indian Universities and the training of the Post-graduate students along with the newly recruited officers of this Department were continued. Arrangements were made to train officers of the State Governments in view of the recommendations made by the Zonal Councils of the Mineral Advisory Board and requests received from the State Governments. Under the Colombo Plan two scholars from Indonesia and one from Phillippines received training under this organisation. The scheme for making laymen mineral conscious has made considerable progress and is being implemented on a wider basis. Besides lecture tours, summer schools were also arranged under this scheme to give a course of lectures on geology at Gram Sevak Sanghs, and Extension Training Centres.

3. The Base Metals Unit of this Department which was set up last year to accelerate the exploration for base metal mineral deposits in the country, has now a complement of 51 field officers.

4. **Geological Mapping.**—Systematic regional mapping was carried out in Andhra Pradesh, Assam, Bihar, Bombay (Maharashtra and Gujarat), Jammu & Kashmir, Kerala, Madhya Pradesh, Madras, Mysore, Rajasthan, Punjab, Uttar Pradesh and Himachal Pradesh on the scale of 1:63,360 (1 inch: 1 mile) covering an area of 14,300 sq. kilometres. Traverse mapping was undertaken in Garhwal and Tehri Garhwal (U.P.), Mandi (H.P.) and Kangra (Punjab), covering about 832 sq. Kilometres.

5. Large scale mapping of 3,886 sq. kilometres was undertaken in the important mineral belts of Andhra Pradesh, Bihar, Bombay (Maharashtra and Gujarat), Jammu & Kashmir, Madhya Pradesh, Madras, Mysore, Andaman & Nicobar Islands and Manipur.

6. **Mineral Investigation.**

Coal.—Drilling for coal was carried out in the following blocks of the Karanpura coalfield:—Sayal 'D' (88:33 metres), Gidi 'C' (1369·47 metres), Jainagar (31·00 metres) and Urimari (183·2

metres), Ramgarh Coalfield, Bihar (329·29 metres). In Jharia coalfield, a depth of 28·78 metres was drilled near Sudamdih, and drilling at Kirkhend was completed at a total depth of 1,196·64 metres after drilling 175·56 metres during the year. In the Singrauli coalfield, Madhya Pradesh, a total of 769·39 metres were drilled to ascertain the extension of the Purewa and Turra coal seams. Drilling operations were continued in the Pench-Kanhan Valley coalfield, Madhya Pradesh (88·96 metres), Raniganj coalfield, West Bengal (1,433·72 metres), Kalakot coalfield, Jammu & Kashmir (619·96 metres) and in Kulti Nawda and Salanpura areas, West Bengal (965·3 metres).

Reserves of coal established are Sayal 'D'—510 million tonnes; Gidi 'C'-138·72 million tonnes; Singrauli coalfield—689 million tonnes and Raniganj coalfield—55 million tonnes.

Copper.—Large scale mapping along with drilling for verifying the geophysical anomalies was continued in Khetri, Rajasthan. A depth of 116·3 metres was drilled in the area. Several thin zones totalling about 10·8 metres in width, containing some copper sulphide were met with.

Large scale mapping of the area near Dhanota, Rajasthan was completed and 139·42 metres of drilling was carried out in two bore holes. Drilling in the Nagel mine area of Pratapgarh, Alwar, Rajasthan, was continued in collaboration with the I.B.M. Detailed geological mapping was continued on aerial photographs and 44·03 sq. kms. more were completed in Thanagazi area, Rajasthan. Detailed mapping in the Mathoka and Kalajoda area in Alwar, Rajasthan, was commenced.

Drilling investigations were continued in the Mahuldih area, Singhbhum District, Bihar, and a total of 409·59 metres was drilled during the period in two bore holes. A number of thin zones showing disseminations of copper sulphide were met with in both the holes.

Large scale mapping and drilling investigations were continued at Mundatikra, Bastar District, Madhya Pradesh, and 285·293 metres were drilled in two holes. In one of the boreholes, pyrite disseminations were met with.

Drilling investigations to trace the extension of the mineralization met in the earlier drill holes were continued in Gani area, Kurnool district, Andhra Pradesh. Detailed mapping of Ramallakotta-Veldurti area was completed, while the geochemical sampling of the eastern end of Gani copper workings was continued.

Drilling investigation was commenced and a total of 18·58 metres was drilled in three holes in Ramsu area, Doda Distt., Jammu and Kashmir State.

Large scale mapping along with geochemical prospecting and exploration by pitting, trenching and sampling of the lead and copper deposits were continued in Dewal-thal, Rain-Agar, Ganai-Gangoli and Shishkhani-Balaldeo area of Almora district, U.P. Agnigundala, Guntur District, and Garaminipenta, Nellore Distt. in Andhra Pradesh; Kalyadi, Hassan Distt., Mysore; Teejanval mine area and Narnaul and Kangra area in Punjab; Sindh valley area, Assar-Bardhwab areas in Jammu and Kashmir; and in the western extension of Rajdah of the Mahuldih area, Singhbhum District, Bihar, while the investigations were commenced at Dhanpur and Pokhri area of Chamoli District, Uttar Pradesh. Preliminary investigations of the reported occurrence of copper and lead desposits in parts of Jaipur, Rajasthan and in adjacent Mahendergarh District, Punjab and in the Simla-Basantpur area, Simla District, Himachal Pradesh were carried out

Lead and Zinc.—Detailed large scale mapping was continued in Zawar area, Udaipur District, Rajasthan. Regional and large scale mapping in Chalima area, Kurnool District, Andhra Pradesh were taken up. A total of 21·64 metres was drilled during the year for galena in the neighbourhood of Poradiha in Mayurbhanj District, Orissa. Preliminary investigations for lead ore were carried out near village Binjam, Dantewara Tehsil in Bastar District, Madhya Pradesh.

Nickel.—Detailed geological mapping and prospecting by trenching and pitting were continued in Moreh area in Manipur and 152·40 metres of drilling was carried out.

Gold.—Detailed geological mapping was completed along the northern extension of the Gadag gold belt, Dharwar District, Mysore. A few auriferous quartz veins were traced. Drilling investigation was continued in the Kolar Gold Field and a depth of 50·13 metres was drilled in three holes. Two sulphide bearing lodes were encountered, but the gold values were low. Large scale mapping along the southern extension of Champion lode and old Harvey, Cock-Burn shaft areas was completed.

Chromite.—Detailed mapping and bulk sampling of the chromite deposits near Byrapur, Mysore State and Vagda, Ratnagiri District, Maharashtra, were continued.

Iron-ore.—Detailed mapping and sampling were continued in Bastar District, Madhya Pradesh and Khammam District, Andhra Pradesh. Some good quality iron-ore bodies were located in the

former area, while the presence of three new deposits of low grade haematite came to light in the latter.

Gypsum.—Detailed geological mapping of an area of 375·907 sq. kms. was completed in the Nagaur area, Rajasthan. A total of 1013·763 metres was drilled during the period. The main gypsum bed varying in thickness from 4·572 to 13·716 metres was encountered in all the holes establishing the continuity of the main gypsum bed in the area covered by these holes. The reserves in the area are estimated to be of the order of 800 million tonnes.

Bentonite.—Reserves of about 10 million tonnes of bentonite clay were established in the Barmer area, Rajasthan. It is found to be eminently suitable for bleaching crude petroleum and vegetable oils, after activation.

Limestone.—Sampling and mapping in the Rohtas limestone area, Shahabad District, Bihar, for flux-grade limestone were continued and three bands of flux-grade limestome were located.

Magnesite.—Systematic and detailed mapping was carried out in Salem Magnesite belt, Madras State. The deposits were found to extend to a depth of 30·48 metres, with a progressive improvement in quality.

7. *Geophysical Investigations.*—Gravity and magnetic surveys of the sedimentary areas of the east coast belt, Madras, manganese deposits in Srikakulam District,, Andhra Pradesh and chromite deposits of Byrapur area, Hassan District, Mysore; electrical and magnetic surveys for copper ore in Singhbhum District, Bihar, in Khetri copper belt, Rajasthan, in Danta Taluk, Banaskantha District, Gujarat, and for sulphide ores in Kolahalu area, Chitaldrug District, Mysore; electrical investigations for graphite deposits in the Trivandrum District, Kerala; magnetic investigation of the Pench-Kanhan-Valley coal fields, Madhya Pradesh; reflection, refraction and seismic investigations for groundwater in Bhagalpur alluvial embayment, Bihar, and for possible petroliferous structures in Kutch, Gujarat; electrical, magnetic, gravity investigations for galena in Hendua, Porapahar and adjoining areas in Palamau District, Bihar; electro-magnetic and magnetic surveys of the mineralized zones (for galena) in the great limestone belt of Riasi Tehsil, Jammu and Kashmir State, were undertaken.

8. Electrical investigations for graphite in the Vellanad area, Trivandrum District, Kerala, indicated a number of anomaly zones. Two trial pits sunk in the anomaly zones indicated the presence of high grade graphite.

9. **Engineering Geology and Groundwater.**—Advice was tendered on the geological aspects of different phases of investigations and constructional work relating to the following projects:—Bhakra and Beas dam projects, Punjab; Beas-Sutlej link project, Himachal Pradesh; Salal Hydel project, Jammu State; Jaldhaka and Teesta projects in West Bengal; Chandrapura thermal power station site, Bihar; Salia, Godohado, Ramnadi, Dhanai, Baghua and Balimela projects, Orissa; Leimatok and Thoubel Hydroelectric scheme, Assam; Koyna dam, Bombay; Nagarjunasagar dam project, Gogarbham, Peddavagu schemes, Adilabad District; dam sites across Kinnerasani river near Marrigundem and Yellambailu in Andhra Pradesh; Mestwa project, Gujarat; Idikki, Pamba and Kakki Hydel projects, Kerala; Kancha Harimpal, Barwaha Sagar and Parvati dam sites in Madhya Pradesh, Geological examination of Railway link between Bimlagarh to Kiriburu and about stability of the Press Building at Simla.

10. Groundwater investigations and exploration work were taken up in Assam, Andhra Pradesh, Gujarat, Madras, Madhya Pradesh, Kerala, Bihar, West Bengal, Orissa, Uttar Pradesh, Punjab, Rajasthan and Jammu & Kashmir.

11. **Earthquake Investigations.**—The Delhi Earthquake of the 27th August 1960 was investigated. The epicentre was found to be between Delhi Cantonment and Gurgaon and the intensity in this tract was about VII of the revised Mercalli scale. It was recommended that a seismic factor of 0·1 g should be provided in the construction of all multistoreyed and costly buildings in the Delhi area.

12. **Petrology Division.**—In addition to the identification of rocks and minerals for private parties and tests on specimens submitted by field parties, study of important minerals by X-ray and other optical methods, and study of rocks, minerals and ores by petrographic, chemical and ore microscopic methods were carried out. Research work was continued in the various laboratories of the Division.

13. **Palaeontology Division.**—In addition to the routine work of the division, collection of fossils was taken up from different fossil bearing localities like Pranihita Godavari basin, in Quilon and Warkalli beds in Kerala; quarternary beds of Ahmednagar District, Maharashtra; cretaceous beds of the Khasi hills, Assam; Marahom area and Kanewas of Kashmir; upper jurassic beds of Lapthal area of Garhwal; Gondwanas of Sonahat coalfield, Madhya Pradesh, etc. Research work was continued in the various laboratories of the division.

14. **Chemistry Division.**—Rocks, minerals and ore samples submitted by the various field parties of the department were analysed by using chemical, spectroscopic and rapid geochemical methods in addition to the research projects taken up by the division. Research work was continued in the various laboratories of the Division.

15. **Maps.**—The drawing office prepared during the period, maps, drawings, charts, sections etc. in addition to the routine work involving photography, process engraving, ferroprinting of plates, etc.

16. **Publication Division.**—The following publications were issued:—

Rec. G.S.I., Vol. 87, pt. 2.

Rec. G.S.I., Vol. 86, pts. 3 & 4.

"A Manual of Geology of India and Burma", Vol. II (3rd Edition).

Bulletin, Series, B. No. 9.

Indian Minerals, Vol. XIV, Nos. 1, 2 and 3.

17. **ECAFE.**—A delegate from the Department attended the ECAFE Conference held in Tokyo, Japan, in April-May 1960, when a draft copy of the mineral map of Asia and the Far East and the proof copy of the geological map of Asia and the Far East, both compiled by the Department, were presented. The final printed copy of the geological map of Asia and the Far East was submitted to the International Geological Congress held in August, 1960 in Copenhagen. These maps received high commendation both in Tokyo and Copenhagen.

18. **International Geological Congress.**—Two delegates from the Department attended the above Congress at Copenhagen. The Congress has accepted the invitation to hold its XXII Session in India in 1964.

19. The estimates of expenditure relating to the Standing Charges of the Geological Survey of India were under constant review. The Geological Survey of India is an expanding Organisation, in view of the stress on indigenous production of mineral requirements of the country, and there is hardly any scope for reduction of expenditure in the Standing Charges of the Geological Survey of India.

CHAPTER VI

PETROLEUM

Oil and Natural Gas Commission.—During the last field season (1959-60), the Oil and Natural Gas Commission had put 20 geological, 8 gravity-*cum*-magnetic and 9 seismic parties in the field. The geological parties completed about 3400 sq. miles of detailed mapping, about 2400 sq. miles of regional mapping and completed about 1300 miles of traverses in Gujerat, Rajasthan, Jammu and Kashmir, Punjab, U.P., Nepal, West Bengal, Andhra, Madras, Andamans and Kerala. The total area covered by the gravity-*cum*-magnetic parties was 16300 sq. miles. The seismic parties completed 1660 line miles of profiling. In the current field season (1960-61), the Commission put 18 geological field parties, 10 gravity-*cum*-magnetic parties and 12 seismic parties. The geological parties continued the surveys in the areas in which operations were carried out during the previous field season. The seismic parties will be operating in Gujerat, Punjab, U.P., Assam and Madras while gravity-*cum*-magnetic parties will work in Gujerat, Rajasthan, Punjab, U.P. Bihar, West Bengal, Andhra and Madras.

2. Drilling has been in progress at the various drill sites. In Punjab, Jawalamukhi Deep Well No. 2 was drilled to a depth of 1255 metres. A structural well to a depth of 939 metres was also drilled at Hoshiarpur (Mangerwal). Januari Deep Well No. 1 was spudded in on 10th October 1960. The depth reached on 13th February 1961 was 2280 metres. Drilling to explore the petroleum potentialities of the area is being continued.

In Cambay, where 12 (twelve) deep wells have been drilled and partially tested, the drilling and testing operations are continuing in two more wells, viz., Nos. 11 and 17. The dates of spudding of these wells were 17th September 1960 and 19th January 1961 respectively. The depth reached on 15th February 1961 in well No. 11 was 2981 metres and in well No. 17 was 1736 metres.

In Ankleshwar, where deep well No. 1 was found to be a producer, six more deep wells have been completed. Testing operations are in progress in two of these wells. The drilling work in this area is being intensified.

In Assam, Rudrasagar Well No. 1 was drilled down to a depth of 3817 metres. Oil was struck in one of the horizons in this well.

Arrangements for drilling another well on this structure are in progress.

In U.P., structural well No. 1 at Badaun was drilled to a depth of 1247 metres. Rig building at site No. 2 is in progress.

3. Thirty-nine officers of the Commission were deputed to foreign countries for training in different aspects of Geology, Geophysics and Drilling Engineering during the year 1960-61. About 49 trainees are proposed to be sent during the remaining part of the year 1960-61, mostly to Russia.

4. At the end of the year 1959-60, there were ten deep and three structural rigs operating in the various parts of the country. During the year 1960-61, orders for 6 deep rigs were placed which are all expected to be delivered soon. In addition, proposals to acquire 3 more deep drills are in an advanced stage of negotiation.

5. The West German Seismic team carried out seismic survey in U.P. and is presently operating in Bihar. The Commission entered into contract with Schlumberger Seaco Inc. for carrying out electrologging work at the various drill sites.

6. In September 1959, a high level conference between Soviet Experts and the officers of the Oil and Natural Gas Commission was held to assess the progress so far made in the oil exploration programme by the Oil and Natural Gas Commission, for discussing the ways and means of resolving the difficulties faced by the Commission regarding the supply of equipment and personnel by the U.S.S.R. and for chalking out the tentative programme for oil exploration in the Third Five Year Plan period. During the month of June, 1960, a delegation headed by the Minister, Mines and Oil, who is also the Chairman, Oil and Natural Gas Commission, visited Russia for negotiating purchase of additional rigs, equipment and spares. A delegation of two officers was sent to attend the International Hydrocarbon Convention and Exhibition held at Piacenza (Italy) during September, 1960. Another officer attended the Second Arab Petroleum Congress, Beirut in October, 1960 as an observer.

7. The Commission's present Third Five Year Plan envisages an outlay of Rs. 115 crores, the foreign exchange element of which is estimated to be about Rs. 53 crores. A major part of this will be met from the credit made available by the Soviet Government for oil exploration. It has been decided to review the oil exploration scheme every six months in accordance with the recommendations contained in para. 12 of the 55th Report of the Estimates Committee. A review for the half year ending 30th June 1960 has already been carried out.

8. **Indo-stanvac Petroleum Project.**—Exploration for oil under the Indo-Stanvac Petroleum Project, in which Government have 25 per cent interest, continued till the end of May, 1960 in the concession area of 10,000 sq. miles in West Bengal. The drilling of the eighth well at Port Canning as well as the ninth and the tenth test wells at Ranaghat II and Ghatal was completed. No oil or gas was encountered. The details of the wells drilled are as follows:—

Name of the Well	Date of spudding	Date of abandonment	Depth of the well drilled	Results
			ft.	
1. Port Canning	9-11-59	15-2-60	13,259 ft.	Dry and abandoned.
2. Ranaghat II	29-2-60	28-3-60	8,541 ft.	Do.
3. Ghatal	14-4-60	24-5-60	10,200 ft.	Do.

The contribution of the Government towards the project in 1960-61 is Rs. 8,96,974; including it, the total contribution of the Government now amounts to Rs. 1,84,25,795·00. The Project has been wound up.

9. **Proposals regarding Oil Exploration.**—Consequent on the decision of the Government of India to invite foreign oil companies to participate in the oil exploration activities of India, expression of interest was received from several oil companies. Subsequently, in response to a circular letter of the 18th May, 1960 requesting the oil companies to send specific detailed proposals on the basis of a questionnaire, such proposals have been received and are under examination.

10. **Oil India Private Limited.**—In Oil India (P) Ltd., Government hold one-third share and the Burmah Oil Company/Assam Oil Company two-thirds. The company was incorporated on 18th February 1959 for exploration and production of petroleum and crude oil (including natural gas) and for arranging for the construction in two stages and operation of a pipeline and other related facilities for the transport of crude oil from the Assam oilfields to the two Government refineries to be set up at Nunmati in Assam and Barauni in Bihar. So far, the Company has issued share capital of Rs. 21 crores of which Government contributed Rs. 7 crores. During 1960-61, a budget provision of Rs. 2 crores was made for investment in the share capital of O.I.L. out of which Rs. 1 crore has been paid. A plan allocation of Rs. 10·33 crores was made by the Planning Commission for investment in the share capital of Oil India (P) Ltd.,

during the Second Plan period. The Planning Commission has agreed to treat Government's contribution to share capital during 1961-62 as a spill-over since a sum of Rs. 8 crores only is expected to be utilised during the Second Plan period. A sum of Rs. 13·14 crores has been paid to Assam Oil Company by Oil India (P) Ltd. for assets and properties transferred to O.I.L. Up-to-date, 88 wells have been drilled by O.I.L. Commercial production of crude is expected to start by the end of 1961, when the Nunmati refinery is scheduled to come on stream.

11. **Pipeline Project.**—The Government of India accepted a loan of £3 million from the U.K. Government for the purchase of pipe and ancillary equipment in the U.K. by O.I.L. for their Pipeline Project. The B.O.C. have undertaken to give a loan of £20 million to O.I.L. to meet the foreign exchange expenditure on the Pipeline Project.

The Burmah Oil Company (Pipelines) have been entrusted with the work of designing and construction of the pipeline from Nahorkatiya to Barauni.

(a) About 84,000 tons of pipe will be required for the entire project. About 32,000 tons of pipe required for the first phase i.e. upto Nunmati have been received and placed in stock piles along the pipeline route ready for stringing. Construction of the pipeline has stated.

(b) Orders for pipe and ancillary equipment have been placed on the basis of competitive tenders.

(c) A total of 510 miles of pipeline route of 720 miles had been surveyed and demarcated by the end of September 1960. Arrangements for the acquisition of land in Assam have been finalised. Negotiations for the acquisition of land in Bengal and Bihar are in progress with the respective Governments.

(d) According to the Agreement between the Government of India and B.O.C. signed on 29th October 1959, the section from the oilfields to Nunmati is to be completed by the date on which Nunmati refinery is ready to receive crude oil or 1st April 1961 whichever date is later, and the remaining section between Nunmati and Barauni is to be completed by the date on which the Barauni refinery is ready to receive crude oil or by 1st April 1962 whichever date is later.

12. **Natural Gas.**—The Expert Committee on Nahorkatiya Natural Gas set up by this Department recommended the setting up of the

following projects to utilise the available associated natural gas from O.I.L. areas (estimate at 38 MMSCFD):

(i) A fertiliser plant to produce about 50,000 tons of Ammonium sulphate and 50,000 tons of urea annually;

(ii) A cement plant to produce about 300 tons of cement daily;

(iii) A power plant with an installed capacity of about 500,000 k.w.;

(iv) Gas distribution for domestic and industrial purposes in Assam;

(v) Furnace Black unit with a capacity of 10,000 tons yearly.

A synthetic rubber plant and a polyethylene plant have also been approved.

13. **Indian Refineries Limited.**

(a) **Numati Refinery.**—This refinery is scheduled to be completed by the end of 1961. The work on the refinery is proceeding in accordance with the time schedule. The entire land required for the erection of the refinery has been taken over by the Company from the Assam Government. The Company intend acquiring an additional area of about 380 acres for the township, water supply, effluent discharge, and any future expansions of the refinery. The technical designs for the refinery, received from Rumania, have been examined and finalised. Contracts for Civil engineering and Mechanical engineering works have been awarded to the contractors. The Company are executing the electrical engineering work themselves. A scheme for the water supply required for the refinery and the township has been prepared by the Company and approved by Government; the estimated cost for this is about Rs. 60 lakhs. The scheme envisages supply of water to the local Army and Railway authorities under a suitable payment arrangement. A scheme for the discharge of refinery effluents, at a cost of Rs. 20 lakhs, has been finalised; and is being executed.

Out of 17,000 metric tons of equipment and materials to be supplied by Rumanian Government organisation in terms of the Indo-Rumanian Agreement, about 14,339 metric tons have been received. In addition to the Supply and Technical Assistance Contract already concluded, an additional contract is proposed to be signed for the supply of items of equipment considered essential to strengthen the site for the erection of the refinery. The contract is expected to cost about Rs. 34 lakhs.

After completion of training in Rumania, 53 trainees have returned so far and have been employed on various construction jobs in the refinery. The Rumanian experts have also come to India to supervise the construction/erection works.

(b) **Barauni Refinery.**—This refinery is expected to produce 1 million tons by December, 1962 and the full two million tons by December, 1963. The land needed for this refinery and also the township has been acquired and taken over from the Bihar Government. The topographical survey and soil investigations have been completed and supplied to Soviet Designing Organisation. The detailed project report, evaluation of the Nahorkatiya crude and the working drawings have been received from U.S.S.R. These will be examined and finalised soon.

The Railway Colony at Hathidah has been taken over to accommodate the staff working at the site. Plans for building up of a 100 roomed hostel to accommodate the Russian technicians have been drawn up. Contracts for approach roads, peripheral roads, fencing around refinery, supply of building materials, stores yards and godowns have been awarded. The Bihar Government have arranged to supply electric power for construction purposes.

Based on the results of the investigations of the soil and other conditions and also the discussions with the Soviet experts, the Indian Refineries Ltd. have devised the steps necessary to strengthen the site, prevent flooding of the area by the river and provide for adequate drainage for the storm and rain water. A nucleus of senior staff, including a Chief Engineer required for the project has since been recruited and is in position.

Interviews for the selection of Indian trainees to be sent to Russia for training on erection, maintenance and operation of the refineries have already been completed and the first batch of 22 trainees will leave for Russia in April 1961.

(c) **Gujerat Refinery.**—Based on the tentative estimates of the extent of reserves of crude oil in Cambay/Ankleshwar regions, it is proposed to set up a conventional refinery, of a capacity of about 2 million tons per annum, with reasonable safeguards for expansion. A team of officials has visited the various possible areas of location in the State of Gujerat. The data collected by them on the various locations would be placed at the disposal of a technical committee to be appointed to select the actual site for the refinery.

14. **Lubricating Oil Plant Project.**—A proposal to establish a Lubricating oil plant project in the public sector with a capacity of about 100,000 tons per annum is at present under consideration.

15. **Existing Refineries.**—All the four existing refineries have been in full production during the year 1960. During 1960, the total crude throughput of the existing refineries increased by nearly half a million tons over the 1959 rate. Continuous efforts to maximise the yields of kerosene and diesel oil resulted in the output of kerosene being increased by 29 per cent and diesel oil by about 15 per cent over the 1959 level of production.

The Assam Oil Company and the Standard Vacuum Oil Company are producing Jute Batching Oil and the production of this item from these two refineries appear sufficient to meet the present demand for this product in the country.

The Burmah-Shell Refineries surrendered the duty protection on black oils and bitumen with effect from 1st July, 1959. The Caltex refinery have surrendered the duty protection on Motor Spirit with effect from 1st October 1959; and they are yet to surrender the duty protection which they are enjoying on other products. The Standard Vacuum Oil Refining Company have surrendered the duty concessions on Diesel and Fuel oils with effect from the 15th November 1960.

16. **Petroleum Supplies.**—Despite the foreign exchange difficulties, the supply position of petroleum products continued to remain satisfactory throughout the year under review and it was possible to meet all the demands for oil in the country. The fall in the c.i.f. value is again one of the contributory factors to help maintain these supplies.

17. **Indian Oil Company Ltd.**—The Indian Oil Company Ltd., a wholly Government undertaking with an authorised capital of Rs. 12 crores was incorporated on 30th June 1959 to enter into marketing and distribution of petroleum products in the country. This Company will take up at refinery points, the products of the two public sector refineries being set up by the Indian Refineries Ltd. (a public undertaking), one at Nunmati in Assam and the other at Barauni in Bihar. The Company will also handle part of imports of deficit petroleum products, such as kerosene and High Speed Diesel Oil.

On the basis of the Trade Agreement between the Government of the U.S.S.R. and the Government of India, signed on November 16, 1958, the Indian Oil Company entered into a contract with Messrs. Sojuznefteexport, Moscow, (Soviet Trade Organisation) for import of 1·5 million tons of petroleum products during a period of 4 years. This contract was entered into on 15th July 1960, at favourable prices against payment in non-convertible rupees. To the extent I.O.C. is able to import from the USSR, imports made by the private oil distributing companies involving direct expenditure of foreign exchange, will be reduced. The first shipment of oil from the USSR arrived towards the end of August, 1960.

18. **Prices of Petroleum Products.**—In October 1959, an *ad hoc* price agreement was reached with the Oil Companies, whereby the reduction offered by them had been mopped up by levy of Additional Duties (non-recoverable) and the ceiling selling prices for consumers as on 1st April 1959 remained unchanged. This Agreement expires on 31st March 1961, unless extended by mutual consent. In the meantime, the Government of India set up on 2nd August 1960 the Oil Price Enquiry Committee to examine the principles and elements according to which selling prices of various Petroleum products in India should be determined after April 1, 1961.

The report of the Committee is expected to be available by the end of May, 1961.

19. **Oil Advisory Committee.**—The Government of India decided to constitute a committee to advise on problems of common interest concerning petroleum products and, in particular, problems pertaining to pattern of demand, supply, distribution and consumption of these products. Resolution constituting this Committee was published on the 14th January, 1960. There are 17 members of the committee both from the Government and the Trade. The Chairman of the Committee is the Minister for Mines and Oil. The Committee has held a number of meetings and is currently examining various problems including forward estimates of consumption and imbalance between production and consumption.

20. **Research and Training Facilities in Petroleum.**—An Institute of Petroleum has been established, with the assistance from the French Petroleum Institute, under the control of the Council of Scientific and Industrial Research. It has also been decided to create a Training and Research Wing in the Oil and Natural Gas Commission.

APPENDIX I

List of subjects dealt with in the Department of Mines and Fuel

(*Vide para 2 of Introduction*)

1. Administration of the following offices:—
   (a) Office of the Coal Controller;
   (b) Geological Survey of India;
   (c) Indian Bureau of Mines; and
   (d) Controller of Mining Leases.
2. Production, supply, distribution and prices of coal and coke.
3. National Coal Development Corporation Ltd., Ranchi.
4. Indian Mining and Construction Co. Ltd., Calcutta, (In voluntary liquidation).
5. Coal Council of India.
6. Fuel Efficiency Committee.
7. Administration of the Coal Mines (Conservation and Safety) Act, 1952.
8. Administration of the Coal Bearing Areas (Acquisition and Development) Act, 1957.
9. Setting up of synthetic oil plant and low temperature carbonisation plants for the production of smokeless domestic coal.
10. Neyveli Lignite Corporation Ltd., Neyveli, and matters connected with the exploration of lignite deposits in other parts of India.
11. Coal Board, Calcutta.
12. Mineral Advisory Board and Regional Mineral Advisory Councils.
13. Orissa Mining Corporation Ltd., Bhubaneswar.
14. National Mineral Development Corporation Ltd., New Delhi.
15. Sikkim Mining Corporation.
16. Regulation of mines and mineral development under the Mines and Minerals (Regulation and Development) Act, 1957 and other Union laws including questions concerning various States and incidental business in respect of these, except regulation of labour and safety in mines.

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17. Production, supply, distribution and prices of petroleum and petroleum products.

18. Exploration for and exploitation of oil resources in India including the setting up of participatory projects, *e.g.*, Indo-Stanvac Petroleum Project, Oil India (Private) Limited, etc. and utilisation of Natural Gas and Refinery Gases.

19. Setting up of oil refineries in India.

20. Indian Refineries Ltd., New Delhi.

21. Production of refinery products by:

    (i) Standard Vacuum Refining Company, Bombay;

    (ii) Burmah-Shell Refinery, Bombay;

    (iii) Caltex Refinery, Vasakhapatnam; and

    (iv) Assam Oil Company Ltd., Digboi.

22. Setting up of lubricating oil plants.

23. Indian Oil Company Limited.

24. Utilisation of natural gas and establishment of industries based on natural gas and refinery by-products *e.g.*, petro-chemicals, fertilizers, power generation stations, etc.

25. Oil Advisory Committee.

26. Regulation of oil fields and development of mineral oil resources under the Oil Fields (Regulation and Development) Act, 1948 and rules made thereunder.

27. Oil and Natural Gas Commission; and administration of the Oil and Natural Gas Commission Act, 1959.

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